

COASTAL PLANNING DATA AND ANALYSIS

INTRODUCTION

Subsection 163.3177(6)(g), Florida Statutes (F.S.), requires certain designated local governments, including Charlotte County, to have a Coastal Management element as part of the local Comprehensive Plan that "sets forth goals, objectives and policies that shall guide the local government's decisions and program implementation" regarding activities in the 'Coastal Planning Area' (CPA). The Goals, Objectives, and Policies [9J-5.012(3)] of the element state:

- a. The coastal management element shall contain one or more goal statements which establish the long term vision toward which regulatory and management efforts are directed. These shall reflect the stated intent of the Legislature in enacting Section 163.3178, F.S., which is that local governments in their comprehensive plans restrict development activities that would damage or destroy coastal resources, and protect human life and limit public expenditures in areas subject to destruction by natural disasters.
- b. The element shall contain one or more specific objectives for each goal statement which addresses the requirements of paragraph 163.3177(6)(g) and Section 163.3178, F.S. The Coastal Planning element shall set forth the policies that shall guide the local government's decisions and program implementation.

The following sections of this document supports this element's Goals, Objectives and Policies:

As required by Florida Statutes, the Coastal Planning element (CST) sets forth goals, objectives, and policies to guide Charlotte County's decisions. These decisions include (but not limited) the following:

- Restrict development where such activities would damage or destroy coastal resources;
- To limit public expenditures while protecting the health, safety, and welfare of the citizens of Charlotte County.

The CST Data and Analysis document provides an inventory of existing resources along with the analysis of natural resources and land use concerns specific to the County's coastal area, including beach and coastal systems, beach erosion, public access to the shoreline and coastal waters, development and maintenance of infrastructure in the coastal area, existing and future land use activities in the coastal area, and hurricane evacuation times and shelter capacity. For these purposes, the CPA shall include all tidal areas and adjacent lands below the most-recently delineated five-foot contour for Charlotte County (FLUM Series Map # 13: Coastal Planning Area).

RELATIONSHIP TO 2050 PLAN

In addition to meeting the requirements of the State, Charlotte's CST also embodies the goals expressed by the 2050 Framework. While virtually every element of the Plan provides for protecting the County's natural resources; the goals, objectives and policies (GOPs) of the CST provide the public and private sectors with the specific structure, direction and guidance for identifying, preserving and protecting the County's valuable coastal resources.

Specifically, CST Goal 1 and its associated objectives and policies, in conjunction with the Natural Resources and other elements, describes the processes that development activities must follow to minimize impacts and protect valuable coastal marine, aquatic, wetland and wildlife habitats, historical and archeological resources. CST Goal 1 also provides for preserving, developing, and protecting water-dependent activities and facilities. Likewise, CST Goal 2, the Natural Resource and Infrastructure elements provide for identifying water quality conditions, minimizing activity impacts, improving and protecting future coastal water quality. CST Goal 3, in conjunction with the Future Land Use element, provides guidance for limiting government spending and private development in coastal high hazard areas. CST Goal 4 (Coastal Management Plan), in conjunction with the Traffic, Capital Improvements and other elements, provides for evacuation, emergency shelters, public education, and Level of Service (LOS) standards.

LEGISLATION

FEDERAL

- [*Rivers and Harbors Act*](#)
- [*Marine Mammal Protection Act*](#)
- [*Coastal Zone Management Act*](#)
- [*National Flood Insurance Act*](#)
- [*Coastal Barrier Resources Act*](#)
- [*North American Wetlands Conservation Act*](#)
- [*Estuary Protection Act*](#)
- [*Estuaries and Clean Waters Act*](#)
- [*Fish and Wildlife Act*](#)

STATE

- [*Marine Turtle Protection Act*](#)
- [*Florida Manatee Sanctuary Act*](#)

- **Chapter 161, F.S., and Chapter 62B-33, Florida Administrative Code (F.A.C.):** These chapters established the State's beach and shore preservation regulations including structural requirements, Coastal Construction Control Line (CCCL) guidelines, and sea turtle protection regulations.
- [Surface Water Improvement and Management \(SWIM\) Act](#)
- [Mangrove Trimming and Preservation Act](#)

LOCAL

- **Sea Turtle Protection code:** This code requires development to obtain approval from the Department of Environmental Protection pursuant to 62B-33, F.A.C., Chapter 161, F.S. and Section 370.12, F.S.; outlines beachfront lighting requirements, and provides remedies for compliance issues. This ordinance implements local regulations that complement Federal and State sea turtle protection laws, thereby reducing the impacts of uncontrolled construction activity and beachfront lighting on sea turtle reproduction.
- **Shoreline Protection code:** This code preserves the physical integrity of the County's beach and dune system, and protects the public health, safety and welfare by ensuring that all coastal hardening and construction seaward of the CCCL shall be consistent with Chapter 62B-33, F.A.C., and Chapter 161, F. S., and permitted by the Department of Environmental Protection (FDEP). Specific regulations continue to apply to the operation of motor vehicles on beaches and dunes, and require dune walkovers at beach access points.
- **Boats, Docks and Waterways code:** This code designates public bathing beaches and Slow Speed Zones for boats.

