CHAPTER 7

ST. LUCIE COUNTY
COMPREHENSIVE PLAN

COASTAL MANAGEMENT ELEMENT

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St. Lucie County
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ST. LUCIE COUNTY
COASTAL MANAGEMENT ELEMENT

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INTRODUCTION

The statutory purpose of the Coastal Management Element is to plan for and, where appropriate, restrict development activities where such activities would damage or destroy coastal resources, and to protect human life and limit public expenditures in areas that are subject to destruction by natural disasters (Chapter 9J-5.012, Florida Administrative Code).

In order to meet this requirement the social, economic, and environmental features of the area were inventoried. This element presents this information in relation to existing and future land use, natural resources, estuarine pollution, historic resources, natural disaster planning, beach and dune systems, public access, and infrastructure. The goals, objectives, and policies establish the long-term ends, courses of action, and regulatory and management techniques that are directed to meet the above enumerated coastal management directives.

BOUNDARY OF THE COUNTY'S COASTAL AREA

Figure 7-1 shows the coastal area of unincorporated St. Lucie County. It includes three (3) distinct oceanic, estuarine, and riverine water systems - the Atlantic Ocean, Indian River Lagoon, and the North Fork of the St. Lucie River, respectively. The land area includes parts of North and South Hutchinson Island, the mainland along the eastern shore of the lagoon, and the mainland along the St. Lucie River.

1. Oceanic and Estuarine Area

The western boundary is marked by U.S. 1 north of the City of Ft. Pierce and the Florida East Coast Railroad south of the City. Both transportation routes lie on top of the Atlantic Coastal Ridge, a high elevation sand ridge, formerly a coastal dune. The northern and southern boundaries are the respective county lines. The eastern boundary is the Atlantic Ocean.

2. Riverine Area

The western and eastern boundaries are marked by the ten (10) foot contour line of the USGS 7.5 minute quadrangle maps exclusive of the incorporated limits of the City of Port St. Lucie. The northern boundary is the Gordy Road Spillway. The southern boundary is the St. Lucie County - Martin County line.

NATURAL RESOURCES

A. VEGETATIVE COVER (UPLANDS AND WETLANDS)

Figure 7-1. Coastal Area of St. Lucie County, Florida.

Through the use of several sources, including the Florida Fish and Wildlife Conservation Commission Landsat data, South Florida Water Management Land Use and Land Cover (LULC) data, and the Florida Natural Area Inventory Classification; the major vegetative cover in the coastal area has been compiled and mapped (Figure 7-2). Of concern within the coastal area, comprised of the Coastal High Hazard Area and Coastal Planning Area, are the beach and dune systems and the estuarine and riverine systems.

B. BEACH AND DUNES

Beach and dune systems are naturally in a state of dynamic equilibrium. The stability of these systems is often critically dependent upon the associated vegetative communities that trap and bind sand particles with their root network. In addition, the stability of natural beach and dune systems is maintained by a constant source of sand, which is transported to and from the system by longshore currents. Although man-made structures (e.g. jetties and seawalls) may provide effective localized erosion protection and accretion, they often do so by disrupting the natural longshore flow of sand, thus causing reactive erosion problems downstream.

These vegetative communities catch and hold sand and their extensive roots help the planta to spread, thereby serving to build and bind the beach and dune system together.

The coastal dune (or dunelands) is fairly continuous in the northern portions of both North and South Hutchinson Island east of SR A1A; however, there are only several small areas in the southern halves (SFWMD, LULC, 1986). The coastal dune is made up of two (2) spatially limited vegetative communities: the dunes and coastal strand (FGFWFC, 1982).

On the barrier island, the beach and dune systems are fairly continuous in the northern portions of both North and South Hutchinson Island east of SR A1A; however, there are only several small areas of continuous dune systems in the southern half of each island. Pioneer or early successional herbaceous vegetation characterizes the foredune and upper beach, with a gradual change inland to woody plant species of the coastal strand.

Within this ecosystem, many wildlife species have adapted to the constant change in the beach environment. In the upper beach and fore-dune zones, three species of sea turtles are the most noteworthy of listed species dependent on this ecosystem for reproduction. Major threats to this system, and, in turn, to sea turtles, are beach erosion and land development. On South Hutchinson Island, beach erosion just south of the Ft. Pierce inlet continues to be a problem as a result of the jetty. A 1.3 mile section of beach south of the jetty has recently been renourished. Recent storms have removed much of the material placed during this renourishment.

Further west, the dune vegetation transitions into upland scrub and maritime hammock habitats. Hammocks in the County have a mixture of tropical and temperate vegetation, with the more tropical hammocks occurring in the southern half of South Hutchinson Island. Species composition of the maritime hammock can vary from a mature canopy of oaks and palms with a sparse understory of wild coffee and stoppers, and a dense ground cover of ferns and vines, to a jungle-like community of tropical hardwoods, vines, and shrubs, with a fairly open canopy of oaks and palms.

In many instances, Australian pine and Brazilian pepper have invaded these coastal communities. Invasion of such exotic species displaces native vegetation, degrading the habitat quality, and reducing suitable wildlife habitat. The Florida Fish and Wildlife Conservation Commission reports that invasion by Brazilian pepper and Australian pine is common especially in areas of human disturbance such as filled areas or spoil islands.

Figure 7-2 Urban and Natural Features Within St. Lucie County's Coastal Area

C. OCEANIC AND ESTUARINE SYSTEMS

Estuaries are waterbodies in which seawater is significantly diluted with freshwater flowing from inland. One of the most biologically diverse and productive ecosystems in North America, the Indian River Lagoon estuarine system, is made up of seagrass meadows, salt marshes and mangrove forests, all tidally influenced wetlands. Tidal wetland vegetation traps silt and absorbs excess nutrients from upland sources of drainage, and also protects upland areas by stabilizing coastal sediments and preventing erosion from storm events.

Another important function of the estuarine wetlands in the Indian River Lagoon is their role in providing food usable by marine animals, thus forming the base of the aquatic food chain. In addition to serving as a food source, estuarine vegetation provides shelter and nursery areas for the young of many economically important species, such as snapper, red drum, grouper, pink shrimp, and blue crabs.

1. Seagrasses

Seagrasses are submerged flowering plants with true roots and stems and are distinctly different from marine algae. The documented importance of seagrasses and other submerged aquatic vegetation in the ecological stability and productivity of the estuarine ecosystem is the stabilization of sediments, prevention of re-suspension of particulate matter, and cover and food for fish and wildlife. Of the habitats entirely confined within the lagoon, seagrass beds support the richest fish community in terms of both diversity of species and density. Seagrass beds support some of the most abundant fish populations in the Lagoon with a large species diversity. The seagrass habitat is also a critical resource for the Florida Manatee. This marine mammal depends on seagrasses for a major part of its food supply. Juvenile sea turtles have also been documented as foraging on turtle grass and other seagrasses in the Indian River Lagoon (Woodward-Clyde, 1994).

The Indian River Lagoon contains seven species of seagrasses: manatee grass, shoal grass, Johnson's seagrass, turtle grass, paddle grass, star grass, and widgeon grass. This diversity of seagrasses is greater than that found in any other United States estuary. One of the species, Johnson's seagrass (*Halophilia johnsonii*), is a federally threatened species endemic only to the southern Indian River Lagoon region. Where conditions are appropriate, seagrasses may form an underwater meadow of dense cover. These meadows are generally found in water between 0.7 and 3.3 ft deep on sandy or muddy sand substrates. In deeper water where there is less light or in areas where substrate or water quality conditions are not ideal, seagrasses may not be present or may occur only as scattered clumps or as plants not more than a few inches in height.

Seagrass beds have varied in density over time between the Ft. Pierce and St. Lucie Inlets, where dense beds are found around the shoals being formed at the mouth of the St. Lucie River. Seagrass beds in the Ft. Pierce area were moderately dense when mapped in 1986 (Virnstein and Cairns, 1986) but were less dense when mapped in 1992 (Fletcher, 1993). Historical seagrass coverage changes between the 1970's and 1992 were determined as part of the Indian River Lagoon National Estuary Program Final Report. Within St. Lucie County, the majority of the Lagoon reported a 0 to 25% increase in seagrass coverage. One exception is the area of the Ft. Pierce Inlet, between Bear Point and Jack Island. This area reported a greater than a 25% increase in seagrass coverage. Another exception was the western shore of the Lagoon from approximately Blind Creek to the Dollman site which showed a 25-50% decrease in coverage (Woodward-Clyde, 1994).

Figure 7-3 indicates seagrass coverage in St. Lucie County. Substantial research has indicated that distribution and health of seagrass and other submerged aquatic vegetation is directly related to water quality and water clarity of the estuaries, and can thus be used as an estuarine health indicator. Factors influencing seagrass and other submerged aquatic vegetation growth and distribution include water depth, water clarity and availability of light, substrate, nutrient levels, salinity, temperature, and anthropogenic influences such as runoff and boating activities.

2. Intertidal Wetlands

The two basic types of salt water wetland or "intertidal" wetlands in the Lagoon are mangrove forests and salt marshes. The distribution of these habitat types is primarily on a latitudinal basis, caused by temperature, particularly by the occurrence of freezes. Mangroves are sub-tropical species that are sensitive to freezes and low temperatures (Woodward-Clyde, 1994).

Mangrove communities, like other coastal wetlands, contribute to the removal of dissolved nutrients in runoff from adjacent upland areas. Nitrogen, phosphorus, and other essential nutrients are absorbed by mangrove root systems. Studies have shown that mangrove size and growth are proportional to the levels of nutrients received and that this growth may be correlated to the amount of runoff received from adjacent terrestrial sources. (Lugo and Snedaker, 1974) The submerged root systems of mangroves form a protected nursery habitat for dozens of fishes, such as the common snook, striped mullet, tarpon, and mangrove snapper. Many avifaunal species also utilize these systems for nesting and/or foraging, including herons, egrets, brown pelicans, roseate spoonbills, and white ibis.

Coastal saltwater wetlands, both forested swamp and salt marsh, covered approximately 6,000 acres of St. Lucie County•s coastal shoreline area adjacent to the Indian River Lagoon, as late as 1950. These coastal areas were dominated by salt marsh halophytes, and black and white mangroves. The majority of the coastal wetlands were sold by the federal government and the State of Florida to private developers, and human development resulted in the filling of approximately 17 percent of the wetlands in St. Lucie County.

Mosquito Control activities during the later part of the 1950's and early 1960's, isolated the high marsh habitat, through construction of borrow ditches and dikes along the Indian River Lagoon shoreline of the wetlands. The initial result of the mosquito impoundment process was to severely restrict the exchange of water between the wetlands and the lagoon, affecting biodiversity by precluding the movement of marine life and nutrients to and from the wetlands. Largely monotypic red mangrove swamps also developed in the marshes of South Hutchinson Island, as a result of impoundment water control activities, or the lack thereof.

To remediate the biology of the wetlands managed by the St. Lucie County Mosquito Control District, the District initiated a cooperative wetland restoration program with landowners and developers. Multiple culverts and pumps were installed over a period of years, beginning in 1983, to restore estuarine exchange, biodiversity and water quality. Water level controls were also implemented to restore salt marsh and mangrove vegetation, and seasonal management was introduced, to minimize the impact of mosquito control activities, while reducing/eliminating the need for pesticide use in managed areas.

Ongoing coastal wetland activities are directed at public acquisition and preservation, restoration, recreation and public management of these environmentally sensitive ecosystems. Multi-agency coordination is an integral component of this effort, which involves multiple management goals,

Figure 7-3 Seagrass Coverage in St. Lucie County

adaptive management strategies and ecosystem management principles focusing on the protection of coastal ecotonal biodiversity.

3. Spoil Islands

Spoil islands in the lagoon also provide vegetative cover (Figure 7-4). There are thirty-four spoil islands within the County's portion of the Indian River Lagoon (Woodward-Clyde, 1994). Most of them resulted from the deposition of spoil material during the dredging of the Intracoastal Waterway in the early 1900's, or its rebuilding between 1961 and 1995, although a few were natural islands on which dredged spoil was placed (FGFWFC, 1982). Although spoil islands are generally dominated by exotic vegetation, they also provide shallow water habitat in fringe areas for the growth of mangroves, seagrasses, and other native wetland vegetation (South Florida Water Management District, 1987). In 1990, the Florida Department of Natural Resource studies showed that a total of 467 plant and animal species ranging from fungi to marine mammals inhabited or use these islands. The uses include nesting sites for many wading and diving birds. County Spoil Islands and Bird Islands are considered major rookeries by the Florida Fish and Wildlife Conservation Commission. The removal of the exotic vegetation and planting of native plant species would increase the value of the spoil islands for bird and fish species.

D. RIVERINE/FRESHWATER SYSTEMS

Numerous freshwater wetlands and streams are found adjacent to or connected directly to the lagoon system. Although not directly a part of the lagoon, adjacent wetland communities are a vital component for the biodiversity of the lagoon. They function in maintaining water quality and in filtering harmful substances from surface runoff waters before reaching the lagoon. The quality and quantity of freshwater discharges from the mainland into the estuary is critical to the maintenance of a healthy estuary and the salinity gradient required by numerous estuarine-dependent fisheries. There are two primary points of discharge into the Indian River Lagoon. The Belcher (C-25) Canal, discharges directly into the lagoon across from the Ft. Pierce Inlet. The St. Lucie River discharges into the lagoon directly across from the St. Lucie Inlet.

Estuarine wetlands and mixed forested freshwater swamps are the prevalent vegetative associations along most of the unincorporated shore of the St. Lucie River North Fork, which is fed by Five Mile and Ten Mile Creeks. Threatened and endangered species that inhabit the river basin include the West Indian Manatee, bald eagle, wood stork, eastern indigo snake, hand fern, and leather fern. Upstream, riparian plant communities consist of red maples, pond apples and water hickory inundated with bromeliads, ferns and orchids. Downstream mangroves dominate where saline conditions prevail in the St. Lucie Estuary.

Other freshwater systems in the watershed include the North and South Savannas, located just west of the Atlantic Coastal Ridge, and smaller freshwater swamps located between the Ridge and the lagoon. Freshwater communities adjacent to the lagoon system contribute valuable cover, foraging ground and reproductive habitats for many wildlife species that utilize the lagoon and freshwater bodies as part of their ecological life history (Woodward-Clyde, 1994).

E. LIVING MARINE RESOURCES

A variety of living marine resources, oceanic and estuarine plants and animals, occur within the coastal area of St. Lucie County. The following will be described below: natural reefs, oyster bars, fish, shellfish and crustaceans, marine mammals, and reptiles. Additional information is provided in the Conservation Element

Figure 7-4 Indian River Lagoon Spoil Islands - St. Lucie County

on the commercial value of fisheries and shellfish and the endangered and threatened sea turtles and manatee.

F. NATURAL REEFS

Limestone natural reefs are found both nearshore and offshore within the coastal area of St. Lucie County. The nearshore reefs or hard bottom areas exist both north and south of the Ft. Pierce Inlet. They are primarily coquinoid limestone, occurring at approximately 10 to 20 foot depths and extending from 150 feet out to 2,000 feet offshore. Discontinuous pavements with ledges up to 6 feet in relief parallel the shoreline. They continue several miles south of the Inlet, but only exist as an extensive intertidal wormrock reef near the St. Lucie Power Plant. Offshore reefs with relief up to 15 feet are known parallel the coastline in discontinuous patches at depths of approximately 45, 60, and 90 feet, and are similar to the nearshore reefs in structure, flora and fauna.

The nearshore reefs support a dense and diverse cover of flora and fauna. Algae, sponges, and soft and hard corals are a few of the dominant species that, along with numerous other cover species, provide shelter and food for invertebrates and over 225 species of fish. A study on the animal community associated with the Oculina hard coral alone found over 200 species of mollusks, 97 species of crustaceans, and 21 species of echinoderms.