THE ESTUARINE SYSTEM

The following subsections document the environmental functions and associated values along with the potential threats to the estuarine system.

ENVIRONMENTAL FUNCTIONS AND VALUES

An estuary is a semi-enclosed water body having an open connection to the sea with a measurable dilution of sea water from freshwater inflow. It is a zone of ecological transition between fresh and saltwater systems, and is the ecological heart of the coastal area.

Charlotte Harbor is still considered one of Florida's most productive estuaries, providing the basis of a multi-million dollar fishing industry as well as critical habitat for a wide range of flora and fauna. Most of the actively nesting bald eagles in the County are found in close proximity to the estuaries, and the food supply they provide. Pelicans and ospreys can be seen fishing the

area's productive waters, while egrets, herons and roseate spoonbills wade the shallow waters in search of food.

The Gulf of Mexico continues to attract an array of tourists each season, and the County's Gulf-front beaches provide not only attractive places for human recreation, but also critical habitat for nesting sea turtles, overwintering and nesting shorebirds, and other wildlife.

Charlotte County's coastal waters support a diverse array of plants and animals. Estevez and co-workers (1981) reviewed existing information on the biological diversity of the Charlotte Harbor Estuary and tabulated the number of species that have been reported in the estuary, or that probably occur in the estuary. The presence of these 1,122 species from several groups of plants and animals been verified in various taxonomic surveys of the Harbor. While this list does not cover all groups of plants and animals that occur in the County's coastal area, it does illustrate that the coastal area supports an impressive diversity of flora and fauna.

Of particular importance to the coast are the benthic invertebrates and fishes that live in coastal and estuarine waters. Benthic invertebrates are the invertebrate animals (e.g., clams, worms, crabs, etc.) that live on or in the bottom of the rivers, bays and harbors and "make their living" by feeding on detritus, bacteria, algae and other aquatic organisms, and which in turn constitute an important food source for fishes. The number of species (diversity) and types of species of benthic invertebrates can also be used to assess the health and environmental quality of aquatic ecosystems.

THREATS

Threats to the estuarine environment generally include point and non-point sources of pollution, changes in the quantity and timing of freshwater inputs, destruction of habitat from dredge and fill activities, and shoreline stabilization (seawalls, etc.). Seagrass meadows are severely damaged by "prop scarring" when boats are run across shallow areas with various types of Seagrass. The furrows caused by the propellers may persist for years. The "Boaters Guide to Charlotte Harbor", produced in 1994 by the County Extension Office, is one of the methods being used to educate boaters and to indicate locations of vital seagrass beds. Marine Advisory Committee (MAC) seek further protection of these areas by providing reliable navigation channels as an alternative to many boaters' habit of seeking deeper water in any direction upon coming to the end of the currently-dredged portion of the channel. High sediment loads resulting from dredging, improper disposal of dredge spoil, and poor land management practices can literally bury seagrass meadows. Various types of Seagrass are also lost as a result of shading from docks constructed over seagrass meadows.

Past, present and future man-made and natural activities have created and will likely continue to create a variety of environmental impacts to coastal resources. A wide variety of impacts are associated with population growth, associated development and human use of coastal lands

and resources. Likewise, there are a variety of impacts associated with many natural forces like weather, climate change and rising sea levels.

OPEN SURFACE WATER RESOURCES

This section documents the surface water classifications and the various major open surfaces waters in the County along with the associated issues, concerns and actions needed to project them into the future.

SURFACE WATER CLASSIFICATIONS

FLUM Series Map#16 generally depicts Charlotte County's surface water features which include both natural and man-made systems. The County's surface waters are categorized as:

- Category I - Potable Water Supplies
- Category II - Shellfish Propagation or Harvesting
- Category III - Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife
- Category IV - Agricultural Water Supplies
- Category V - Navigation, Utility, and Industrial Use
- Outstanding Florida Waters (OFW) - Waters designated by the Environmental Regulation Commission as worthy of special protection because of their natural attributes.
- Outstanding National Resource Waters (ONRW) - Waters designated by the Environmental Regulation Commission that are of such exceptional recreational or ecological significance that water quality should be maintained and protected under all circumstances, other than temporary lowering or lowering allowed under Section 316 of the Federal Clean Water Act.
- Aquatic Preserve - Waters that have exceptional biological, aesthetic, and scientific value to be which are "set aside forever...for the benefit of future generations." Charlotte County also has three aquatic preserves: the Cape Haze Aquatic Preserve, the Gasparilla Sound-Charlotte Harbor Aquatic Preserve, and the Lemon Bay Aquatic Preserve. The Cape Haze and Gasparilla Sound-Charlotte Harbor aquatic preserves are typically jointly referenced as simply the Charlotte Harbor Aquatic Preserve. Supporting Policy and Analysis (SPAM) Series Map # 53 illustrates the boundaries of the aquatic preserves.

Table CST-1: Major Open Surface Water Classifications

Major Surface Water Body	Class I	Class II	Class III	Class IV	Class V	Aquatic Preserve	OFW	ONRW	Nat'l Estuarine Preserve
Charlotte Harbor		*X				X	X		X
Gasparilla Sound		*X				X	X		X
Cape Haze		*X				X	X		X
Lemon Bay		*X				X	X		X
Peace River	*X		*X			*X	*X		
Myakka River	*X					*X	*X		
Shell Creek	*X						*X		
Prairie Creek	*X						*X		
Alligator Creek	*X	*X				*X	*X		

* Peace River – Class I

* Myakka River – River mile 11 to Harbor is Aquatic Preserve and OFW

* Shell Creek – above reservoir to headwaters is Class I and OFW

* Prairie Creek – above reservoir to headwaters is Class I and OFW

* Alligator Creek – Taylor Road to Harbor is Class II, Aquatic Preserve, OFW

* Alligator Creek – Taylor Road to headwaters is Class I

MAJOR OPEN SURFACE WATERS – DESCRIPTION

The following discussion briefly describes conditions within some of Charlotte County’s major surface water features which, for ease of reading, are presented as separate systems. It is acknowledged, however, that such distinctions are wholly artificial, and that from an ecological standpoint all the County’s surface waters (and the groundwaters with which they are hydrologically connected) must be considered as part of a large, interconnected system.

Charlotte Harbor

[Charlotte Harbor](#) is designated as an aquatic preserve, a priority water body of the Southwest Florida Water Management District’s (SWFWMD) [Surface Water Improvement and Management](#) (SWIM) program, the South Florida Water Management District’s (SFWMD) [SWIM program](#) and, as of 1995, is included in the [National Estuary Program](#) administered by the US Environmental Protection Agency. With a surface area of approximately 270 square miles (including the southern portion which occurs in Lee County), and a watershed area of approximately 4,400 square miles ([CNEP Comprehensive Conservation and Management Plan](#)), the Charlotte Harbor Watershed, identified in SPAM Series Map #54, is the second largest estuary in the State of Florida. In addition to being considered one of the State’s most productive estuaries for commercial and recreational fishing, it provides habitat for more than 30 endangered species (Hammett, 1988). The Harbor’s major tributaries are the Peace, Myakka, and Caloosahatchee (in Lee County) rivers, as well as numerous smaller creeks and streams.

Charlotte Harbor is separated from the Gulf of Mexico by a chain of barrier islands and connected to it through a series of passes, the largest of which are Boca Grande Pass and San Carlos Pass (in Lee County). Including its southern portion, Charlotte Harbor has an average depth of approximately seven feet, though the northern portion tends to be deeper (SWFWMD SWIM Plan, 1993).

The 2002 [Southwest Florida Regional Planning Council's Strategic Regional Policy Plan, \(SRPP\)](#) identifies the Charlotte Harbor Estuary as one of Florida's largest bays. Fresh water is fed to the system from the north by the Myakka and Peace Rivers and from the east from several small coastal creeks and canals. Charlotte Harbor is significantly influenced by the flows from the Peace River to the north.

Charlotte Harbor's shoreline is predominantly comprised of mangrove swamps. Urban developments do occur in some areas of the northernmost section of the Harbor (Port Charlotte) and at the mouth of the Peace River (Punta Gorda). Along the southern basin boundary, large upscale community developments are being developed. The Charlotte Harbor National Estuary Program (CHNEP) credits urban development for changing the character and ecology of river mouth and coastal waters.

Lemon Bay

Lemon Bay was designated an [Aquatic Preserve](#) by the Florida Legislature in 1986, and, like all Aquatic Preserves, is an Outstanding Florida Water. The Lemon Bay Watershed, identified on SPAM Series Map #55, occupies approximately 73 square miles and is located within Charlotte and Sarasota counties. A relatively long, narrow body of water, Lemon Bay's average width along its 13 mile length is three-quarters of a mile, though this figure ranges between one-eighth of a mile and 1.2 miles. Lemon Bay has an average depth of approximately 6 feet at mean high water (FDNR 1991).

Lemon Bay is separated from the Gulf of Mexico by a chain of barrier islands, and connected to it through Gasparilla and Stump passes. There are seven shallow tidal creeks that drain into Lemon Bay. These are: Lemon, Buck, Oyster, Ainger, Gottfried, Forked, and Alligator creeks. Forked and Alligator creeks draining occur in Sarasota County. Waterward of the bridges over County Road 775, these tributary creeks are considered part of the aquatic preserve.

The Peace River

The Peace River begins in the waters of the Green Swamp and partially connected lakes in Polk County (Black, Crow and Eidsness, 1976), and, after coalescing into a defined stream near Bartow, flows generally southwest for approximately 105 miles until it empties into Charlotte Harbor in Charlotte County (Hand, et. al., 1994). The Peace River Basin encompasses in excess of 2,400 square miles (CDM, 1994), and, as shown in SPAM Series Map #56, includes all of Hardee and DeSoto counties, as well as significant portions of Charlotte, Highlands, and

Polk counties. Much of the Peace River is designated a Class I Water, as well as an Outstanding Florida Water.

The Peace River is the largest of Charlotte Harbor's tributaries, contributing well over half of the freshwater which flows into the estuarine system. Because of this, and because it is the principal source of potable water for much of the greater Port Charlotte area, as well as an important river for industry, agriculture, tourism and the environment, the Peace River has been the subject of a great deal of monitoring and study for a number of years.