G. OYSTER BARS

Oyster bars are essentially an exposed sand-shell biotype where the shell component is dominant. Oyster bars are common between the Sebastian Inlet and Ft. Pierce Inlet and historically contributed to the commercial fishing industry at Ft. Pierce. However, there are no commercially leased oyster beds and there is only a relatively small area north of Ft. Pierce and east of the Intracoastal Waterway that presently has approved, open shellfish waters. The oyster performs a valuable function in the food web by converting plankton, detritus and possibly dissolved organics into animal protein, which is then available to higher predators. Attaching to dead shells or stony outcroppings, oyster communities are self-perpetuating once established and provide attachment sites and protective cover for a large number of invertebrates including tunicates, bryozoans, amphipods, decapods, and gastropods. This secondary community provides a forage base for opportunistic fishes which, in turn, support roving carnivores such as crevalle jack, gray snapper, snook, and red drum.

H. FISH

The Indian River Lagoon reportedly has the "richest estuarine ichthyofauna in the continental United States" (Gilmore, 1988). Recent reports have indicated that a total of 788 species are present (Gilmore, 1994), many using a variety of habitats, particularly during different phases of their life histories and/or at different times during the year. St. Lucie County is located within the southern portion of the Lagoon where twice as many fish species as in the northern portion have been recorded. The higher diversity in the southern portion of the Lagoon has been ascribed to the greater tropical climate, hard-bottom and reef-like habitats, and to the abundance of Atlantic inlets (Woodward-Clyde, 1994).

The status of fish resources is normally difficult to establish on a quantitative or definitive basis and much information must come from anecdotal sources and non-scientific reports. Such information indicates the populations of many fish have declined in the period from about 1952 to 1989. Populations of some species such as the common snook and red drum appear to have increased in recent years, probably in response to catch limitation regulations, while others such as the spotted sea trout have continued to decline.

Reconnection of thousands of acres of mosquito impoundments may have a beneficial effect on ichthyofaunal food chains and lead to increased populations of fishes, while changes in seagrass abundance may also affect fish abundance. The Florida Department of Environmental Protection is conducting a juvenile fisheries study which offers the best potential for identifying trends in fisheries resources. However, the program has not been operating long enough to have developed meaningful

information.

I. SHELLFISH AND CRUSTACEANS

The major sources of consumable shellfish within the Indian River Lagoon are the blue crab, the southern and northern hard clams, and the American oyster. The blue crab has been the most heavily harvested shellfish species in terms of total poundage, accounting for almost 80% of the total commercial shellfish landings between 1958 and 1988 in the Indian River Lagoon complex. (Woodward-Clyde, 1994) Non-commercial blue crab harvesting is also a major activity throughout the Indian River Lagoon complex.

The shellfish industry within the Indian River Lagoon is regulated by the Florida Fish and Wildlife Conservation Commission, Division of Marine Fisheries, which is delegated rule making authority over harvesting and culture of marine life. The Florida Department of Environmental Protection classifies and manages shellfish resources of the lagoon so that shellfish harvests are safe for consumption. Currently, the industry is vulnerable to bacterial contamination of the lagoon from wastewater treatment discharges and from stormwater runoff. In St. Lucie County, harvesting is now virtually non-existent with only a small area of approved shellfish harvesting north of the Ft. Pierce Inlet.

J, MARINE MAMMALS

The SJRWMD and SFWMD (1987) report that, although a few studies on dolphins have been conducted all others on marine mammals concern the endangered manatee, mostly regarding their distribution and congregation around power plants in the winter in order to avoid cold water. Based on aerial photographs and marking and scar studies, manatees migrate north and disperse throughout the lagoon system (Volusia County to Palm Beach County) feeding extensively on seagrass during the summer. Except for isolated congregations around power plants, they migrate south during the winter.

There are a number of sources of manatee mortality including, but not limited to, wintertime cold, boat-barge collisions, and natural causes. The Conservation Element provides more detail regarding the manatee's endangered status and protection efforts.

K. REPTILES

Limited study has been conducted on salt marsh snakes and alligator. Most research has been directed to marine turtles which may utilize the lagoon system during their developmental stage (SJRWMD and SFWMD, 1987). The Conservation Element provides information on the sea turtle•s endangered and threatened status as well as ongoing protection efforts.

AREAS SUBJECT TO COASTAL FLOODING.

Chapter 9J-5.003(37) defines the hurricane vulnerability zone, or areas subject to coastal flooding, as those areas requiring evacuation in the event of a 100-year storm or Category 3 storm event (figure 7-5). The lagoon will rise up the land mass along it•s western bank to the approximate surge height. The topographic ridge which extends 20-25 feet high near U.S. 1 north of Ft. Pierce and the Florida East Coast Railroad south of Ft. Pierce serves as a natural barrier obstructing the storm-surge from continuing westward. Therefore, potential storm-surge flooding is essentially constrained to Hutchinson Island, a few miles west of the lagoon, and inland along the North Fork of the St. Lucie River.

The following Saffir/Simpson Hurricane Scale was used in the classification of specific storm events (TCRPC, 1988):

* Category 1 (74 - 95 mph maximum sustained winds)
* Category 2 (96 - 110 mph maximum sustained winds)
* Category 3 (111 - 130 mph maximum sustained winds)
* Category 4 (131 - 155 mph maximum sustained winds)
* Category 5 (over 155 mph maximum sustained winds)

Review of the storm surge maps show that the areas described below would be vulnerable to specific storm events.

A. HUTCHINSON ISLAND

In general, almost all of North Hutchinson Island would be vulnerable to a Category 1 storm, except for State Road A1A which would be impacted by a Category 2 storm. On South Hutchinson Island, all of the island would be vulnerable to a Category 1 storm including State Road A1A, except for discontinuous strands which would be impacted by Category 2 storms, probably near higher dune elevations.

B. MAINLAND ALONG THE LAGOON

1. North of Ft. Pierce

A majority of the land area between U.S. 1 and the lagoon would be vulnerable to a Category 1 storm. Each successively greater storm would extend the impact area further inland. U.S. 1 would be the western limit from the area near St. Lucie Village south to Taylor Creek. The Category 3 storm would also extend inland several thousand feet along both sides of Taylor Creek, covering an area of less than one (1) square mile.

2. South of Ft. Pierce

Probably due to elevations, it would take storm-surges from Category 4 and 5 storm events to reach and cover Indian River Drive, respectively, for approximately the first 4 - 5 mile stretch south of the City. Apparently the even greater elevation for the next several miles south is such that no storm surge from any category storm event would rise up the bluff. However, in the last few miles it would only take a Category 1 storm-surge to reach and cover the road and successively greater storm-surges would extent inland up to fifteen hundred (1,500) feet.

3. Mainland Along the River

There would be some surge flowing inland along the North Fork of the St. Lucie River up to or near the ten (10) foot contour (National Geodetic Vertical Datum elevation).

Figure 7-5 Hurricane Areas within the County

LAND USE INVENTORY AND ANALYSIS

A. EXISTING LAND USE.

The existing urban lands are shown on Figure 7-6 (South Florida Water Management District, 1995). The following descriptions are divided into four (4) areas based on the actual land uses (residential, commercial, industrial, etc.) for North Hutchinson Island, South Hutchinson Island, Mainland Along the Lagoon, and Mainland Along the River.

B. NORTH HUTCHINSON ISLAND

Residential and undeveloped land uses are dominant in the lower half of North Hutchinson Island. The residential use consists of low density single family subdivisions, townhouses, and highrise multifamily buildings. Commercial land use in this area, is limited to a hotel, sales and services area and a small shopping center.

Of the 3,110 total acres on North Hutchinson Island, 2,026 acres are in public ownership, 75 acres have a conservation easement and another 147 acres are targeted for public purchase. There are six public parks within the Conservation Public land use designation: Pepper Park, Ft. Pierce Inlet State Park, Jack Island, Kings Island, Queens Island and Avalon State Park.

The northern portion of North Hutchinson Island is a mix of residential, undeveloped and public land uses. Except for several single family residences near the north county line, the upper one and one half (1 1/2) miles of the island is in a natural state made up of cabbage palm, oak hammock and coastal dune communities, much of which are part of the Avalon State Park. Multifamily, recreational vehicles, single family residences and a restaurant located south of the Avalon State Park are interspersed with remnants of the same hammock.

C. SOUTH HUTCHINSON ISLAND

South Hutchinson Island consists of 4,531 acres of which 1,824 are in public ownership, 644 have a conservation easement, and an additional 421 acres are targeted for acquisition.

Undeveloped land use is predominantly in the upper half of South Hutchinson Island, much of which contains John Brooks Park and Frederick Douglass Park. The St. Lucie Power Plant, a privately owned nuclear generating facility, is within the Transportation and Utility land use classification.

There is one residential land use area approximately one mile north of the St. Lucie Power Plant and one residential land use two miles south of the Power Plant. A fire station and wastewater recovery plant exists across from the residential area. Ocean Bay Preserve is located adjacent to the waste water treatment plant and the residential development.

Most of the residential land use south of the power plant is in the southernmost three (3) miles. The predominant residential use is multifamily along both sides of State Road A1A. There are two mobile home areas along the lagoon side and urban open areas including a private golf course and private recreational facility. Commercial uses include two hotel-motel establishments and two small sales and service areas.

D. MAINLAND ALONG THE LAGOON

There are a variety of land uses north of Ft. Pierce. The following exist north of St. Lucie Village and east of the railroad: citrus, truck crops, undeveloped areas, an

oceanographic research facility, sales and services, and manufactured homes - no one use is predominant. Between U.S. 1 and the railroad (north of the Village) there are several commercial areas, several low density single family residential areas, and undeveloped areas including two cemeteries and one junkyard.

There is also a mix of uses south of the Village where industrial and commercial uses together are predominant. Commercial uses include sales and services, entertainment, and two marinas. Low density single family residential uses exist along the shoreline and adjacent to the Village and Ft. Pierce. There are also several undeveloped areas along the lagoon.

Located within the City of Ft. Pierce is the Port of Ft. Pierce. It is both privately and publicly owned, with current operations specializing in the export of fresh citrus and sand mining materials. Future development and expansion of the port uses are regulated by the City of Fort Pierce Comprehensive Plan and Land Development Code regulations. St. Lucie County is responsible for the preparation of a Port Master Plan which is being updated to maintain consistency with the City of Fort Pierce Comprehensive Plan.

Almost all of the residential land use south of Ft. Pierce (east of the railroad) is low density single family residential except for the mobile home residential area near the south county line.

E, MAINLAND ALONG THE RIVER

The predominant residential land use along the North Fork of the St. Lucie River is low density single family residential. Interspersed along the shoreline or associated wetlands are the following uses: mobile homes, medium density single family, citrus, truck crops, and public conservation/recreation uses.

Figure 7-6. Existing Land Use Within the Coastal Area.

IDENTIFICATION OF AREAS IN NEED OF REDEVELOPMENT.

Most of the buildings in the County have been built within the last thirty years and are in good condition. Within the coastal area there are no large concentrations of dilapidated structures or blighted areas. However, individual structures which should be considered for condemnation or rehabilitation are scattered in the coastal area. No neighborhood redevelopment plans need to be considered at this time.

ANALYSIS OF THE ECONOMIC BASE

Most of the existing land use in the coastal area within the County is residential except for the commercial and industrial areas on the mainland north of Ft. Pierce and conservation/recreation uses on the barrier islands. These latter components, primarily tied to the commercial fishing industry, form the economic base of the coastal area along with tourism, recreation fishing, and construction.

A. **COMMERCIAL FISHERIES**

Commercial fisheries are an important component of the local economic base. Historical trends and analysis of fin fish and shellfish commercial landings for the period from 1958 through 1988 for counties in the Indian River Lagoon region indicates that the average total fisheries contribution of each county in 1988 was almost identical to the average contribution for the 30-year period, indicating that there has been no major shift in the overall distribution of total fisheries during this period (Woodward-Clyde, 1994). The study reported that St. Lucie County accounted for 20.1% of the total commercial fisheries landings in the five county Indian River Lagoon region for the thirty year period. (Rathjen and Bolhassen, 1988). Total yield for the Indian River Lagoon region showed an upward trend from about 10 million pounds to about 15 million pounds (1987), with most of the increase coming from Brevard, St. Lucie and Martin Counties.

Although total commercial landings showed a slight change in distribution among counties, a dramatic shift was apparent for shellfish landings. St. Lucie County shellfish landings represented 2.8% of the landings during the thirty year period and only .6% of the 1988 total shellfish landings. The study indicated a major shift in shellfish activity from the more southern counties Martin, St. Lucie, Indian River to Brevard County in the north.

Since 1986 when the Florida commercial landings reporting system was implemented, annual reported landings have increased slowly from a statewide total of 850,000 pounds in 1986 to 1,233,000 pound per year during 1995. In St. Lucie County alone, dock side value of all species (finfish and shellfish) landed increased from approximately $1,000,000 in 1970 to $5,000,000 in both 1980 and 1985 (Florida Department of Natural Resources, Division of Marine Resources, 1989). In 1998, St. Lucie County fisheries landings was lower, reporting 3,079,308 pounds with a value of $4,039,294, with finfish accounting for over 97% of all landings (Florida Department of Environmental Protection, 1999). Commercial fish landings reported in St. Lucie County for the years 1994 through 1998 are shown below.

Trends in commercial catch rates are influenced by changes in quotas, gear restrictions, closures and monitoring methods. To replenish fisheries, on July 1, 1995, the Florida Constitutional Amendment 3, net ban, was implemented. The ban has had a large impact on the amount of commercial fishing landings made in Florida's nearshore and inshore waters. Overall landings for species or species groups referred to in the bill passed by the Florida Senate in 1995 were down by 66% on the Atlantic coast and down by 83% on the Gulf coast. Comparison of corresponding numbers of trips show that on both coasts overall trips were down by 52% and 71% respectively (Florida Marine Research Institute, Floridas Inshore and Nearshore Species: Status and Trends Report, December 2, 1996).

TABLE 7-1
Landings of Saltwater Products

Sub-Group	1994		1995		1996		1997		1998	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fin fish	4,363,358	4,453,222	3,438,234	4,696,697	2,750,029	3,637,834	2,972,858	3,742,847	3,011,583	3,997,076
Invertebrate	56,022	33,391	53,488	34,343	62,628	28,044	109,482	55,906	67,673	42,095
Food Shrimp	1,071,100	1,558,153	1,367,030	1,600,832	5,502,830	3,927,345	208,706	353,321	0	0
Bait Shrimp	0	0	0	0	0	0	0	0	52	124
Total	5,490,480	6,044,766	4,858,752	6,331,873	8,315,487	7,593,223	3,291,046	4,152,075	3,079,308	4,039,294

Source: Florida Marine Research Institute

B. RECREATIONAL FISHING AND BOATING

The Indian River Lagoon draws a significant number of tourist and recreation users to the area. Estimates of recreational fisheries landings and the economic value of recreation fishes to the Indian River Lagoon Region is estimated to be as much as six times that from commercial fisheries (Woodward-Clyde, 1994). The Florida Department of Commerce estimated that in 1991, the sales tax base of the Indian River Lagoon watershed represented 15% of the recreational sales taxes collected in Florida. St. Lucie County received $27,504,000 from tourism/recreation sales tax in 1991 (Woodward-Clyde, 1994). Recreation fishing and boating represent important economic and cultural assets for St. Lucie County. Of the 10,097 registered boats in 1997, registered pleasure boats accounted for 9,556 of those registered with the remaining 626 registered as personal watercraft.