The Myakka River

The Myakka River originates in the marshes of Myakka Head in Manatee County and flows in a roughly southwesterly direction until it empties into Charlotte Harbor, draining a basin of approximately 550 square miles as illustrated by SPAM Series Map #57. A 34-mile segment, which begins at the crossing of County Road 780 (river mile 41.5 in Sarasota County) and ends at the Sarasota/Charlotte County line (river mile 7.5), was declared a Florida Wild and Scenic River in 1985. This segment is also designated an Outstanding Florida Water. The lands by which the Myakka River passes along its 66-mile course are predominantly rural with many of the natural riparian communities intact. South of the Wild and Scenic segment, along its banks in Charlotte County, however, a substantial amount of urban development has occurred, including the 1960's vintage Gulf Cove developments along its southern (or western) shore, and the community of Riverwood along its eastern (or northern) bank. Through the Development of Regional Impact review process, much of the native vegetation (particularly in wetland communities) along the Riverwood shoreline has been maintained. The waterway is also a SWIM priority and is recognized by the CHNEP as an estuary of national significance.

From the Manatee County line to river mile 20, the Myakka River is designated a Class I Water; from river mile 11 to Charlotte Harbor, it is designated a Class II Water. The segment between the State Road 776 in Charlotte County and the start of Charlotte Harbor proper is considered part of the Charlotte Harbor Aquatic Preserve and is, therefore, designated an Outstanding Florida Water (Hunter Services/FDNR, 1990).

Prairie and Shell Creeks

This system is discussed in the Natural Resources Data and Analysis.

Alligator Creek

Alligator Creek, shown on SPAM Series Map #58, was once also known as Allapatchee Creek. The creek rises in central Charlotte County and flows generally westward, draining a basin of approximately 38.5 square miles, including portions of the Babcock/Webb Wildlife Management Area. Both the north and south prongs of Alligator Creek are classified as Category I waters from their headwaters to Taylor Road (State Road 765-A). Alligator Creek served as the City of Punta Gorda's drinking water supply from 1936 until 1965 when the Shell/Prairie Creek system came on line. The tidal portions of Alligator Creek, up to the salinity barrier located at Taylor

Road along the South Fork and to Taylor Road for the North Fork, are part of the Charlotte Harbor Aquatic Preserve.

Alligator Creek is subject to extended periods of little or no flow; it is also known to have elevated levels of chlorides and dissolved solids as well as periods of low dissolved oxygen (Black, Crow, and Eidsness, 1976). Because of its past use as potable water supply and Class I designation, Alligator Creek was included in the Special Surface Water Protection Overlay District. Prior to the creation of this Comprehensive Plan, the City of Punta Gorda recommended that Alligator Creek be removed from this district, as reflected by the Future Land Use Map Series #1, presented in the Future Land Use element.

On its way to Charlotte Harbor, Alligator Creek passes through the State-owned lands which comprise the Charlotte Harbor Buffer Preserve. As its name implies, the buffer preserve is managed by the FDEP to protect Charlotte Harbor from anthropogenic degradation, and as upland preserve area in its own right. The Charlotte Harbor Environmental Center occupies approximately 20 acres of the buffer preserve in the vicinity of Alligator Creek, and provides opportunities for outdoor education and recreation.

Man-made Canals

Charlotte County has hundreds of miles of man-made canals which were constructed as part of the Port Charlotte, Punta Gorda Isles, Rotonda, South Gulf Cove, and other residential subdivisions. They were created both by channelizing natural drainage features and by excavating uplands. These canals serve a number of purposes, including drainage, creation of waterfront property as an enhancement for sales, access to Charlotte Harbor and the Gulf of Mexico, and as a source of fill material (when originally constructed) for the creation of developable lots.

Many of the canals in Port Charlotte drain directly into Charlotte Harbor; some, however, such as the Manchester Waterway system, drain into an interceptor lagoon which was constructed specifically for the purpose of providing a rudimentary level of water treatment prior to discharging into the Harbor.

Similarly, the canals of South Gulf Cove feed into an interceptor lagoon that borders the western portion of the Charlotte Harbor Buffer Preserve. Again, this lagoon was constructed specifically for the purpose of treating the canal water prior to discharge into Charlotte Harbor.

While the Punta Gorda Isles canal system does not drain into an interceptor lagoon, it is a somewhat self-contained system, with relatively few points of discharge into the Harbor. The City of Punta Gorda monitors the quality of the water at a number of stations located throughout this canal system.

MAJOR SURFACE WATER PROGRAMS AND PLANS

Charlotte Harbor National Estuary Program

In 1995, Charlotte Harbor was selected for inclusion in the National Estuary Program (NEP) administered by the Environmental Protection Agency. The Charlotte Harbor National Estuary Program (CHNEP) study area includes substantial portions of Lee, Charlotte, DeSoto, Hardee, Polk, Sarasota, and Manatee Counties. The CHNEP is administered locally by the Southwest Florida Regional Planning Council (SWFRPC). Considering the ongoing and past studies that have been conducted in the estuary, inclusion into this national program represented the next logical step in maintaining and improving the quality of the Charlotte Harbor estuary and the watersheds of the CHNEP Study Area. Without effective coordination, integration, and expansion of management efforts, it is doubtful that the Harbor's productivity and overall ecological integrity could be sustained with the continuing trend of development and overuse that it will surely experience.

The CHNEP is governed by a management conference comprised of a Policy Committee, a Management Committee, a Technical Advisory Committee, and a Citizens Advisory Committee. The goals, policies, and implementing actions of the NEP are contained in a Comprehensive Conservation and Management Plan (CCMP) which was completed in March 2000. The CCMP is implemented through research, restoration, legislative advocacy, and public outreach. The partners of the CHNEP are primarily responsible for implementing the CCMP. The CHNEP program contracts targeted research, support grants, conducts public outreach, participates in and coordinates restoration programs, advocates positions to protect Charlotte Harbor and its watersheds, and pursues funding on behalf of partners. More can be found at www.CHNEP.org.

Section 208 Studies

Assessing the impact of non-point sources of pollution on the County's estuaries was the subject of two water-quality management studies (Section 208 studies) conducted in 1976-77 for the Charlotte Harbor and Lemon Bay estuarine systems. In the Charlotte Harbor 208 study, septic tank leachate, eroded soil and urban stormwater containing lawn fertilizers were identified as local non-point sources of contamination. Detectable levels of organo-chlorine pesticides, including Benzylchlorida, Dieldrin, Lindane, Heptachlor, and Aldrin were found in the tributaries and in the northern portion of the estuary.

The Lemon Bay 208 study attributes degraded water quality in the Lemon Bay estuary to a variety of non-point sources. Historically, clear-cutting of the pine flatwoods and cattle grazing on Cape Haze, and improper disposal of dredge spoil during the dredging of the Intracoastal Waterway resulted in increased siltation and nutrient levels in the estuary (Morrill et. al., 1978). More recently, land development activities, including the extensive destruction of wetlands and sloughs that comprised the headwaters of Oyster Creek and Buck Creek, the channelization of Oyster Creek, the construction of dead-end finger canals along the shoreline of tidal creeks and

Lemon Bay, and bacterial contamination by cattle and septic systems, are cited as contributing factors to the overall degradation of water quality in the Lemon Bay Estuary (Morrill, et. al., 1978).

1981 Charlotte Harbor Resource Planning and Management Plan

In January, 1979, Governor Bob Graham formed the Charlotte Harbor Resource Planning and Management (CHRP) Committee. This committee was charged with addressing problems related to rapid population growth, the need to improve and expand public services, and protection of the Harbor and its related coastal estuaries. The CHRP Plan outlined many issues relevant to the preservation of water and land resources and to wise land development for both the 1980s and 1990s. The plan developed two overall goals for Charlotte Harbor:

- To maintain and improve the functional and structural integrity of the natural estuarine ecosystems and related coastal components through coordinated management of human impacts in surrounding uplands and freshwater systems;
- To identify and address the impacts of growth so as to minimize or eliminate adverse effect on the Charlotte Harbor area.

The CHRP also outlined the need for region-wide commitment to the plan and laid out regulatory actions in the form of goals, objectives, and policies that addressed twelve issues relating to water quality and growth. Overall, the CHRP is considered a success, accomplishing many of its goals and setting into motion programs and policies which will be good for the estuary's future. Since 1988, the Charlotte Harbor Management Plan has been incorporated by reference into the Charlotte County Comprehensive Plan.

Charlotte Harbor Surface Water Improvement and Management (SWIM) Plan

The Surface Water Improvement and Management Act of 1987 directed the State's water management districts to design and implement plans and programs for the improvement and management of surface waters. Of particular concern was the ecological, recreational, aesthetic, and economic value of the State's waters.

Charlotte Harbor's estuarine system ranks sixth on SWFWMD's priority list of SWIM water bodies. Since the Charlotte Harbor watershed was seen as being of regional and statewide significance, with overall good water quality, and natural systems that were not significantly degraded, it was designated as a Preservation water body. This means that the plan focuses primarily on maintaining and protecting existing water quality and natural systems, and enhancing and restoring water quality or natural systems when necessary and feasible.

Four primary goals were developed for the Charlotte Harbor SWIM program. They are:

- To preserve natural and functional components of the ecosystem while restoring, where feasible, such conditions to the degraded portions of the system;

- To preserve or, where necessary, restore the quantity and quality of water necessary to support thriving biological communities, containing appropriate diversities of native species, within the riverine, estuarine, and lagoonal systems of the Charlotte Harbor watershed;
- To establish an ongoing public education program to communicate the beneficial reasons for the long-term conservation and preservation of the Charlotte Harbor system;
- To pursue the development and implementation of management plans for each of the Harbor's major tributaries, concurrently with implementation of the management plan.

Projects included under the SWIM plan include establishing water quality targets, determining the loading capacity of major pollutants (including nutrients), identification of point and non-point sources of pollutants, habitat protection and land acquisition, regulatory enforcement and compliance monitoring, and public education.