A 1995 study of the Indian River Lagoon estimated the economic value of this coastal estuary at over $700 million per year (Woodward-Clyde, 1994). Recreational fishing and shell fishing accounted for 48% and boating almost 10% of this value while commercial fishing accounted for less than 2%. These recreational uses are expected to experience a large increase, with non-local saltwater anglers expected to double by 2010 (Ecotourism-Heritage Tourism Advisory Committee, 1997).

C. STATE AND COUNTY PARKS AND CONSERVATION AREAS

Recreational activities from parks and conservation lands generate direct economic benefits to the local economy. The 1999 Visit Florida report stated that the top five nature-based activities for travelers to Florida were visiting parks, exploring preserves, viewing wildlife, hiking, and nature trails through ecosystems. Florida and local residents are expected to seek similar activities. St. Lucie County has four state recreation areas and multiple local conservation and recreation areas. An Economic Assessment of the Florida Park System for 1997/1998 concluded that the system contributed $201 million to local economies throughout the state. The study estimated that for every 1,000 persons attending a state park the total direct impact on the local community is about $15,000. Three of the County•s state

Figure 7-8 Water Dependent Uses

recreation areas, Avalon State Park, Fort Pierce Inlet State Park, and the Savannas Preserve State Park were estimated to have a direct economy impact of $4,759,086 in the fiscal year 1997/1998, generating 123 new jobs. Non-local visitors to St. Lucie County State Parks were estimated to account for 65% of park attendance and expend $23 per person/day (Visit Florida, 1997).

Since 1995, the County=s Environmentally Significant Lands program acquired almost 6,000 acres of conservation lands and targeted over 5,000 additional acres for purchase through the program. These areas, which will provide additional facilities for hiking, watching wildlife, swimming and camping, are expected to increase the economic impact of nature-based tourism significantly. The County is currently developing an eco-tourism program that will focus on promoting the natural and cultural resources of these properties.

D. PORT OF FORT PIERCE

The Port of Fort Pierce is the only deepwater port facility located within the Indian River Lagoon (Woodward-Clyde, 1994). The Port is largely undeveloped except for a privately owned cargo operation at the south end of the port. The company operates an export business consisting mostly of citrus, but on occasion accommodates general and other refrigerated cargo. Other cargo at the port include importation of Caribbean and Bahamian fruits and vegetables as well as aragonite and other building materials. The waterborne cargo imported and exported at the Port of Ft. Pierce was 95,433 tons in fiscal year 1996-97 (University of Florida, 1998). The total value of shipments handled by customs at the Port was $23,673,000 with the value of exports representing the largest share at nearly $20,000,000 (University of Florida, 1998). Approximately 67 acres in private ownership and 20 acres owned by St. Lucie County within the Port boundary remain undeveloped. These vacant lands are expected to be developed in a manner consistent with the mixed commercial, recreational, and tourism uses similar to those proposed in the 1996 Port Charrette Plan. St. Lucie County is in the process of updating the Port Master Plan to replace the 1989 Master Plan.

All of the above components are expected to remain the basis of the coastal area's economy. However, it is clear that one aspect of the commercial fishing industry, i.e., shellfish harvesting, lags far behind the finfish sector and recreational boating and nature-based tourist activities are increasing.

ANALYSIS OF CONFLICT AMONG SHORELINE USES

The predominant land use along the North Fork of the St. Lucie River and Indian River Lagoon (south of Ft. Pierce) is residential. The shoreline of the Indian River Lagoon on Hutchinson Island is primarily public conservation/recreation and the mainland north of St. Lucie Village is undeveloped (Figure 7-6). The Future Land Use Map foresees low density residential land use in most of these areas (from 1 to 5 dwelling units per acre). Any greater intensity would be considered a conflict. The siting of water-dependent facilities such as public use marinas in these areas would be difficult since they are generally incompatible with residential areas. Recreational facilities, such as shoreline access points, do not usually create conflicts when located near residential units if the access point is designed properly.

The County's Future Land Use Map recognizes the need for water-dependent and water-related uses by the commercial, industrial, and mixed-use designations on the mainland north of Ft. Pierce. There are several existing or potential shoreline conflicts:

- the existing non-water dependent uses in the platted industrial area are conflicts and redevelopment should focus on water-dependent uses;
- the environmental sensitivity of these areas in regard to stormwater management and hazardous materials handling and storage needs to be addressed;
- potential conflict between mixed use designations and low density residential designations must be offset through transitional gradients;

A. WATER-DEPENDENT USES

Water-dependent uses are defined as those activities which, "can be carried out only on, in, or adjacent to water areas because the use requires access to the water body for: waterborne transportation including ports or marinas, recreation, electrical generating facilities; or water supply" [Chapter 9J-5.003(96), Florida Administrative Code]. Within the unincorporated area of St. Lucie County, the St. Lucie Power Plant, Harbor Branch Oceanographic Institute, Riverside Marina, residential marinas, and the many County and State beaches located on the barrier island constitute water-dependent uses. Riverside Marina in Ft. Pierce is the only commercial fishing marina in the County. The Port of Ft. Pierce is a water-dependent use located within the City of Ft. Pierce. The location of the power plant, Harbor Branch Oceanographic Institute, the Smithsonian Institute, the Port of Ft. Pierce and public, private and water dependent facilities can be found in Figure 7-7.

B. WATER-RELATED USES

Water-related uses are defined as those activities which, "are not directly dependent upon access to a water body, but which provide goods and services that are directly associated with water-dependent or waterway uses" [(Chapter 9J-5.003(98), Florida Administrative Code]. These uses consist of beach parking, and bathhouses, and upland services for marinas including dry slips, parking, bait and tackle stores, and fuel sales. Most of the marinas provide some upland support service; however, one marina alone accounts for 76% of the dry dock storage in the County.

ARCHAEOLOGICAL AND HISTORIC RESOURCES OF THE COASTAL AREA

There are 1,027 historical structures and 59 archeological sites within St. Lucie County that have been recorded by the State Bureau of Historic Preservation. Five new archeological sites have been recorded since 1990. Of the countywide total, 10 structures are on the National Register, 7 of these are in the City of Fort Pierce. Most of these known archaeological and historic resources of the County occur in the archaeological zones of the coastal area and are shown Figure 7-8. Two of the County's National Historic Register sites, as well as several prehistoric sites and shipwreck sites, are in the coastal area. The State Bureau of Historic Preservation does not identify archaeological resources other than by U.S.G.S. section. This is done to prevent the destruction of these sites by looters.

The listed archaeological and historic sites are protected to a limited extent by Florida law. Those properties on state-owned land or state-owned sovereignty submerged lands receive the highest level of protection. In order for a privately-owned site to receive state protection, the proposed project must be a development of regional impact, an electrical power plant, or a federally funded project; otherwise, private sites should be considered endangered. The state may also buy historic properties or designate an area of critical state concern based on historic importance. The types of archaeological and historic sites that may be located in St. Lucie County include submerged shipwrecks, Spanish salvor sites on the barrier island and mainland, Indian burial grounds and Indian shell mounds.

St. Lucie County recently received a Phase I Archaeological Survey of the unincorporated County. The study provides an indication of the probability of archaeological sites expected to be located in each archaeological geo-environmental region, as defined by the survey. The survey and report demonstrated that site densities are highest in the Coastal and Central Marsh Regions of the County.

Figure 7-8 Archaeological Zones of the Coastal Area

ESTUARINE POLLUTION

A. GENERAL FEATURES OF THE INDIAN RIVER LAGOON

Although, water quality has been good, especially south of Ft. Pierce Inlet, concern is growing over the estuary•s degradation. The Lagoon receives nutrients and excess fresh water from Belcher Canal (C-25) which drains agricultural and urban areas. Ft. Pierce operates a wastewater treatment plant that discharges to the Lagoon south of the Ft. Pierce Inlet. In the southern portion of St. Lucie County, urban run-off from waterfront developments causes most pollution.

B. OVERALL AREA

The Indian River Lagoon system is part of a physiographic basin that extends 250 kilometers (155 miles) from the Ponce de Leon Inlet in Volusia County south to the Jupiter Inlet in Palm Beach County. The lagoon itself is about 225 square miles in area, has an average depth of three (3) feet and a width that varies from a half mile to five and one-half miles. Physiographic features of the basin include coastal hills and lagoons, barrier islands, natural and man-made inlets, the Intracoastal Waterway, mosquito impoundments and drainage canals, all of which affect the quality of the lagoon.

C, ST. LUCIE COUNTY AREA

All the natural and man-made features within the County affect existing conditions in the lagoon. The lagoon's biological processes and water and sediment quality are influenced by the tidal flushing action of the Atlantic Ocean through the Ft. Pierce Inlet, as well as by wind driven circulation and freshwater discharges. As a result of urban and agricultural development, essentially all of St. Lucie County is within the overall physiographic basin of the Indian River Lagoon. Hutchinson Island, part of the barrier island chain, protects the lagoon from the Atlantic Ocean although there are two (2) man-made inlets in the St. Lucie County area - Ft. Pierce Inlet and St. Lucie Inlet (in Martin County). The Atlantic Coastal Ridge, formed when much of the area was under water, is very narrow but ranges up to 80 feet in elevation near Jensen Beach. Natural drainage from the west side of the ridge into the lagoon occurs through Moores Creek and the St. Lucie River. The river's headwaters are located in flats behind the ridge. The western portions of the County include valleys, flats and plains. Man-made features include the Intracoastal Waterway (ICW) which is maintained at an approximate depth of 11.5 feet, inlets, spoil islands, and a port (within Ft. Pierce). These features were built to improve navigation, or as a result of the improvements. The area also contains mosquito impoundments which were constructed in order to control mosquito breeding.

D. DRAINAGE

Historically, the western portions of the County did not drain into the lagoon under normal situations. Over the years, however, extensive agricultural drainage systems have been installed which discharge either into the lagoon or North Fork of the St. Lucie River, thereby enlarging the drainage basin boundaries of the lagoon. These drainage modifications and land use intensification in the watershed have dramatically increased wet-season flows to the Indian River Lagoon and significantly reduced dry-season inflows. Dry-season inflows to the estuary are reduced due to the storage of water in the canal systems and the reduction in groundwater flows caused by lower groundwater tables.

The majority of land within St. Lucie County is within the St. Lucie River Watershed of the South Indian River Lagoon. The County contains eight sub-basins with two primary points of discharge for flows from the drainage system to the Indian Rive Lagoon (Figure 7-10). The Belcher (C-25) Canal, discharging directly into the lagoon across from the Ft. Pierce Inlet, and the St. Lucie River, which discharges into the lagoon directly across from the St. Lucie Inlet.
In 1994 National Estuary Program published the Final Technical Report ■Loading Assessement of the Indian River Lagoon▲ which identified existing and projected future point and non-point discharges into the lagoon. The report noted that the North St. Lucie River sub-basin has the highest loadings of any sub-basin in the Southern Indian

River Lagoon segment (Woodward-Clyde, Loading Assessments of the Indian River Lagoon, 1994). On a per acre basis, the Belcher Canal sub-basin was reported to have the highest loading rates for all constituents except metals (Woodward-Clyde, Loading Assessments of the Indian River Lagoon, 1994). Projected percentage increases in total pollutant loads in the South Indian River Lagoon Basin are expected to be among the lowest in the region for nitrogen, phosphorous, biological oxygen demand and total suspended solids. However zinc and lead are projected to increase by above average amounts. The highest loading will continue to be contributed by the North St. Lucie River sub-basin. The highest loading rate (based on a per acre basis) will be from the Belcher Canal sub-basin Woodward-Clyde, Loading Assessments of the Indian River Lagoon, 1994).

Two significant points can be made regarding the sub-basins within the County, both of which have direct impacts on the County's coastal area and estuarine pollution. First, nearly all of St. Lucie County's total population is concentrated within the sub-basins along the lagoon especially within and surrounding Ft. Pierce and Port St. Lucie which, in effect, affords less time for treatment of stormwater runoff. Secondly, a large portion of the County historically did not drain into the lagoon. Today the whole County drains into the lagoon by way of complex drainage systems. Urban and agricultural lands are, therefore, both potential sources of estuarine pollution.

E. SURFACE WATER DISCHARGES

Freshwater discharge generated by rainfall enters the Indian River Lagoon from overland flow (Hutchinson Island and along Indian River Drive) and from point source streams and canals (Moores Creek, St. Lucie River, Virginia Avenue canal and the C-25 canal). In addition, freshwater discharges from Lake Okeechobee entering the St. Lucie Estuary are expected to move north to a greater extent than they move south in the Indian River Lagoon (St. Lucie River Issues Team Interim Report, October 1998). Subsequently, the Lagoon north of the St. Lucie Inlet may have been subjected to a greater amount of and duration of freshwater discharges. These feshwater flows lower salinity levels, and increase color and turbidy that reduce seagrass growth in these areas.

Stormwater discharges have only been recognized during the past 15 years as a contributor to negative impacts on natural surface water resources. Furthermore, only during the past 10 years has stormwater treatment been required for new development. Water quality in the lagoon is generally good, however, major problem areas are in the sub-basins. Ten Mile Creek receives runoff from citrus groves and exhibits levels of pesticides reported to exceed State of Florida water quality standards (Graves and Strom, 1995).

St. Lucie County Utilities provides wastewater collection for unincorporated North and South Hutchinson Island. The North Hutchinson Island facility eliminated all package treatment plants on the island as required by the Indian River Lagoon Act. The plant provides service to approximately 70 percent of the developed units on the Island. The South Hutchinson Island facility replaced 18 individual package treatment plants. At this time only one package plant remains on the island. Both facilities also provide reclaimed water that is made available to the developed parcels.

The long range plans call for construction of a new wastewater treatment plant on the mainland. Planning for the mainland wastewater treatment plant has been put on hold as result of excess capacity created by an extensive infiltration/inflow reduction program undertaken by the Fort Pierce Utility Authority. Most package wastewater treatment plants which discharge to the Lagoon have been eliminated since the construction of the County•s facilities on North and South Hutchinson Island.

Industrial wastewater discharge permits are issued by the Florida Department of Environmental Protection for any wastewater streams that do not meet the domestic

Figure 7-09 The County Drainage Basins.

Figure 7-10 FDEP classifications of the Indian River Lagoon within St. Lucie County

wastewater stream criteria and/or contain materials that must be treated differently than domestic wastewater.

F. WATER QUALITY CLASSIFICATIONS

Figure 7-11 depicts the Florida Department of Environmental Protection classifications of the Indian River Lagoon within St. Lucie County:

* Class II water for shellfish propagation or harvesting [Chapter 17-3.111, Florida Administrative Code (F.A.C.)]; and

* Class III water for recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife (Chapter 17-3.121, F.A.C.).

Only a small portion of the lagoon has been approved by the Florida Department of Environmental Protection for the harvesting of shellfish. The Department also manages the aquatic preserves which exist within the coastal area. These preserves have also been assigned the additional classification of Outstanding Florida Waters (Chapter 17-3.041, F.A.C).

G. SUMMARY OF WATER QUALITY DATA

The 1996 Water Quality Assessment for the State of Florida report the water quality of the Indian River Lagoon as "good".

H. SUMMARY OF EXISTING KNOWN POINT AND NONPOINT SOURCE POLLUTION PROBLEMS

This section provides a concise outline of known point and nonpoint sources which contribute to pollution in coastal area waters.

I. KNOWN POINT SOURCE POLLUTION PROBLEMS

Point source pollution comes from any discernible, confined, and discrete conveyance from which pollutants are discharged. Table 7-2 below lists the numerous point sources in St. Lucie County which contribute to the major pollution problems in the Indian River Lagoon and St. Lucie River coastal area waters.

St. Lucie County contains 66 point sources permitted by the Florida Department of Environmental Protection (Janicki, 1999). There are 46 domestic point sources and 20 industrial point sources that discharge to water bodies or lands within the St. Lucie Watershed.

TABLE 7-2
Point Sources Which Contribute to Pollution Problems in Coastal Area Waters.