Peace River Cumulative Impact Assessment

In 2003, the Florida Legislature directed the FDEP to assess the cumulative impacts in the Peace River. This study was performed by the FDEP at the direction of the Florida Legislature and in accordance with Chapter 2003-423, F.S. The purpose of the study was to assess the cumulative impacts of activities in the Peace River basin, and to form the basis for preparation of a resource management plan. The subsequent resource management plan (not a part of this study) identified regulatory and non-regulatory means to minimize future impacts to the basin.

The project's objective was to assess the cumulative effects within the study area of historical land use, water use, and climate changes on Peace River stream flows, water quality, and ecological factors. To this end, the project developed a database of existing information and applied statistical and other analytical techniques to assess the degree of influence these factors have had on the Peace River drainage basin, including Charlotte Harbor. The project duration was September 2004 through August 2006. This information was critical to the project outcome since a significant part of the scope-of-work involves determining land use changes due to urbanization, mining, and agriculture over the last 60 years in the basin. The total project cost was \$750,000, funded entirely by the FDEP. For updated information regarding this study, go to: <http://www.swfwmd.state.fl.us/waterman/peacriver/index.html>.

County's Marine Land and Water Use Siting Study

The County's Marine Land and Water Use Siting Study was conducted by the University of Florida/Florida Sea Grant program. Although the Study was completed, it was never adopted by the County Commissioners. Recommendations from the Study will be considered in evaluating future projects.

Public Boating Access Study

The project shall consist of updating the April 1997 *Planning for Public Boating Access: A Geographic Information Systems Approach to Evaluate Site Suitability for Future Marinas, Ramps and Docks*. This will occur in three phases as outlined below. As each phase is completed, it will be presented to the Board of County Commissioners and adopted as a large scale plan amendment to the Smart Charlotte 2050 Comprehensive Plan.

Phase 1 – Tasks 1-3 shall be completed by Florida Sea Grant through the University of Florida Law School: (1) Evaluate Charlotte County's compliance with State working waterfront legislation; (2) Outline the development of a Charlotte County Manatee Protection Plan; (3) Update the 1996 Marine Use Regulatory Study for Charlotte County.

Phase 2 – Tasks shall include: (1) Evaluating and making recommendations to address the effect of sea level rise on Charlotte County's coastal properties, (2) Make recommendations concerning the creation of a marine overlay district, (3) Make recommendations to create flexible zoning regulations to encourage water access and marine facilities.

Phase 3 – Tasks shall include developing a manatee protection plan for Charlotte County.

MAJOR OPEN SURFACE WATERS – ISSUES, CONCERNS, AND FUTURE ACTIONS

Water Quality Issues and Concerns

Charlotte Harbor continues to be the focus of numerous water-quality monitoring programs. In 2001, Charlotte County and SWFWMD entered into an agreement to provide random water quality sampling in Charlotte Harbor. Testing of Lemon Bay is also part of the water-quality sampling program. The agreement states that SWFWMD is responsible for the water sampling which is done by the Florida Fish & Wildlife Conservation Commission, Fish & Wildlife Research Institute, while Charlotte County is responsible for the lab analysis.

In addition to the County agreement with the SWFWMD, other groups also do water sampling. With help from local volunteers, the Charlotte Harbor Environmental Center conducts monthly water-quality tests in the Lemon Bay and Gasparilla Sound areas of greater Charlotte Harbor as part of the Charlotte Harbor Aquatic Preserve Program. Another volunteer program started in 1996, called the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network, is managed by the FDEP and Charlotte Harbor Aquatic Preserves in Punta Gorda. The monitoring efforts undertaken by many different agencies are tabulated by FDEP through its Water Quality Assessment Report which is required by Section 305 (b) of the Clean Water Act.

Sampling sites can be seen on SPAM Series Map #59. SWFWMD samples ten sites, the City of Punta Gorda samples nine sites, the Peace River/Manasota Region Water Supply Authority

samples three sites, and the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network (monitored by FDEP) samples 30 sites. This data is uploaded into STORET, (Storage Retrieval) EPA's national data system. This system holds all of the water quality data collected by the various entities in Florida. Charlotte Harbor Environmental Center utilizes this system as well. The uploading is paid for by SWFWMD as part of the agreement. The agreement was only a forty-two month agreement; however it has been extended through 2008 with the anticipation of additional extensions at the time of expiration.

The latest water testing information is compiled from a sub-committee of the CHNEP, which is mapping all the monitoring sites from the various groups and agencies monitoring the Harbor. The following agencies have some form of monitoring programs in the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network: the City of Cape Coral, the City of Punta Gorda, Lee County, Manatee County, Polk County, Sarasota County, SWFWMD, and Peace River Manasota Region Water Supply Authority. All groups monitor particular sections of the River.

The County's surface waters continue to meet the standards of their classifications, though there is some evidence that anthropogenic impacts, locally and regionally, (including runoff from urban and other land use activities, alterations of drainage basins, decreasing flows, and hydrologic alterations) are becoming manifest, particularly in near-shore, shallow portions of the County's estuarine systems, and within certain areas of the man-made canals.

Likewise, while Charlotte County's groundwater resources are largely intact, urban development and cyclic climate conditions (drought conditions in 1999 and 2009) have impacted direct recharge of the surficial (water table) aquifer and regional stream flows which provide most of the area drinking water and freshwater needed to maintain the estuarine health, integrity and productivity that are critical to the regional economy.