Basin	Point Sources	Problems
Indian River Lagoon	Closed marinas	D.O., nutrients, f. coli
	Wastewater treatment plants	nutrients, f. coli
	Drainage canals	nutrients[1], f. coli, muck

TABLE 7-2 Point Sources Which Contribute to Pollution Problems in Coastal Area Waters.		
Basin	**Point Sources**	**Problems**
	Residential canals[2]	nutrients[1], D.O.
	Moores Creek	f. coli
	Canal C-25	pesticides, heavy metals, D.O., suspended solids
Ten Mile Creek	citrus runoff	pesticides
Five Mile Creek	urban and agriculture runoff	pesticides
Canal C-23	urban and agriculture runoff	nutrients[3], D.O.
Canal C-24	urban and agriculture runoff	nutrients[3], D.O.
NFSLR	urban/construction runoff	nutrients, pesticides, heavy metals

[1] Particularly inorganic forms [2] Includes developed and undeveloped
[3] Total phosphorus and total nitrogen, D.O.: dissolved oxygen
f. coli: fecal coliform bacteria
Source: St. Lucie County Community Development Department, 1999

J. KNOWN NONPOINT SOURCE POLLUTION PROBLEMS

Most nonpoint source pollution problems stem from stormwater runoff and are, therefore, dependent on land use. Both coastal and inland land uses contribute to the nonpoint source pollution problems in the coastal area waters of the County. Since canals, rivers and creeks are stormwater conveyances for the land surrounding them, the pollution problems associated with them (as seen in Table 7-2) are the same pollution problems associated with known nonpoint sources. Table 7-3 below associates predominant land uses along these coastal and inland water bodies which contribute to nonpoint source pollution problems in coastal area waters.

Table 7-3 Predominate Land Uses Which Impact Nonpoint Source Pollution in Coastal Area Waters.			
Discharge Basin	**Area**	**Water Body**	**Land Use**
Indian River Lagoon	Coastal	Eastern shoreline	residential/conservation
		Western shoreline	residential
	Inland	Canal C-25	citrus/pasture
		Moores Creek	urban

Table 7-3 Predominate Land Uses Which Impact Nonpoint Source Pollution in Coastal Area Waters.			
Discharge Basin	**Area**	**Water Body**	**Land Use**
St. Lucie River	Coastal	NFSLR	residential/commercial
	Inland	Five Mile Creek	residential/commercial
		Ten Mile Creek	citrus/residential/industrial
		Canal C-23	citrus/pasture/residential
		Canal C-24	citrus/pasture/residential
Source: St. Lucie County Department of Community Development, 1999			

K. IDENTIFICATION OF ACTIONS NEEDED TO REMEDY EXISTING POLLUTION PROBLEMS

Although there are several types of point sources which contribute to these problems, the impact of nonpoint source pollutants is far greater. Improvement in coastal area waters can probably be best effected by focusing on a reduction in nonpoint source pollutants. Nevertheless, point sources should not be ignored and will also be discussed below.

L. NONPOINT SOURCES

To effect a reduction in nonpoint source pollutants to coastal area waters, two primary areas need to be addressed: 1) shoreline areas; and 2) inland areas.

1. Shoreline Areas

The studies suggest that shoreline development on both sides of the lagoon contribute nutrients to coastal waters, although the problem appears to be worse along the western shore. One possible action to reduce this impact would be the implementation of a natural shoreline stabilization project that includes shoreline revegetation which will not only aid in reducing nutrients but also provide protection against erosion. Another possible action would be the application of the appropriate shoreline policies recommended in the Indian River Lagoon (IRL) Surface Water Improvement and Management Plan and the IRL Comprehensive Management Plan. A third possible action would be the continued support of the St. Lucie County Mosquito Control District in their efforts to improve tidal flushing to the impoundments within the County. A fourth possible action would be increased efforts to control illegal dumping, make proper disposal more convenient, clean up illegally dumped trash, and require homeowners to dispose of grass clippings and yard trash and debris properly.

2. Inland Areas

Improvements to the quality, quantity and timing of freshwater flows in the inland area to better mimic the natural system can enhance the health of the inland waterbodies and downstream coastal waters. The most prominent action that can be taken to effect a reduction in non-point source pollution from inland areas is the continued implementation of the County•s stormwater master plan and implementation of the Surface Water Improvement and Management program and the Indian River Lagoon Feasibility Study initiatives. In addition, implementation of best management practices in the citrus industry is critical to improving the quality of coastal waters.

In 1996, the Army Corps of Engineers and South Florida Water Management District's nominated the Ten Mile Creek Water Preserve as a Critical Restoration Project for funding under Section 528 of the Water Resources Development Act of 1996, to reduce excessive freshwater discharges and improve the quality of waters in the St. Lucie River basin. The Ten Mile Creek Water Preserve Project is a natural resource conservation and infrastructure project that has the potential to serve as the catalyst for the restoration and enhancement of the St. Lucie River. The proposed project includes the acquisition of 740 acres in the Ten Mile Creek Basin and construction of a water attenuation facility. The property has been purchased and improvements are currently under design. The facility is expected to be constructed within the next two to three years.

The Indian River Lagoon Feasibility study is a portion of the South Florida Ecosystem Restoration and Army Corps of Engineers Comprehensive Restudy efforts. In early 1999, a multi-agency team began developing specific recommendations for the project implementation phase of the study to address environmental problems associated with the original Central and South Florida Project which constructed canals to drain inland areas. Some of the improvements being considered include Water Preserve Areas (reservoirs), stormwater treatment areas, natural area rehydration and redirection of water to provide base flows to natural waterways. These improvements would reduce excessive freshwater flows to the St. Lucie River and Indian River Lagoon which in turn would reduce nonpoint source pollutants to these waters. The final draft of the Indian River Lagoon Implementation Plan is expected to be released in the summer of 2001.

Recent concerns with the health and sustainability of plant and animal species in the Indian River Lagoon and associated tributaries has highlighted the need for all users to minimize the adverse environmental effects of their operations. As a result of a multi-agency steering committee•s commitment to developing Best Management Practices (BMP) for the citrus industry in the Indian River Lagoon watershed the ■Water Quality/Quantity BMPs for Indian River Area Citrus Groves• document was released in May 2000. The long term goal of the project is to ■*implement an ongoing process to identify and develop improved, science-based BMPs to enhance and protect the Indian River Lagoon and St. Lucie Estuary•s Resources*•. Local citrus growers are encouraged to utilize the manual and implement practices to improve the quality and reduce the quantity of water draining into area canals that ultimately outfall to the St. Lucie Estuary and Indian River Lagoon.

M. POINT SOURCES

The major point source problems are sewage treatment plants and closed marinas in the lagoon and citrus processing plants discharging to the river. The County should support the identification of alternative methods for disposal of effluents from sewage treatment plants and the removal of surface water discharges that have documented water quality problems. New surface water outfalls should be located carefully to prevent contamination of approved shellfish harvesting areas and Class II waters. The County should also support the enforcement of standards and restrictions on marina discharges or runoff related to sewage pumpout facilities and boat maintenance practices.

ASSESSMENT OF THE IMPACT OF DEVELOPMENT AND REDEVELOPMENT INCLUDING FACILITIES PROPOSED IN THE FUTURE LAND USE ELEMENT ON WATER QUALITY, CIRCULATION PATTERNS, AND ACCUMULATION OF CONTAMINANTS IN SEDIMENTS.

A. IMPACT OF PROPOSED LAND USES AND FACILITIES ON COASTAL WATERS

1. New Point Sources

For the most part, residential land uses are proposed on the Future Land Use Map within the coastal area. There is some Industrial, Commercial, and Mixed Use Development land uses proposed for portions of the coastal area north of Ft. Pierce which is expected to be marine related. Most of the residential development within the mainland coastal area will be single family. Proposed residential land uses on Hutchinson Island will be a mix of single and multifamily. The General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Ground Water Aquifer Recharge Element (Infrastructure Element) does not propose any new facilities within the coastal area which discharge directly to coastal waters. Possible impacts from this development are related to marina sites, sewage treatment plant effluents, and stormwater treatment conveyances.

Closed marinas are major contributors to estuarine pollution and, therefore, should not be permitted. All marinas, however, are potential point sources of pollution via petroleum spills, improper disposal of sewage, and sediment contamination by metals. Strict adherence to the marina policies adopted as part of this element will reduce the risk of marina pollution.

Wastewater treatment plants along the lagoon require strict adherence to State rules to reduce potential negative impacts, especially to the Class II Waters and approved shellfish harvesting areas, aquatic preserves, and Outstanding Florida Waters within the coastal area. In the past, poor operating and maintenance, as well as insufficient State enforcement personnel, has contributed to pollution incidents, particularly on South Hutchinson Island. All but one of the package plants on the barrier islands has been discontinued and replaced by a central wastewater treatment and reuse facilities operated by St. Lucie County. The City of Fort Pierce also continues to operate a wastewater treatment facility on the west side of the lagoon just south of the Fort Pierce Inlet.

Stormwater management facilities are also potential point sources of pollution to coastal waters especially when inadequately operated and maintained. If new facilities function properly, most pollutants will be removed prior to discharge to coastal waters.

2. New Nonpoint Sources

The major impact from development proposed on the Future Land Use Map may be from nonpoint pollution sources. The impact from coastal area development should be comparatively minimal with improved stormwater management and shoreline stabilization, relative to potential inland area impacts, since most of the projected land use in the Future Land Use Element will occur within inland areas. Without effective stormwater water management systems for all development, increased loading of nutrients, suspended solids, metals, pesticides and other pollutants can be expected.

3. Circulation Patterns

This Comprehensive Plan does not propose any new facility that would be expected to alter the circulation patterns within the Indian River Lagoon. Maintenance dredging of the port basin, inlet, or Intracoastal Waterway would probably have the most impact on circulation.

4. **Contamination in Sediments**

There are at least four areas that probably will continue to contribute to the increase in sediment contamination seen in coastal waters - residential, industrial, agricultural, and marina development - unless effective point and non-point source management initiatives are implemented. Marinas can add hydrocarbons, metals, and sewage to surface waters; pesticides and metals can come from the other areas.

5. Federal, State, Regional, and Local Regulatory Programs to Reduce Estuarine Pollution

The 1994 Woodward-Clyde inventory identified twelve federal agencies and thirteen state or regional agencies that have regulatory programs that affect the Indian River Lagoon.

State pollution regulation is largely vested in the Florida Department of Environmental Protection (FDEP) which regulates the dredging and filling waters and wetlands under state jurisdiction. Dredge and fill permitting is also carried out by the U.S. Army Corps of Engineers. Florida Department of Environmental Regulation also regulates discharges of pollutants into natural or artificial bodies of water, establishes and enforces water quality standards, sets minimum treatment requirements, issues permits for the operation of wastewater treatment plants, administers construction grants for sewage treatment plants, and regulates discharges of stormwater. A special permit program can be used to obtain long-term permits for dredging deep water ports.

The Florida Department of Environmental Protection and the South Florida Water Management District regulate the withdrawal, diversion, storage, and consumption of water, with the water management district responsible for most of the permitting and operational aspects. The Florida Department of Environmental Protection certifies the siting of any power plants and must consider the cooling water needs and environmental impacts of any proposed power plant.

The Florida Department of Environmental Protection (FDEP) is also involved in controlling estuarine pollution through responsibilities which include selling or leasing state owned submerged lands that are not contrary to the public interest. The proposed use of the conveyed or leased submerged land must not interfere with the conservation of fish, marine life, or wildlife, or other natural resources. Deeds or leases may contain restrictions on dredging and filling.

The Florida Department of Environmental Protection is the designated lead agency in the Florida Coastal Pollutant Spill Contingency Plan, with nine other departments and the Florida Fish and Wildlife Conservation Commission on the state response team. As part of this plan, the Department is also responsible for certification of terminal facilities storing pollutants.

The Florida Department of Environmental Protection is also responsible for managing the aquatic and buffer preserves throughout the state. These preserves are state-owned submerged and adjacent upland buffer lands which the state wishes to maintain in an essentially natural condition. Special requirements pertain to the sale or lease of state owned submerged land within the aquatic preserves. Most of the Indian River Lagoon in St. Lucie County has an aquatic preserve status as does the North Fork of the St. Lucie River south of Midway Road. Approximately 1,200 acres of adjacent buffer lands north and south of West Midway Road are owned and managed by the Department of Environmental Protection as part of the North Fork of the St. Lucie River Buffer Preserve. A management plan for each preserve guides the use of each site. This agency also regulates exploration, drilling, and production of oil, gas, or other petroleum products, including drilling in estuaries.

The Florida Department of Environmental Protection is the chief land purchasing agent and land manager for the state. The state, through several land acquisition programs, often purchases environmentally sensitive lands which are vital for estuarine water quality. As of 1998, the Florida Department of Environmental Protection inventory included 7,467 acres within the coastal area of St. Lucie County with value at closing of $74,462,9302. This includes Avalon State Park, Ft. Pierce Inlet State Park, John Brooks, Blind Creek, North Fork of the St. Lucie River and the South Savannas Preserve State Park.

The Florida Department of Health administers the mosquito control program. This program sets limits on the types and amounts of oil and chemicals used to control mosquitoes. The program also provides financial aid to counties or mosquito control districts. The County Public Health Unit, as part of the Department of Health, administers septic tank regulations and utility hook-ups and enforces the state plumbing code.

The St. Lucie County Mosquito Control District is responsible for managing approximately 94% of the nearly 4,800 acres of mangrove swamps in the County.

Management policy and techniques include the installation of culverts and tidegates for tidal matching and seasonal (winter) tidal exchange, excess cross-flow pumping for water quality improvement and inverted tide gates for improved impoundment circulation.

The principle regional agency involved in controlling estuarine pollution is the South Florida Water Management District. The District is responsible for major flood control and drainage structures, thereby affecting the quantity and timing of much of the fresh water delivered to the Indian River Lagoon and North Fork of the St. Lucie River. The District is also responsible for certain regulatory activities delegated from Florida Department of Environmental Protection. Chief among these is stormwater permitting.

The South Florida Water Management District is also assigned responsibility for regulating agricultural activities in wetlands under the Warren Henderson Act of 1984. The District has a land acquisition program called Save Our Rivers which allows the District to purchase environmentally sensitive lands and by preserving them, improve the quality of fresh water entering the lagoon and North Fork of the St. Lucie River.

The Florida Inland Navigational District is responsible for and provides dredge material sites pursuant to 9J-5.006(1)(f)(3). St. Lucie County coordinates with the Florida Inland Navigational District to manage some of the sites for environmental enhancement purposes and to find suitable beach disposal sites (for beach suitable sand) to augment the county•s beach renourishment efforts.

The Treasure Coast Regional Planning Council and the Florida Department of Community Affairs, have some control over land use and development through local comprehensive plan reviews and the Development of Regional Impact (DRI) program. Should the comprehensive regional policy plan call for stringent controls of pollution, then the consistency requirements between the regional and local plans would invoke strong local controls of pollution. The DRI process can require reviews of large development impacts on significant state and regional resources such as aquatic preserves or Outstanding Florida Waters. The impacts can be mitigated through conditions in the development order issued by the local government. The TCRPC has appeal rights if the council feels that the development order does not adequately address the regional concerns.

The St. Lucie County Soil and Water Conservation District is a countywide taxing district established by State law. The District's purpose is to control soil erosion. Their erosion prevention efforts assist in maintaining estuarine water quality by reducing the sediment and nutrient loads of waters flowing into the estuary.

The Army Corps of Engineers is the lead agency in the development of the Indian River Lagoon Implementation Plan which is the portion of the Central and South Florida Restudy that addresses problems within the St. Lucie Estuary Watershed of the Indian River Lagoon. The Indian River Lagoon draft implementation plan is expected to be released in the summer of 2001. Actions being addressed by the plan are expected to include, reservoirs, stormwater treatment areas, natural water preserve areas, and restoration projects along the North Fork of the St. Lucie River including, shoreline stabilization.
St. Lucie County through its police power regulates numerous activities which impact estuarine water quality. The County regulates stormwater and drainage and mangrove alteration and trimming, controls the disposal of domestic solid waste including yard debris, regulates land use through zoning and comprehensive planning, and enforces site planning and subdivision requirements. Additionally, the purpose of the St. Lucie River Code (Chapter 1-7.5, Article II) is to prevent erosion and runoff into the North Fork of the St. Lucie River by preserving shoreline vegetation.

The County•s Land Development Code Natural Resource Protection Standards regulations are designed to reduce impacts of development upon natural resources. The standards include Vegetation Protection and Preservation, Coastal Area Protection, Shoreline Protection, Wetlands Protection and the protection of Habitats of Endangered or Threatened Species. The Shoreline Protection standards apply to the North Fork of the St. Lucie River and the Indian River Lagoon and all tributaries to these water bodies.

BEACH AND DUNE SYSTEM

A. GENERAL CHARACTERISTICS OF THE BEACH AND DUNE SYSTEM

St. Lucie County has approximately twenty-one (21) miles of beachfront shoreline, six (6) miles on North Hutchinson Island (or North Beach) and fifteen (15) miles on South Hutchinson Island (or South Beach) (Coastal Zone Resources, Inc., 1985). North Beach and South Beach are separated from each other by the Ft. Pierce Inlet. General characteristics of the beach and dune system are provided below.

1. Beach

Coastal Zone Resources, Inc. (1985) reported that the width of the beach berm (from the water's edge to the dune) ranges from forty (40) to one-hundred and forty (140) feet, with seventy-five (75) and eighty-five (85) foot averages on North Beach and South Beach, respectively, although there are numerous exceptions. Extreme conditions exist within the 2.3 miles immediately south of the Ft. Pierce Inlet where there is no beach and dune line due to erosion. The average elevation of the berm is two (2) to five (5) feet above mean high water (MHW).

2. Dunes

Coastal barrier dune systems generally consist of a series of active dunes, sand ridges, troughs and flats which extend landward from the beach (Kimley-Horn, 1982). The dune system in St. Lucie County, however, is considered atypical in that it is characterized by a single primary dune in most areas. Most of North Beach and south of the St. Lucie Power Plant on South Beach also include landward overwash areas lacking defined secondary dunes and ridges.

The widest and strongest dunes are found on North Beach probably due to a supply of sand from littoral drift (Coastal Zone Resources, Inc. 1985). Dune widths vary from about two hundred (200) feet immediately north of the inlet to being nearly nonexistent at the north county line, but most are between fifty (50) and one hundred (100) feet. The dune on North Beach ranges in height from ten (10) to (15) feet. As noted above, there is no dune line immediately south of the inlet. There is a stronger dune south of this area which ranges in width from twenty (20) to fifty (50) feet (Coastal Zone Resources, Inc., 1985). Continuing south are several areas with no dune including the St. Lucie Power Plant area which is subject to overwash. From one (1) mile south of the inlet a low dune appears which eventually reaches fifteen (15) feet near the south county line.

B. HISTORICAL AND RECENT TRENDS IN EROSION AND ACCRETION

1. Historical Trends

The Ft. Pierce Inlet was historically a meandering natural passage from the Indian River to the Atlantic Ocean known as the Indian River Inlet. After 1892 with the opening of the St. Lucie Inlet, the natural passage became unusable due to shoaling. In 1921 the current inlet was first modified by dredging, followed by the construction of jetties in 1926.

The Ft. Pierce Inlet plays a dominant role in the dynamics of the County's beach system by interrupting longshore sediment transport (littoral drift) with resulting accretion to the north and erosion to the south (FDNR, 1988). The area of major influence of the inlet in its current configuration is 15,000 feet to the north and 12,000 feet to the south. Net longshore transport has been estimated to be at least 130,000 cubic yards annually (Florida Department of Environmental Protection, 1996).

Since 1935, the maintenance of the inlet and port turning basin have been the responsibility of the Federal Government, U.S. Army Corps of Engineers. As a result, the inlet and turning basin have been dredged a total of 34 times to remove sediment from within the entrance channel and turning basin. Much of this sediment has been dumped offshore while some of the beach quality sand has been pumped on the beach immediately south of the inlet. Beach erosion south of the inlet had progressed by the late 1960's to the point that Federal participation in a beach restoration project was authorized (House document No. 84, 89th Congress, 1st. Session). The first beach restoration project was completed by the Federal government in July 1971. A second beach nourishment project was completed in 1983. Since 1983, sand from channel maintenance dredging has been place on the beach south of the inlet. A total of 1,283,200 cubic yards of material has been placed on the beach within the area 1.3 miles south of the inlet from 1971 through 1990 (Coastal Planning & Engineering, Inc., 1997).

To improve commercial access, the Army Corps of Engineers widened and deepened the channel in 1995. The existing Fort Pierce Inlet includes an entrance channel 350 feet wide by 30 feet deep, an interior channel 250 feet wide by 28 feet deep, and a turning basin 1,100 feet wide by 28 feet deep. Of a total dredge quantity of 600,000 cubic yards, 166,650 cubic yards of material was placed on the beach south of the inlet (Coastal Planning & Engineering, Inc., 1997).

2. Recent Trends

Erosion and accretion during the last fifteen (15) years generally follow historical trends The sediment budget for the Fort Pierce Inlet indicates volumetric changes associated with these processes which indicates net accretion on North Beach (544,000 cubic yards) and net erosion on South Beach (325,000 cubic yards). An estimated loss of 181,000 cubic yards from 1972 to 1987 for the County's beaches as a whole during this period was also reported despite the accretion north of the inlet and renourishment south of the inlet.

The Florida Department of Natural Resources, Division of Beaches and Shores (1988) developed a 30-year shoreline erosion project for St. Lucie County. The average projected erosion rate for the 10,000 feet of shoreline south of the inlet is 4.3 feet annually while the average projected accretion rate for the 10,000 feet of shoreline north of the inlet is 5.4 feet per year (Coastal Planning & Engineering, Inc., 1997).

A related issue is expected sea level rise, which the Environmental Protection Agency (1988) estimates at 4.9 and 7.5 feet along the east coast of Florida between 1980 and 2100. The historic rate in this area is 0.06 to 0.08 feet year. Under natural conditions, barrier islands migrate landward as sand is transferred from oceanside to lagoon side through overwash areas. Development requires efforts to prevent this natural process and, in doing so, prevents the sediment buildup of lagoon side marshes. Therefore, attempts to buffer sea level rise may lead to higher water elevations along the lagoon shoreline.

3. Effects of Coastal and Shore Protection Structures on the Beach and Dune System

As noted above, the Ft. Pierce Inlet plays a dominant role in the dynamics of the County's beach and dune system. The stone jetties were constructed 900 feet apart and extended in 1926 to stabilize the inlet (Coastal Planning & Engineering, Inc., 1997). The existing south jetty is approximately 1,200 feet long while the northern jetty is approximately 1,600 feet long. The inlet modifications have caused the interruption of normal longshore sand transport along the shoreline. The area of major influence of the inlet in its current configuration is 12,000 feet to the south and 15,000 feet to the north.

In 1982, a Federal study evaluated the effects of the navigation project on the adjacent shoreline. The study showed that the combined effect of the jetties and required maintenance dredging of the navigation channel have caused approximately 60% of the erosion problems for a distance of 1.3 miles south of the inlet.

Very little structural erosion control measures have been implemented along the County's beachfront shoreline (FDNR, 1987). Some rubble and bulkheads had been placed in the critically eroded area south of the inlet but were covered over by a 1970 nourishment project. The few sand fences that have been used in other areas have

not been successful in trapping sand. In response to continued beach erosion, St. Lucie County pursued various short and long term alternatives to combat chronic beach erosion.

4. Existing and Potential Beach Renourishment Areas

a. **Existing**

Early restoration efforts included a U.S. Army Corps of Engineer (COE) 1970-1971 South Beach project adjacent to and south of the inlet (FDNR, 1987a). The beach was widened an average of 342 feet over a 1.3 mile area with 718,000 cubic yards of sand obtained from a borrow area 2,000 feet offshore in 20 feet of water. Shoreline recession averaged 42 feet per year from profile readjustment and erosion losses. This area also received 33,000 cubic yards of sand in 1974 and 74,000 cubic yards in 1978 from maintenance dredging operations. A 1980 renourishment project was performed due to continued severe erosion. Since then small quantities of beach material have been trucked to this area to protect the boardwalk south of the jetty.

In 1987, a Beach Restoration Management Plan was prepared by the Florida Department of Natural Resources. The plan evaluated project areas in immediate need of erosion control measures, sand source compatibility, and the economic justification of the proposed projects.

Through a cooperative agreement between St. Lucie County, the State of Florida and Coastal Planning and Engineering, Inc. the Fort Pierce Inlet Management Plan was prepared and ultimately adopted by the State of Florida on May 30, 1997. The plan addresses the extent to which the inlet causes beach erosion and recommends action to mitigate the erosive impact of the inlet.

The three major goals of the inlet management program are: Mitigate erosion impact of the inlet; Maintain navigation; and re-establish longshore sediment transport (Coastal Planning & Engineering, Inc., 1997). Ultimately the Bureau of Beaches and Shores recommended and adopted the following actions implementation plan:

1) Initial restoration of 2.3 miles of beach south of the inlet.
2) Placement of all beach compatible maintenance or offshore dredged material on downdrift beaches. Material shall be placed on beaches in areas of greatest need.
3) Placement of supplemental material from upland sources or dredged from nearshore north of the inlet, or from seaward of depth of closure on the beaches south of the inlet such that the combined total of material from all sources equals or exceeds 130,000 cubic yards on an average annual bases at a minimum.
4) Improvement of south jetty to incorporate a spur jetty or other measures to reduce backflow of material into the inlet.
5) The sediment budget contained in the study report is adopted as an interim measure and shall be formally validated or redefined in subsequent revisions of the plan based on a comprehensive monitoring plan by December 31, 2001.
6) Implement a comprehensive inlet, beach, and offshore monitoring program subject to approval of the Department.
7) Evaluate possible alternatives to facilitate the bypassing of sand from the shoreline north of the inlet to the downdrift beaches.

5. Measures to Protect or Restore Beaches and Dunes

a. **State**

The Coastal Construction Control Line (CCCL) program administered by the Florida Department of Environmental Protection is the primary state effort to protect the beach and dune system (Chapter 161, Florida Statutes). In the fall of 1988, a new line for St. Lucie County was adopted by the State which is adjacent to or east of A1A within the unincorporated areas of Hutchinson Island. Any construction seaward of the CCCL line must be permitted by the State. Additionally, the State generally will not permit a structure that would lie within a projected thirty (30) year erosion line if seaward of the CCCL.

B. County

There are several County laws which apply to beach and dune protection or restoration. One is the St. Lucie County Beach Preservation Act (Chapter 61-2755, Laws of Florida), a special act adopted by the State legislature to provide the County with a beach restoration and preservation program. Preservation includes erosion control, coastal flood control, regulation of shoreline and beach use, and regulation of work and activities likely to affect adversely the physical condition of the beach.

The ordinance only allows shoreline protection, beach access, and other beach dependent or public uses between the mean high water line and the western edge of the primary dune (or area characterized by beach and dunelands in the Kimley-Horn, 1982, report). Erosion control measures must not interfere with normal littoral processes or sea turtle activities, or negatively impact coastal resources. Additionally, the ordinance also requires dune restoration as part of a development proposal when the elevation of the existing dune is not one foot greater than the minimum required flood elevation or equal to the height of the adjacent dune. At a minimum, a restored dune must be eight feet in height. Any dune vegetation must use native site specific vegetation. The ordinance also prohibits motor vehicles on the beach and dune system unless authorized by the State.

The Beach Preservation Act is implemented through various land development regulations that protects the County's beaches and dunes. These Land Development Code regulations include: the County Coastal Construction Code which requires buildings to be sited so as to not interfere with natural shoreline fluctuations and diminish storm buffering capability and stability of the dune system; Resource Protection Standards, Beach and Dune Protection and Dune Restoration requirements that provide for the submittal of dune restoration plans as part of development proposals; and the Hutchinson Island Residential District regulations that require all development proposals to include an environmental impact report and limits development to lands located west of the western edge of primary dune system.

PUBLIC ACCESS

This section provides an inventory and analysis of the existing and projected public facilities that provide access to the Atlantic Ocean, Indian River Lagoon, and North Fork of the St. Lucie River.

A. INVENTORY OF EXISTING FACILITIES

1. Public Access to the Ocean and Indian River Lagoon

There are a total of 41 access points, three are on the shoreline of the lagoon, three provide access to the lagoon and ocean, and 35 have access to the

ocean (Figure 7-11). Of these access facilities, three are regional parks, twelve are community parks and the remaining facilities consist of neighborhood parks, pocket parks, private property with beach access and pedestrian or limited parking access. Their shorelines range from 40 to 12,225 feet and the largest facility contains 958 acres.

2. Boat Ramps

Table 7- 4 lists the boat ramps available to the public for access to the Indian River Lagoon or St. Lucie River. Four of the listed boat ramps are privately run, each with one slip; three provide access to the lagoon and one to the St. Lucie River. The ten facilities provide a total of 21 slips; three provide access to the river and seven to the lagoon. Additionally, there are unimproved launching areas on the North and South Causeway.

3. Non-boat Fishing Access

Eleven non-boat fishing access points to the Atlantic Ocean and the Indian River Lagoon are located in St. Lucie County. Bridges, piers, and jetties provide 7,350 feet of pedestrian access. Public access is also available to approximately 25,300 feet of beach shoreline.

B. CURRENT AND FUTURE NEEDS

The analysis of current and future public access needs is based on general State guidelines. They provide hypothetical estimates of the amounts of resources and facilities that are required to support a given total population. They do not take into account the percentage of a given total population which may actually use the resource or facility, therefore the results of the analysis must only be used in the broadest planning terms; actual excess capacity or deficits can only be determined by adjusting the State's guidelines to account for a more defined local user demand.

C. SHORELINE, BOATING, AND NON-BOATING ACCESS

One guideline to gauge the adequacy of public beach access is the State's median guideline of one mile of beach access with parking per 100,000 in population (Florida Department of Environmental Protection, 1994). The existing beachfront access in the County is 4.87 miles would be adequate for a population of 487,000 and carry the County beyond the current planning period (2015). The potential for public access to the lagoon shoreline is also good and continues to improve as public land is being acquired as part of the County's Environmentally Significant Lands program.