Although the SRPP and the CHNEP report that the water quality in the basin is generally good, there are some areas of concern. The CHNEP states that nutrient levels such as phosphorus and nitrogen are at higher levels. Phosphorus levels are also elevated and are believed to originate in the Peace River watershed and are associated with the impacts from mining activities in Polk and Hardee Counties. Much of the pollution identified within the estuary can be linked to development, this includes bacteria which enters the system from urban runoff through canals, and sediments from construction and from reverse osmosis discharges.

Excessive surface water withdrawals from rivers and creeks for purposes of water supply may also degrade estuaries that receive freshwater inflows. Changes in historic/natural duration, seasonality and volume of water may affect important sport and commercial saltwater fisheries and other estuarine species. Reports do indicate that fisheries have declined, and shellfishing is periodically closed due to bacterial contamination. Despite these considerations, surface

water withdrawals from the Peace River and the Myakahatchee Creek are proposed for expansion due to the need to supply the continuing development of the area.

Urban development continues to change the character and ecology of river mouth and coastal waters. Mangroves are removed or cut back, red tide events cause public health warnings, seagrass areas have declined or have been damaged, and groundwater pumping has reached its maximum limit. Although the main body of Charlotte Harbor and its adjacent estuarine systems, as stated previously, are in comparatively good condition, the watershed reflects the pressure of human activities. If the population within the watershed continues to grow at predicted growth rates, these pressures must be addressed to prevent further threats to natural systems and to protect current uses of resources.

Management challenges include not only water quality issues but management of mangrove areas, protection of seagrass areas from boat damage and water pollution, establishment and protection of new water supply sources for growing populations and businesses, management of waste generated by septic tanks and sewer outfalls, protection of wetland areas for water retention, groundwater recharge, and wildlife habitat, and improving the efficiency of freshwater usage.

Future Actions

The County has attempted to take additional steps that would protect certain species and their habitats. The State and many counties have realized that protection and proper management of large tracts of land not only protect rare species, but indirectly benefit the public interest in that they provide opportunities for recreation (hiking, biking, horseback riding, nature appreciation) and environmental education. These green spaces, when protected through a thoughtful process that balances acquisition and regulation, serve the interests of the community at large. Finally, wildlife habitat protection compliments the County's commitment to wetland and water protection as well as preservation strategies that are the result of environmental land acquisition efforts. Therefore, Charlotte County intends to pursue additional protection measures for wildlife habitat protection.

COASTAL PLANNING AREA NATURAL RESOURCES AND ACCESSIBILITY

Charlotte County's CPA is endowed with a great diversity of native habitats including coastal dunelands, a major estuary and river system, swamps, pine flatwoods and oak scrub. These habitats are important resources which perform a number of vital functions. Coastal wetlands, mangroves and tidal marshes improve water quality, act as storm buffers, provide shelter for coastal wading birds and perform a vital role in the important and complex estuarine food chain which is the foundation of a multi-million dollar fishing industry. The barrier island beaches and dunes dissipate wave energy and act as a repository for shifting sands as well as serving as an upland buffer from erosion and flooding. Upland habitats are vitally important as well in that

they provide habitat for a number of threatened or endangered species such as the bald eagle, and perform flood control functions and buffer the area's waterways from pollutants found in stormwater runoff.

COASTAL NATIVE COMMUNITIES

The following descriptions are of native communities endemic to coastal areas in Charlotte County. The Natural Resources Data and Analysis contains a discussion of a broader range of native communities and habitats occurring throughout the County.

Tidal Marshes and Salt Flats

Tidal marshes are found along gradually sloping, low-energy coastlines with salinities ranging from nearly-fresh to full-strength sea water. Salt grass and slender cordgrass occupies the deepest zone of the marsh, with black rush dominating the wide mid-zone. Salt grass and slender cordgrass occur in the innermost zone which is only inundated by storm tides. This typical zonation may be indistinct or irregular, depending on substrate topography or disturbances such as ditching and diking. Sea myrtle, saltwort, sea-oxeye daisy, key saltgrass, glasswort, and other high marsh species may be encountered at landward fringes of the marsh and in salt flats. Because the high marsh and salt flat areas are only periodically inundated by sea water, evaporation of ponded water imparts a high concentration of salt to the soil. The plants that grow in these areas are extremely tolerant of the high salt content of the soil.

Mangrove Swamps

These brackish or salt-water swamps are found along low-energy coastlines and occupy more than 14,000 acres in Charlotte County. Florida is the only state in which the three species of mangroves occur. The red mangrove (*Rhizophora mangle*) is an intertidal species that is typically found growing along the water's edge and may be identified by its tangled network of reddish prop roots. The black mangrove (*Avicennia germinans*) is also an intertidal species which is usually located inland of red mangroves. They occur in the part of the system that has the least tidal flushing and circulation. The black mangrove can be identified by its numerous finger-like projections, called pneumatophores, which protrude from the soil around the tree trunks. The white mangrove, (*Laguncularia racemosa*) typically occupies the highest elevations farther inland than the red and black mangroves, although it can be interspersed through the swamp. The white mangrove differs from the red and black mangrove in that it has neither an aerial root system nor pneumatophores. Identification is best accomplished by examining the leaves, which are elliptical, light yellow-green, and have two distinguishing glands at the base of the leaf blade where the stem starts. It is interesting to note that, while other coastal habitats are known to have experienced significant declines in aerial extent, mangrove forest acreage has increased by approximately 10 percent between 1945 and 1982 (Harris et. al, 1983).