FIGURE 7-11 Beach Access Locations

TABLE 7-4

Marinas Within St. Lucie County

NAME	FACILITY	WET SLIPS	DRY SLIPS	BOAT RAMPS
Riverside Marina	Commercial	50	20	No
Harbortown Marina	Commercial	340	100	No
Taylor Creek Marina	Commercial	No	600	No
Ft. Pierce City Marina	Commercial	240	No	No
Ft. Pierce Inlet Marina	Condo/Multi-Family	32	No	No
Ft. Pierce Yacht Club	Private	4	No	No
Little Jim's Marine	Commercial	20	No	No
Pelican Yacht Club	Private	104	No	1
Village Marina	Private	35	13	No
Club Med Marina	Commercial	67	45	1
Ballantrae Marina	Commercial	24	No	No
Island Cove Marina	Condo/Multi-Family	40	No	No
Colonnades Condo Docks	Condo/Multi-Family	58	6	No
Bryn Mawr	Condo/Multi-Family	12	No	1
Harbor House	Condo/Multi-Family	10	No	No
Norsemans Marina	Condo/Multi-Family	12	No	No
Kitching Cove	Condo/Multi-Family	16	No	1
Tarpon Bay Yacht Club	Condo/Multi-Family	65	No	No
Anchorage	Condo/Multi-Family	25	No	No
Ocean Harbor	Private	90	No	No
Ocean Resorts	Private	40	No	No
Sorrento Court	Private	4	No	No
Island Dunes Yacht Club	Condo/Multi-Family	26	No	No
Harbor Ridge	Private	66	No	No
St. Lucie River Yacht Club	Private	0	No	No

TABLE 7-4

Marinas Within St. Lucie County

NAME	FACILITY	WET SLIPS	DRY SLIPS	BOAT RAMPS
Rivers Edge	Private	6	No	No
River Woods	Private	24	No	No
La Entrada Del Mar	Private	30	No	No
Nettles Island Marina	Private	36	No	No
Spruce Bluff	Private	98	No	No
The Sands Lakeview	Private	70	No	No
Moores Creek Ramp	Public	No	No	4
Black Pearl Ramp	Public	No	No	2
South Causeway Ramp	Public	No	No	2
North Causeway Ramp	Public	No	No	2
North Port Marina Ramp	Public	No	No	2
White City Park Ramp	Public	No	No	1
Rivergate Park	Public	No	No	2
Middle Cove Access	Public	No	No	2
Little Jim Bridge	Public	No	No	2
Prima Vista Park	Public	No	No	2
TOTAL		**1,719**	**784**	**26**

The supply of public boat ramps with direct access to the Indian River Lagoon and the North Fork of the St. Lucie River accommodate a population of 130,000, based on the State's median guideline of one ramp per 5,000 in population (Florida Department of Environmental Protection, 1994). There are currently 26 boat ramp lanes in the County. This amounts to a total deficit of 11 ramp lanes to serve the County's 1999 permanent population.

Based on the State's median guideline for non-boating fishing access of eight hundred (800) feet per 5,600 population (Florida Department of Environmental Protection, 1994), there is also a deficit of piers, bridges (catwalks) and jetties for non-boating fishing access. The current supply (7,350 feet) is only adequate for a population of 51,450 which is only 28% of the 1999 permanent population. As recent environmental lands acquisition purchases on North and South Hutchinson Island are open to the public, the deficiency in non-boating access will be significantly reduced.

D. MARINA FACILITIES

Currently the County's inventory of wet and dry slips (public, private, condominium/multifamily, and commercial) totals 2,451. The Florida Department of Natural Resources (Florida Department of Natural Resources, 1985b) estimates a growth rate ranging from 64 percent to 89 percent between 1982 and 2005 which would be 2,319 to 2,673 slips. The 64 percent growth rate would result in an excess of 132 slips while the 89 percent growth rate would require 221 additional slips.

COASTAL AREA INFRASTRUCTURE

This section provides a summary of existing infrastructure and future infrastructure needs within the coastal area. This information is analyzed in greater detail in the Traffic Circulation Element; the General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge Element; and earlier sections of this element.

A. EXISTING FACILITIES

1. Roads, Bridges, and Causeways

The Traffic Circulation Element provides a detailed inventory of transportation infrastructure and Level of Service (LOS) within the County. Table 7-5 lists the primary roadways and their LOS within the coastal area which shows that most of the roadways are at adequate levels for normal traffic flow.

The following critical links for hurricane evacuation have been identified:

- North Bridge;
- South Bridge;
- South A1A;
- Indian River Drive;
- Jensen Beach Bridge (for South Island County residents);
- Indrio Road;
- State Road 70;
- Walton Road;
- Port St. Lucie Boulevard;
- Prima Vista Boulevard;
- Midway Road;
- Florida Turnpike; and
- I-95.

TABLE 7-5

Roadway network, functional classification,
And Level of Service (LOS) within the coastal area, St. Lucie County.

Roadway	Classification	LOS	Comment
SR A1A (North)	Major Arterial	A	South to Pepper Park
SR A1A	Major Arterial	B	East to U.S. 1
U.S. 1	Limited Access	F	South of Edwards Rd.
U.S. 1	Principal Arterial	F	St. Lucie Blvd- N. County line
SR A1A (south)	Major Arterial	B	South of Seaway Dr.
S. Indian River Dr.	Collector	C	South to Savannah Road
S. Indian River Dr.	Collector	C	To South County Line

Source: Spring, 1999 Traffic Counts, Average Annual Daily Traffic
St. Lucie Metropolitan Planning Organization

2. Sanitary Sewage Facilities

St. Lucie County operates three regional wastewater treatment facilities, one each on North and South Hutchinson Island, and the Holiday Pines facility. The facilities provide service for most of the barrier island and the Holiday Pines area in northern St. Lucie County. Completed in November 1996 and June 1997, respectively, these reuse facilities were built to comply with the Indian River Lagoon Act. As new and existing developments are brought online, the use of package sewage treatment and disposal facilities are eliminated.

On North Hutchinson Island, the Florida Department of Environmental Protection has permitted the facility to operate at 0.50 million gallons per day with high level disinfection, with the effluent being disposed of through irrigation at Pepper Park and residential uses. On South Hutchinson Island, Florida Department of Environmental Protection permitted a 1.6 million gallons per day average daily flow. The primary effluent disposal for this facility is all the green areas within the service boundary area through irrigation, with the alternate discharge to Florida Power and Light St. Lucie Nuclear Power Plant cooling water discharge canal. The effluent is then mixed with FP&L's discharge to the Atlantic Ocean. The Ft. Pierce Utilities Authority provides sewage service on South Hutchinson Island only from the Ft. Pierce Inlet south to Ocean Village.

3. Potable Water Facilities

The primary supplier of potable water for most of the coastal area in the County is the Ft. Pierce Utilities Authority. Currently, the Fort Pierce Utility Authority provides potable water services for most of South Hutchinson Island, and sells water on North Hutchinson to the North Hutchinson Services. Areas on the mainland north of Ft. Pierce use private, (single family), semi-public, (commercial), and community (Harbor Branch Oceanographic Institute) water systems.

4. Drainage Facilities

The major drainage facilities within the coastal area include the Belcher/C-25 Canal and the North Fork of the St. Lucie River, which receives flow from Five Mile Creek, Ten Mile Creek, and Canals C-23 and C-24. Additionally, Moores Creek drains part of the unincorporated area west of Ft. Pierce. Any flooding in the area of the Indian River Lagoon has been due primarily to unusual tide conditions rather than drainage inflow. However, the coastal and inland areas of the North Fork of the St. Lucie River do experience flooding problems that are due to stormwater and a combination of stormwater and tides.

Hutchinson Island has numerous water management systems which discharge to the Indian River Lagoon following moderate (3 year/24 hr.) and severe storm events. Some older developments discharge for any storm event.

B. FUTURE NEEDS

1. Roads, Bridges, and Causeways

The Traffic Circulation Element provides detailed information on the needs of the coastal area, the costs involved, and the funding alternatives that could be used. A general summary of these needs and constraints on implementation is presented in this element.

St. Lucie County adopted the Hutchinson Island Residential District ordinance which scheduled roadway improvements in phases for the barrier island. The phases are established by development levels and the accompanying traffic generation. A summary of roadway improvements from the "Barrier Islands Access Study" (Kimley-Horn, 1986) includes the following:

a. Commencement Level
- Left-turn lane on Ocean Boulevard at Binney Drive.
- Right-turn lane on Binney Drive at Ocean Boulevard.
- Improve Seaway Drive to four lanes between bridge and Binney Drive.

b. Level 2
- Improve SR A1A to four lanes north of North Beach Causeway.
- Improve North Beach Causeway to four lanes.

c. Level 3
- A second left-turn lane on North Beach Causeway at SR A1A.
- A second left-turn lane on U.S. 1 at Seaway Drive.

d. Level 4

- Improve SR A1A north of North Beach Causeway to six lanes.

The Jensen Beach Bridge in Martin County has been an essential part of the traffic circulation system for the southern portion of St. Lucie County's south island. As noted in the Barrier Island Access Study (Kimley-Horn, 1986), development in this portion of the south island will not be allowed beyond the commencement level without either the construction of a new bridge or improvements to structures in Martin County. However, since most of the undeveloped private land in this portion of the island can be developed at the commencement level and, in fact, is mostly developed to date, greater dependence on the Martin County structures is not anticipated.

2. Sanitary Sewage Facilities

With the operation of the two County-operated regional wastewater treatment facilities, future needs at this time are considered adequate.

3. **Potable Water Facilities**

No new public water supply facilities are presently planned in the coastal area. However, single family and small multi-family developments may use on-site domestic wells on the mainland.

4. **Drainage Facilities**

Drainage improvements to remove shoaling of the North Fork of the St. Lucie River are being studied by the South Florida Water Management District. However, due to the aquatic preserve status of this part of the coastal area, permitting processes will be extensive and time consuming Ten Mile Creek east of I-95 includes shoaling as well as shoreline erosion and exotic plant species that are blocking the creek in some areas. Drainage improvements on Hutchinson Island will be on a project by project basis.

C. SPECIAL RESTRICTIONS ON SITING FACILITIES IN THE COASTAL AREA

Changes in Federal and State law have placed restrictions on funding public facilities in the coastal area. The United States Congress approved the Coastal Barrier Resources Act which prohibits the use of federal funds to build new infrastructure or expand existing infrastructure in designated parts of barrier islands. St. Lucie County contains two such designated units as depicted in Figure 7-12. One is on North Island and extends from the north County line to the Queens Cove subdivision, exclusive of some existing development; the other is on South Island and extends from the southern limits of Ft. Pierce to the Nettles Island area; exclusive of some existing development including the St. Lucie Power Plant.

The Coastal Barrier Resource Area act only restricts the use of federal funds; thus facilities could be built with state or local funds. However, the restrictions on federal funds extend to those provided to the state, including disaster assistance. Without federal disaster assistance, the full cost of repairing and replacing new or expanded facilities will fall upon the county. Therefore, benefits and costs associated with expansion of facilities within the two coastal barrier resource units should be evaluated

Figure 7-12. Cobra Zones

Former Governor Graham's Coastal Zone Executive Order formulated a coastal infrastructure policy, banning the use of state funds to build facilities in coastal high hazard areas, unless such expenditure was consistent with the local comprehensive plan. Through a series of cross references and consistency requirements, the revised planning laws require that local comprehensive plans limit development in coastal high hazard areas. The County will evaluate thoroughly any recommendations for new or expanded publicly owned facilities in coastal high hazard areas.

SUMMARY AND IDENTIFICATION OF SIGNIFICANT ISSUES

A. LAND USE

The predominate land uses in the coastal planning areas are residential. The major water-dependent uses are water-oriented recreation, commercial and industrial. Major land use issues are development intensities, protection of natural resources, and the provision of appropriate waterfront sites for public use activities.

The identification and implementation of stormwater treatment and shoreline restoration projects that reduce the quantity of suspended solids and nutrients that enter the Indian River Lagoon and North Fork of the St. Lucie River is critical to maintain and improve coastal waters and the many species with special protective status that inhabit the coastal planning area of the County.

B. NATURAL HABITATS

The most significant natural habitats within the coastal area are associated with the Indian River Lagoon, North Fork of the St. Lucie River, Atlantic Coastal Ridge and the Atlantic Ocean. As a general rule, maintaining native habitats in these areas and providing connections between habitats will enhance biodiversity and the long term viability of wildlife, marine life and vegetative species. If these resources are not protected the loss of the natural quality of our resources can negatively effect the county•s economic viability and quality of life, as well as the viability of our native habitats and the species they support. The County should continue to identify native habitats in need of preservation and manage public lands for the long-term protection of native habitats and the species they support.

C. MOSQUITO IMPOUNDMENTS

The restoration of tidal exchange to the mosquito impoundments is an important habitat restoration measure to improve wetland habitats in the coastal area. The St. Lucie County Mosquito Control District has developed an effective management plan, part of which includes acquisition and the restoration of marshes along the Indian River Lagoon. These efforts should continue to be implemented with restoration and development improvements that enhance coastal waters for fisheries and wildlife. Cooperative initiatives between the State and County should continue to evaluate the future efforts of the District to integrate the objectives of marsh restoration and mosquito control.

D. SEAGRASS BEDS

As St. Lucie County•s population increases, additional land clearing and development will take place. This creates the potential for additional runoff to enter our coastal waters resulting in reduced water quality and light penetration which could result in declines in seagrass coverage . A potential significant impact of continued residential and water-dependent uses is the progressive loss of seagrass beds within the Indian River Lagoon. St. Lucie County recognizes the importance of protecting food sources endangered species which include seagrass beds used by sea turtles and manatees. It is important to continue periodic monitoring of all seagrasses so that the impact of improvement and developments can be evaluated.

Through state, regional and local environmental land acquisition programs approximately 54 % of the County•s barrier island is protected through public ownership. Preservation of lands along the County•s coastal waters in conjunction with the implementation of the Indian River Lagoon Plan should be supported. These programs are essential in protecting seagrass beds which are recognized as the most critical habitat in the lagoon.

E. ENDANGERED AND THREATENED SPECIES AND SPECIES OF SPECIAL CONCERN

St. Lucie County contains nine species listed as threatened and eleven species listed as endangered by the federal government. The most endangered species are the manatee, woodstork and several species of sea turtles. St. Lucie County is currently developing a Manatee Protection Plan that will assist to protect the endangered manatee. To date, a Boating Facilities Siting Plan and a Boating Use Study has been completed, the final component of the Manatee Protection Plan will summarize these two earlier reports and include education and environmental components of the plan. The Final Manatee Protection Plan will also identify measures and a schedule for implementation. The Final Manatee Protection Plan is expected to be completed by the summer of 2001.

Woodstorks, which require a more natural fluctuation of water levels in wetlands, as well as other wading birds, would benefit from the preservation and enhancement of wetland areas. On-going wetland restoration projects and the proposed study to identify significant wetlands within the county will assist in protecting woodstorks.

St. Lucie County beaches are important nesting areas for the loggerhead, leatherback, and green sea turtles. The U.S. Fish and Wildlife Service recently identified critically important nesting areas for the federally threatened loggerhead sea turtle on South Hutchinson Island. About 80 percent of the loggerhead nesting in the southeastern U. S. occurs along the south Atlantic Coast of Florida where Hutchinson Island is located. Approximately 70 acres with two miles of beachfront are proposed for addition to the Hobe Sound Wildlife Refuge. Continued County support is needed to purchase
and protect the proposed Refuge lands.

F. ESTUARINE WATER QUALITY

The natural watershed of the Indian River Lagoon and the St. Lucie River has been significantly altered by human activities. Recently, reduced water quality and recent ■fish kills• in the St. Lucie River and Indian River Lagoon, has cause significant concerns. Restoration and water quality improvement in these water bodies is the focus of the Indian River Lagoon Project Implementation Report which is currently being developed. Drainage discharges, sewage treatment plants, canals, marinas contribute to pollution loads. The County should continue to re-evaluate and update stormwater management and land development standards to protect the quality of estuarine waters.

G. BEACH AND DUNE SYSTEM

The beach and dune system is under stress in much of the county. Much of the beach erosion is a result of the inlet jetties interrupting the natural southern littoral drift of sand, although storms have contributed to the problems. Beach restoration is on-going south of the jetty. The primary dune is non-existent or very low in some locations has also been impacted by storms, the lack of sands and exotic plant species. Dune restoration including exotic removal and re-vegetation with native plant species and additional dune crossings are needed.

H. PUBLIC ACCESS

The County is well provided with public access facilities, such as recreational parks, but many of these areas have yet to be improved. Additional access points with parking and boat/canoe ramps to the lagoon as well as non-boat fishing access such as piers are needed. Some mosquito impoundment dikes could be used for fishing

access if improvements were made. Additional access to the North Fork of the St. Lucie River for canoes is also needed. As demand for marina slips grows, existing excess capacity will be used up.

GOALS, OBJECTIVES AND POLICIES

The following Comprehensive Plan Goals, Objectives, and Policies are modifications of portions of the Element as adopted in 1990.

GOAL 7.1 **BALANCING GROWTH AND COASTAL RESOURCES. ALL DEVELOPMENT PROPOSED IN THE FUTURE LAND USE ELEMENT IN THE COASTAL AREA SHALL OCCUR IN A MANNER WHICH PROTECTS, CONSERVES, AND ENHANCES THE NATURAL RESOURCES OF THE COASTAL AREA AND THE ENVIRONMENTAL, SOCIAL AND ECONOMIC BENEFITS ATTRIBUTED TO THEM.**

Objective 7.1.1: **Future Development in the Coastal Area. St. Lucie County shall continue to protect the natural resources of the coastal area from adverse impacts caused by future development through the implementation and strengthening of existing environmentally related laws and the assignment of appropriate Future Land Use designations.**

Policy 7.1.1.1: Future development in the coastal area shall be limited to those land uses which are resource dependent or compatible with the physical and environmental characteristics of the coastal area, or to those uses which can occur without degradation of important environmental values or interference with legally used public access to coastal area shorelines.

Policy 7.1.1.2: All land development regulations adopted pursuant to this element shall be consistent with:

a. The Future Land Use Element and Map;
b. The County's Hutchinson Island Residential Development Ordinance;
c. Vested development rights;
d. The County's Hutchinson Island Coastal Area Protection Ordinance, and the Sea Turtle Protection Ordinance; and
e. The goals, objective and policies of this element and the Conservation Element concerning the protection, appropriate use, and conservation of natural resources.

Policy 7.1.1.3: Erosion control measures shall be limited to those that do not interfere with the natural resources and processes of the coastal area.

Policy 7.1.1.4: Future development or redevelopment within the coastal area shall provide infrastructure to service the development or redevelopment at the Level of Service standards adopted in the appropriate elements of this Comprehensive Plan, and which is consistent with the coastal resource protection, access, and safe evacuation requirements of this Comprehensive Plan, and as further provided for in the Capital Improvements Element.

Policy 7.1.1.5: The County shall continue to coordinate with appropriate state agencies in meeting the goals and policies of the Indian River Lagoon Aquatic Preserves Management Plan, the North Fork of the St. Lucie River Aquatic Preserve Management Plan, the Indian River Lagoon Surface Water Improvement and Management Plan, and the Indian River Lagoon Comprehensive Conservation & Management Plan. Coordination will consist of, at a minimum, continual

participation on applicable committees and task forces as well as the provision of administrative and fiscal support.

Policy 7.1.1.6: The County shall provide eco-tourism opportunities within the coastal area in a manner that does not degrade or reduce the long-term viability of the functions and values of coastal waters and adjacent uplands. Lands purchased through federal, state and local natural resource protection programs shall provide public access and recreational improvements in a manner that minimizes impacts to the natural areas and does not compromise the long term viability of the protected resources.

Policy 7.1.1.7: St. Lucie County shall conduct a study that results in the provision of an eco-tourism zoning designation and land development standards that provide for the development of sustainable eco-tourism support facilities.

Objective 7.1.2: Protecting Wetlands and Wildlife Habitat. The County shall support the protection, conservation, or enhancement of coastal uplands and wetlands. The County shall include within its Land Development Regulations criteria and standards for the protection and enhancement of the remaining native plant communities in the County. There shall be no net loss of existing wetland functions and values which are regulated by federal and state agencies. The land development regulations shall include open space requirements, upland buffers and clustering of units as means to protect existing wetlands.

Policy 7.1.2.1: The County shall continue to implement and enforce land development regulations that require the use of native or drought tolerant vegetation adapted to existing soil and climatic conditions in landscaping in the coastal area.

Policy 7.1.2.2: The County shall require the removal and eradication of all nuisance and exotic vegetation such as Australian pine, Brazilian pepper, and Melaleuca during construction of new development and replacement with plant species that are consistent with Policy 7.1.2.1.

Policy 7.1.2.3: The County shall continue to implement and enforce land development regulations which require a minimum fifty (50) foot buffer zone of native upland and transitional vegetation along rivers, creeks, and estuaries, to be maintained from the landward extent of state waters or from mean high water of the rivers, creeks, and estuaries, whichever is greater. However, setbacks for the North Fork of the St. Lucie River shall be governed by those set out in the Land Use Element to the extent that those requirements may be more restrictive.

Policy 7.1.2.4: A buffer zone of native upland edge (i.e., transitional) vegetation shall be provided and maintained around isolated wetlands and deepwater habitats which are constructed or preserved on new development sites. The buffer zone may consist of preserve or planted vegetation but shall include canopy, understory, and ground cover of native species only. The edge habitat shall begin at the upland limit of any wetland or deepwater habitat. As a minimum, ten (10) square feet of such buffer shall be provided for each linear foot of wetland or deepwater habitat perimeter that lies adjacent to uplands. This upland edge habitat shall be located such that no less than fifty (50) percent of the total shoreline is buffered by a minimum width of ten (10) feet of upland habitat.

Policy 7.1.2.5: All mosquito impoundments shall be assessed to determine if they provide multiple functions of marine fisheries habitat, water quality enhancement, and adequate mosquito control. Particular attention shall be given to the differences between impoundments that are managed versus those that are breached or unmanaged.

Policy 7.1.2.6: The County shall, through the development review process, in cooperation with the appropriate wetland regulatory agencies, continue to conserve and protect coastal wetlands from detrimental physical and hydrological alteration and prohibit unmitigated encroachment into coastal wetlands. The regulation of activities in, on or over wetlands or other surface waters and the management and storage of all surface waters shall be pursuant to applicable Local, State and Federal requirements. The most restrictive of these shall be enforced. County regulations shall include criteria to evaluate and preserve wetlands, based upon their functional characteristics including types, size, values, functions, conditions and location.

Policy 7.1.2.7: The County shall continue to evaluate erosion problems and implement erosion control measures, along Indian River Drive south of Ft. Pierce. Erosion control measures shall be consistent with Policy 7.1.2.1.

Policy 7.1.2.8: There shall be no-net loss of existing wetlands which are regulated by federal and state agencies. The County shall implement this policy through the site plan and building application permitting process . Any approved mitigation plan shall result in a no net loss of wetlands acreage or function within St. Lucie County, unless waived by the Board of County Commissioners.

Policy 7.1.2.9: The County shall support and implement programs, in line with the administrative and fiscal constraints of the County, to restore, enhance, and maintain the functions and values of natural waterways and adjacent upland habitats within the coastal area. Through state and local programs, St. Lucie County will continue to encourage the preservation and enhancement of floodplain wetland functions through public purchase and restoration of the floodplain wetlands and adjacent upland buffers along the North Fork of the St. Lucie River and the Indian River Lagoon, including their natural tributaries.

Policy 7.1.2.10: Management and recreation development plans for lands purchased through state and local natural resource protection programs (Environmentally Significant Lands, Save Our Coasts, Preservation 2000) shall only allow for development that minimizes impacts to natural resources and does not degrade the long-term viability of existing natural resources on the site. Where possible all plans should assist to restore the biodiversity of plant and animal species in the coastal area while providing reasonable public access.

Objective 7.1.3: Protection of Living Marine Resources. St. Lucie County shall protect, conserve, or enhance living marine resources and continue to implement regulations to reduce adverse impacts caused by development.

Policy 7.1.3.1: The County shall continue to implement the sea turtle protection ordinance. The Sea Turtle Protection Ordinance shall be periodically reviewed and updated as necessary to ensure adequate protection for sea turtles in St. Lucie County.

Policy 7.1.3.2: The St. Lucie County Manatee Protection Plan, dated March 1, 2002, is hereby included within this Comprehensive Plan by Reference. All development activities effected by this plan shall be governed accordingly.

Policy 7.1.3.3: The County shall cooperate with the appropriate regulatory and management agencies to implement comprehensive and coordinated management plans for the

Indian River Lagoon in order to improve the biological health of the Lagoon.

Policy 7.1.3.4: St. Lucie County shall continue periodic monitoring of seagrass bed conditions within the County. The County shall protect shorelines containing significant seagrass habitat and shall seek to restore seagrass coverage, where possible.

Policy 7.1.3.5: St. Lucie County shall assist the FDEP upon request in establishing well marked stacking and mooring areas for ships and boats in order to protect reefs and seagrass beds.

Policy 7.1.3.6: Specific and cumulative impacts of navigation improvements to the Ft. Pierce Inlet upon the Sabellariid worm reefs shall be evaluated to ensure the maintenance of viable natural and educational functions of the reefs. The County shall support the mapping of the natural reefs abutting the Atlantic Ocean shoreline and the establishment of appropriate protective measures for these reefs.

Policy 7.1.3.7: Spoil islands shall be retained in public ownership and modified to serve as green areas, bird roosting, nesting, and feeding areas and, when appropriate, water-dependent recreation areas. Revegetation efforts on all spoil islands will utilize 100 percent native vegetation adapted to existing soil and climatic conditions and will include the elimination of exotic species if required by the appropriate State agency. The disposal of spoil material shall be consistent with Policy 7.1.4.5

Policy 7.1.3.8: Efforts between the County and local interest groups shall be made to designate the St. Lucie nearshore and Oculina Reefs federal marine sanctuaries in accordance with the Federal Marine Sanctuary Program with the intent of reaching this designation by January 1, 2003.

Policy 7.1.3.9: Alternative sources for borrow material for the Ft. Pierce Feeder Beach Restoration Project shall be evaluated, to eliminate the degradation of nearshore and offshore natural reefs.

Policy 7.1.3.10: The County shall discourage development activities on submerged lands.

Policy 7.1.3.11: The County shall continue efforts to reconnect all impounded marshes to the Indian River Lagoon.

Policy 7.1.3.12: The County shall coordinate with pertinent state and regional agencies to identify natural area greenways and wildlife corridors to link existing public parks, preserve areas and similar public areas for conservation and habitat preservation purposes through the creation of a system of natural area greenways and wildlife corridors that will protect ecological communities in the coastal area. The greenway system shall also encourage non-motorized transportation through the connection of sidewalks and bikelanes and by locating greenway hubs in close proximity to mass transit stops.

Policy 7.1.3.13: The County shall continue the acquisition of environmentally significant lands to preserve, protect and restore the biological diversity, integrity and productivity of ecological communities.

Policy 7.1.3.14: The County shall cooperate with and assist the Florida Department of Environmental Protection, the U.S. Fish and Wildlife Service and the National Marine Fisheries Commission in the implementation of protective and recovery programs for the West Indian Manatees, Sea Turtles, and other listed species.

Policy 7.1.3.15: The County shall require that land development projects within the coastal area demonstrate non-degradation of water quality for all discharges into receiving waters designated as "Conditionally Approved" or "Approved" Department of Environmental Protection Shellfish Harvesting Area.

Objective 7.1.4 **St. Lucie County shall strive to obtain or maintain water quality and trophic state index classifications of "good" for the Indian River Lagoon, Five Mile Creek, Ten Mile Creek, and the North Fork of the St. Lucie River. The County shall enact appropriate regulations which provide for the maintenance or improvement of water quality.**

Policy 7.1.4.1 No new untreated point source discharges into coastal waters for stormwater runoff & wastewater effluent will be permitted.

Policy 7.1.4.2: In order to reduce the impact of effluent from sewage treatment plants on the lagoon, all existing regulated wastewater plants in the unincorporated areas of Hutchinson Island shall connect to regional waste treatment facilities within the applicable service areas, unless excepted by St. Lucie County through a

Policy 7.1.4.3: New causeways across the Indian River Lagoon shall be prohibited in order to reduce further constriction of water circulation. New infrastructure must be demonstrated to meet all of the measures spelled out in Goal 7.1.

Policy 7.1.4.4: In order to reduce non-point source pollutant loadings and improve the functioning of the County's drainage system, the County shall continue to use a franchise hauler to collect residential solid waste in the urban unincorporated County.

Policy 7.1.4.5: All spoil from the dredging of the lagoon shall be placed on uplands once an upland site is established.

Policy 7.1.4.6: The County shall prohibit shoreline alteration and construction which degrades existing estuarine productivity with exceptions such as necessary access to marine resources, and the abatement of serious and significant erosion, when the projects are not expected to result in long-term or permanent degradation of water quality or habitat value.

Policy 7.1.4.7: The County shall continue to address point and non-point pollution problems through its stormwater management program. The County shall request assistance from appropriate agencies in addressing high priority problems through Federal, State and Regional programs that provide technical and fiscal resources.

Policy 7.1.4.8: The County shall continue to address water quality problems identified in the data and analysis section of this element through:

a. continual cooperation in SWIM programs;

b. the implementation of the St. Lucie County Stormwater Master Plan;c. enforcement of regulations to improve control of illegal dumping into canals, ditches and waterways, and increase implementation of urban and agricultural best management practices;

d. Aggressively lobbing and taking leadership to plan and locate water preserve facilities within St. Lucie County by January 1, 2005. Facilities will be built in order to attenuate storm water discharge, eliminate agricultural pollutants, and manage salinity in the St. Lucie River and the Indian River Lagoon.

e. Public purchase and protection of upland buffer area along all natural waterways.

Policy 7.1.4.9: The County shall continue to construct stormwater management improvements in a manner that enhances receiving waters and provides habitat for native animal and plant species.

Policy 7.1.4.10: The County shall increase public awareness about the Indian River Lagoon and the North Fork of the St. Lucie River, their diverse resources and value, as well as threats to these resources. Increase public awareness of and involvement in programs to protect, enhance and restore the estuaries, including efforts to reduce the impacts of storm-water and fresh-water discharges.

Policy 7.1.4.11: The County shall continue to evaluate and update the Stormwater Master Plan to address water quality issues.

Objective 7.1.5: Beaches and Dunes. St. Lucie County shall provide for the protection and restoration of beaches and dunes. A comprehensive beach and dune management program shall be adopted by 2003 which enhances the natural functioning of the beach-dune system while reducing unnatural disturbances of the primary dune.

Policy 7.1.5.1: The County shall prohibit construction seaward of the Coastal Construction Control Line including construction of coastal or shore protection structures, except where the Florida Department of Environmental Protection has issued the applicable permit authorizing that construction.

Policy 7.1.5.2: Techniques for inlet maintenance which provide for long-term beach stability through facilitation of normal littoral processes shall be supported.

Policy 7.1.5.3: The beach renourishment projects currently recommended by the U.S. Army Corps of Engineers and Florida Department of Environmental Protection shall be supported if shown to comply with the measure of Goal 7.1. Mitigation must be in kind, acre for acre or greater.

Policy 7.1.5.4: The County shall require provisions for public access to beaches renourished at the public's expense.

Policy 7.1.5.5: Access to the beach for new development will be confined to elevated walkways that protect dune systems, subject to the Florida Department of Environmental Protection approval.

Policy 7.1.5.6: The County shall enforce regulations which prohibit motor vehicles on public lands within the coastal strand and scrub upland habitats that lie east of the Coastal Construction Control Line, unless authorized by the appropriate Federal, State, or local agency.

Objective 7.1.6: The County shall implement and strengthen regulations that provide for the protection, preservation, or sensitive reuse of historic resources in the coastal area, including the adoption of a historic preservation ordinance by 2002.

Policy 7.1.6.1: As an alternative to preserving historic or archaeological sites, excavation of a site conducted by the Florida Division of Historic Resources or their approved alternate prior to development shall be allowed. Should a site be scientifically excavated then development may proceed without preserving the site unless found to be of great significance.

Policy 7.1.6.2: In the case of historic or archaeological sites, vegetation removal shall be prohibited unless the vegetation to be removed is a part of a bona fide scientific excavation or is a part of an approved development plan.

Policy 7.1.6.3: Donations of significant historic or archaeological sites shall be considered for acceptance by the Board of County Commissioners.

Policy 7.1.6.4: The criteria for the identification of historic resources shall be developed for incorporation into the Historic Preservation Ordinance required pursuant to the Future Land Use Element.

Policy 7.1.6.5: The following shall be accomplished:

a. The identification, designation, and mapping of any structures or sites that meet the criteria developed pursuant to Policy 7.1.6.4, for incorporation into the Historic Preservation Ordinance required pursuant to the Future Land Use Element; and

b. The submission of a list of any such designated historic resources to the U.S. Department of the Interior for inclusion of the National Register of Historic Places.

Policy 7.1.6.6: A list of historic resources shall be continually updated as appropriate.

Policy 7.1.6.7: Historic resources and their environments should be included and protected in public acquisition programs for recreation, open space and conservation.

Policy 7.1.6.8: By December 31, 2002, the County shall enact regulations that will further protect the integrity of sites identified by St. Lucie County as significant historic resources. At a minimum the regulations shall provide that:

a. No existing archaeological sites shall be excavated, scraped, leveled, or altered without supervision of a professional archaeologist utilizing acceptable techniques;

b. An archaeological survey may be required as part of development reviews;

c. If evidence of historical or archaeological value is exposed through construction or site preparation, work on that location will be temporarily suspended until evaluated by the County or their designees.

Objective 7.1.7: As outlined in the marina siting study, St. Lucie County shall balance the need for environmental protection and restoration with the demands for public, as well as private boating facilities.

Policy 7.1.7.1: The County shall require prospective marina developers to complete the "Preliminary Screening Checklist For Marinas" and review the information with the County Planning Manager to discuss the potential issues for development of marinas in the Indian River Lagoon and North Fork of the St. Lucie River. An official pre-application meeting should be held with the St. Lucie County Planning Manager for early identification of siting issues.

Policy 7.1.7.2: Marinas shall be compatible with the St. Lucie County Future Land Use Map and natural resource protection standards in terms of the types and intensities of uses and the provision of methods to off-set and mitigate impacts to natural coastal area resources.

Policy 7.1.7.3: New marina facilities shall be located in areas that minimize adverse environmental impacts.

Policy 7.1.7.4: St. Lucie County shall encourage the expansion of existing marina facilities and any new water dependent development to take place in disturbed areas.

Policy 7.1.7.5: Adequate and effective measures shall be taken to prevent contamination of area waters from spillage or tank storage leakage. A fuel spill operations and contingency plan will be prepared for all new fueling operations in St. Lucie County. The plan will include operation and safety procedures and contingency plans for clean-up of a potential spill.

Policy 7.1.7.6: Due to the direct economic impact of the marine industry, St. Lucie County shall encourage continued orderly growth of this industry in a manner that maintains the

economic value of coastal resources.

Policy 7.1.7.7: Public marinas, beaches, and other recreational facilities shall be sited with access to major transportation systems, including non-mortorized facilities and existing and proposed mass transit stops.

Policy 7.1.7.8: New and expanded marina facilities shall utilize dry storage, where possible. St. Lucie County shall encourage the use of dry storage in a manner that protects coastal resources and adjacent lands. Review of proposed dry storage area shall consider setbacks, height limitations, parcel size, color, maintenance, etc.

Policy 7.1.7.9: St. Lucie County shall consider zoning classifications for marina development and adopt performance standards and other controlling measures cited in the marina siting study for implementation through the development review process.

GOAL 7.2: REDUCING VULNERABILITY TO HURRICANES. ST. LUCIE COUNTY SHALL STRIVE TO PROTECT THE PEOPLE AND PROPERTY IN ST. LUCIE COUNTY FROM THE EFFECTS OF HURRICANE STORM DAMAGE. ST. LUCIE COUNTY SHALL WEIGH FUTURE DEVELOPMENT AS TO THE IMPACT IT WOULD HAVE ON THE COUNTY=S ABILITY TO PROTECT THE PEOPLE AND PROPERTY IN ST. LUCIE COUNTY FROM THE EFFECTS OF HURRICANE STORM DAMAGE.

Objective 7.2.1: The County shall address development and redevelopment in the coastal area in the County=s Hurricane Evacuation Plan.

Policy 7.2.1.1: The coastal high hazard area shall be defined as all of those properties located within a category one evacuation area. This area includes all mobile home parks, the barrier islands, and any area shown on the Army Corp of Engineers Hurricane Surge Maps as being susceptible in a category one storm surge.

Policy 7.2.1.2: New sanitary sewer facilities in the hurricane vulnerability zone shall be flood- proofed to prevent inflow and insure that raw sewage does not leak from them during flood events.

Policy 7.2.1.3: The construction of County-funded public facilities in the coastal high hazard area shall be prohibited, unless the facility is necessary for public access, natural resource restoration or enhancement, or to provide for recreational facilities and other appropriate water dependent facilities.

Policy 7.2.1.4: New development and redevelopment within V or A flood zones as designated by the Federal Emergency Management Agency shall employ building construction techniques which are consistent with the requirements of the Federal Emergency Management Agency Flood Insurance Program and the County=s Coastal Construction Code.

Policy 7.2.1.5: The County shall prohibit the use of public funds for infrastructure expansion or improvements in coastal high hazard areas unless such funds are necessary to:

a. Provide services to existing development (structures approved for development prior to the adoption of this Comprehensive Plan);

b. Provide adequate evacuation in the event of emergency; or

c. Provide for appropriate water dependent uses including the restoration or enhancement of natural resources within the coastal area.

Objective 7.2.2: The County shall promote the construction of publicly owned buildings that can be safely utilized as public hurricane shelters.

Policy 7.2.2.1: County-funded buildings shall include the function of public hurricane shelter in their design. Some of the elements to be considered in the design are:

a. Flooding potential;
b. Accessibility;
c. Rain surcharge on roofs;
d. Window/door glass exposures;
e. The use of dedicated roll up/down hurricane shutters;
f. Adequate sanitary facilities;
g. Emergency power supply; and
h. Emergency water supply.

Policy 7.2.2.2: Request in writing that other governmental entities in the County design new buildings consistent with Policy 7.2.2.1 when practicable and ask the County's Emergency Management Director to review and comment on proposals for new public buildings.

Policy 7.2.2.3: Structural and functional designs of County buildings shall be reviewed and retrofitted for public shelters where it is cost effective and/or practical.

Policy 7.2.2.4: All new residential development in excess of fifty units in areas subject to coastal flooding shall provide shelter space for twenty percent of the residents at a spacing requirement of forty square feet per person, or demonstrate the availability of the shelter space.

Objective 7.2.3: The County shall maintain the worst case 22.5 hour hurricane evacuation time.

Policy 7.2.3.1: Midway Road, and Prima Vista Boulevard shall be improved as soon as economically feasible so as to achieve and maintain a Level of Service D.

Policy 7.2.3.2: Prior to the completion of the improvements described in Policy 7.2.3.1, the direction of traffic flow for one eastbound lane of each of these roadways (Midway Road, Port St. Lucie Boulevard, and Prima Vista Boulevard) shall be reversed, if necessary, during periods of emergency evacuation.

Policy 7.2.3.3: St. Lucie County shall continue to implement the Treasure Coast Hurricane Evacuation Plan.

Policy 7.2.3.4: St. Lucie County shall require environmental impact studies and appropriate mitigation for any capital projects within the coastal area.

Policy 7.2.3.5: All hurricane evacuation studies and plans conducted by or for the County shall be provided to the Treasure Coast Regional Planning Council, nearby counties, and all municipalities within St. Lucie County for review for consistency with regional and local plans. Conversely, St. Lucie County shall request for purposes of review, all hurricane evacuation studies and plans for nearby counties, municipalities within St. Lucie County, and the Treasure Coast Regional Planning Council.

Policy 7.2.3.6: If the Florida Department of Transportation, in conjunction with Martin County, decides to widen the Jensen Beach Bridge to South Hutchinson Island, discuss possible St. Lucie County participation in the project with the appropriate parties.

Objective 7.2.4: The County shall provide immediate response to post-hurricane situations through the implementation of post-disaster response and redevelopment plans as set forth in the Treasure Coast Hurricane Evacuation Plan.

Policy 7.2.4.1 After a hurricane, but prior to re-entry of the population into evacuated areas, a special meeting of the Board of County Commissioners shall be convened to hear preliminary damage assessments, appoint a Recovery Task Force, and consider a temporary moratorium on building activities not necessary for the public health, safety, and general welfare.

Policy 7.2.4.2 A Recovery Task Force shall be named to include the Community Development Director, Emergency Management Director, County Engineer, and Sheriff, and other members as directed by the Chairman of the County Commission. Staff shall be provided by the departments whose directors sit on the Task Force. The Task Force shall be disbanded after implementing its responsibility.

Policy 7.2.4.3: The responsibilities of the Recovery Task Force shall include: review and issuance of emergency building permits; coordination with state and federal officials to prepare disaster assistance applications; analysis and recommendation of hazard mitigation options to the County Commission, including reconstruction or relocation of damaged public facilities; development of a redevelopment plan; and recommendation of amendments to the Comprehensive Plan, Local Peacetime Emergency Plan, and other appropriate policies and procedures.

Policy 7.2.4.4: The following post-emergency activities shall be pursued: immediate repairs to potable water, wastewater, and power facilities; removal of debris; stabilization or removal of structures about to collapse; and minimal repairs to make dwellings habitable. These actions shall receive first priority in permitting decisions. Long-term

redevelopment activities shall be postponed until the Recovery Task Force has completed its tasks.

Policy 7.2.4.5: If appropriate to rebuild structures which suffer damage in excess of fifty (50) percent of their appraised value, current requirements shall be met including those enacted since construction of the structure including the Coastal Construction Control Line.

Policy 7.2.4.6 Structures which suffer repeated damage to pilings, foundations, or load bearing walls and are proposed to be rebuilt shall be required to rebuild landward of their current location or modify the structure to delete the areas most prone to damage.

Policy 7.2.4.7: Repair or reconstruction of seawalls shall be accompanied by beach fill or other appropriate material authorized by the appropriate Federal or State permitting agencies.

Policy 7.2.4.8: The County shall assess the value of all structures in the coastal high hazard area and the utility of the land for public assess, and evaluate the potential for acquisition, relocation, or other appropriate measures in line with fiscal constraints when post disaster opportunities arise.

Policy 7.2.4.9: The Recovery Task Force shall review all interagency hazard mitigation reports as they are produced and make recommendations for amendments to the comprehensive plan accordingly.

GOAL 7. 3: THE AMOUNT OF PUBLIC ACCESS TO OCEANIC, ESTUARINE, AND RIVERINE COASTAL RESOURCES SHALL BE INCREASED.

Objective 7.3.1: The County shall not experience a net loss of public beach, lagoon, and river access. The County shall continue to increase the number of parking spaces, lagoonal shoreline access, boat ramps, and non-boat fishing access points. Programs for the acquisition of public access facilities shall be consistent with the financing ability of the County.

Policy 7.3.1.1: The County shall enact regulations which provide for the maintenance of existing legally used public access to the beach and lagoon shoreline by new development, and require that existing legally used public beach access points be identified on the site plans for new beachfront development with continuation of the access point relocation of it on the site, or donation of it to the County.

Policy 7.3.1.2: The County shall require parking for and access to all public recreation facilities.

Policy 7.3.1.3: By December 31, 2001, a study of those areas along State Road A1A where paved parking could be provided for access to either the beach or lagoon shall be completed. The study shall be presented to the County Commission for inclusion in the Capital Improvements Element of this Comprehensive Plan and subsequent implementation in a year decided upon by the Commission.

Policy 7.3.1.4: The recommendations of the County=s Boating Facility Siting Plan shall be utilized for the identification of those areas most appropriate for the location of additional boat ramps for access to coastal waters.

GOAL 7.4: PUBLIC FACILITIES SHALL BE ADEQUATE AND AVAILABLE TO SERVE THE RESIDENTS OF AND VISITORS TO THE COUNTY'S COASTAL AREA.

Objective 7.4.1 The appropriate Level of Service standards within this Comprehensive Plan (including those in the Capital Improvement Element and Traffic Circulation Element) and the standards under this objective shall be applied to infrastructure facilities during the development approval process. The service area and phasing of such facilities shall be consistent with the goals, objectives, and policies of this and all other elements of this Comprehensive Plan.

Policy 7.4.1.1: The County shall prohibit the use of public funds for infrastructure expansion or improvements in coastal high hazard areas unless such funds are necessary to:

a. Provide services to existing development (structures approved for development prior to the adoption of this Comprehensive Plan);

b. Provide adequate evacuation in the event of emergency; orc. Provide for appropriate water dependent uses including the restoration or enhancement of natural resources within the coastal area.

Policy 7.4.1.2 The County shall develop criteria for use in the implementation of the regulations required in Policy 7.4.1.1 above.

Policy 7.4.1.3: The County shall cooperate with State and Federal guidelines for all beach renourishment projects which are consistent with the St. Lucie County Comprehensive Plan. Beach renourishment projects shall have a design life of at least five years.

Policy 7.4.1.4: The County shall prohibit development proposals that would reduce the level of service provided by an adjacent renourished beach below locally determined criteria.

Policy 7.4.1.5: The County shall limit future development within water and sewer service areas to the capacity of the facilities to supply the appropriate Level of Service standards established in this Comprehensive Plan.

Policy 7.4.1.6: The County shall require turn lanes, parking lanes, or other paved areas, particularly at appropriate intersections, for new or improved roads, which can be used to increase the number of traffic lanes for hurricane evacuation.

Policy 7.4.1.7: Drainage systems within the coastal area that are operating below the Level of Service standards shall be maintained in accordance with the Drainage Sub-Element of this Comprehensive Plan.

Policy 7.4.1.8: The County shall coordinate with the U.S. Army Corps of Engineers and the State of Florida to implement the Fort Pierce Inlet Management Plan, and shall act as local sponsor when the Fort Pierce Inlet Management Plan is consistent with all provisions of the St. Lucie County Comprehensive Plan.

Policy 7.4.1.9: Public restroom and water disposal facilities shall be provided at waterfront developments accessible by the boating public.

GOAL 7.5: BY OCTOBER 1, 2001, ST. LUCIE COUNTY SHALL DEVELOP A NEW PORT MASTER PLAN FOR THE PORT OF FORT PIERCE TO REPLACE THE EXISTING 1989 PORT MASTER PLAN.

Objective 7.5.1: Incorporate into the Port Master Plan existing and proposed expansions including the 1996 Port of Fort Pierce Charrette report.

Policy 7.5.1.1: Develop the Port Master Plan consistent with Chapter 163.3178(2)(a-k).

Policy 7.5.1.2: The Port Master Plan shall address the environmental conditions of the Indian River Lagoon and its interaction with existing and proposed port activities.

Policy 7.5.1.3: The Port Master Plan shall address all aspects of port management and operation including safety and security of commercial, industrial, recreational, and environmental activities.

Policy 7.5.1.4: Coordinate with the City of Fort Pierce to ensure consistency with the City•s Comprehensive Plan including the Port Sub Element and Coastal Management Element.

Policy 7.5.1.5: Coordinate with the St. Lucie County MPO and other appropriate local, state, and federal agencies to ensure adequate intermodal access and adequacy of public facilities and infrastructure.

Policy 7.5.1.6: Develop funding mechanisms to implement the Port Master Plan such as a Tax Increment Financing District, Community Development Area, as well as exploring other funding mechanisms such a grants.

Policy 7.5.1.7: Throughout the development of the Port Master Plan ensure and encourage public participation of all affected parties through a formalized public participation process.

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