The animals that rely on tidal marshes seeds for habitat include the salt marsh snake, diamondback terrapin, Florida clapper rail, seaside sparrow, black-necked stilt, Marian's marsh

wren, sharp-tailed sparrow, marsh rabbit, marsh rice rat, raccoon, and even white-tailed deer. Many wading birds feed on the small crustaceans and fishes abundant in salt marshes. The salt flats are used as corridors by raccoon, opossum, rabbit and bobcat that come to the estuarine edges to feed.

Mangrove swamps provide habitat for a multitude of forage species including mosquitoes, small fishes, bivalve and gastropod molluscs, fiddler crabs, amphipods and other small crustaceans. Birds comprise the most diverse and numerous groups of larger animals inhabiting mangrove swamps. Herons including the little blue, green, Louisiana, great blue, and both the yellow-crowned and black-crowned night herons nest in mangrove habitats, as do the snowy, reddish, cattle, and great egrets. Roseate spoonbills, white ibis, wood storks, and double-crested cormorants also nest in mangroves. Other species characteristic of these swamps include the red-shouldered hawk, osprey, belted kingfisher, turkey vulture, black vulture, pileated woodpecker, fish crow, mangrove cuckoo, blue-gray gnatcatcher, Carolina wren, Cuban yellow warbler, prairie warbler, and boat-tailed grackle. Many species are abundant in mangrove habitats as seasonal residents or migrants including the cardinal, robin, American redstart, palm warbler, black throated blue warbler, and black and white warbler. Many of these birds are primarily associated with the waterward or landward swamp fringes.

In addition to wildlife habitat, coastal wetlands provide many other environmental benefits, including buffering of storm tides and winds, shoreline stabilization and biological filtration and assimilation of nutrients and other pollutants contained in upland runoff. However, the single most significant function of coastal wetlands is the production of detrital food for estuarine and coastal waters. Detritus is the broken-down plant material produced by wetland plants. Detritus from mangroves, tidal marsh, and salt flats forms the base of the food web which supports virtually the entire estuarine and near-shore marine communities.

Mullet, redfish, spotted sea trout, snook, tarpon, bluefish, mangrove snapper, stone crab, blue crab, pink shrimp, oysters and clams are but a few species sought by commercial or sport fishermen, which are dependent upon this nutrient base. Non-tidal mangrove wetlands may significantly contribute to the estuarine system via heavy utilization by wading birds and other predators of forage fishes, fiddler crabs, and other primary consumers of mangrove detritus.

Estuaries and Bays

The Charlotte Harbor Estuary, Lemon Bay Estuary, Placida Harbor and Gasparilla Sound are the major bays and estuarine systems found in the County. Bays and estuaries are created by the mixing of fresh water rivers and the oceans, and are typically highly productive systems. Their general characteristics include typically shallow depth (less than 20 feet), good mixing of the water column and flushing by tides and freshwater inflow. Salinity varies from fresh-water to normal sea water, and may fluctuate seasonally. Mangroves, salt marshes, seagrass beds, phytoplankton, tidal flats, and oyster bars all play significant roles in estuarine ecology. Wildlife resources are abundant and diverse, with many commercial or sport fishes and crustaceans

inhabiting these areas permanently or as juveniles. Many wading birds, waterfowl and shorebirds winter, feed, and nest in these areas or on landward fringes and islands.

Seagrass Meadows

Seagrass meadows (seagrass beds) are underwater fields of flowering vascular plants that grow on the bottoms of coastal bays and estuaries. Several types of seagrasses are found in the County's coastal waters, including turtle grass (*Thalassia testudinum*), shoal grass (*Halodule wrightii*) and manatee grass (*Syringodium filiforme*). According to several professional biologists familiar with Charlotte County's waters, widgeon grass (*Ruppia maritima*) has also been observed during summer months in Charlotte Harbor and associated brackish water ponds located in the Charlotte Harbor Buffer Preserve. Major seagrass concentrations can be found along the eastern and western shores of Charlotte Harbor, Bull and Turtle Bays, and throughout Lemon Bay as illustrated by SPAM Series Map #60. Seagrass meadows are highly productive habitats that serve as nursery areas for many commercially and recreationally important fishes and provide critical feeding habitat for sea turtles and the West Indian manatee.

Harris and co-workers (1983) estimated that there were 12,554 acres of seagrasses in Charlotte Harbor, Gasparilla Sound and Placida Harbor in 1982, compared with 16,261 acres in 1945. This represents a 28 percent decrease in coverage over the 37-year study period. While the causes for decline are speculative, known threats to seagrass meadows include degradation of water quality, increased scarring and water column turbidity caused by boat traffic in shallow waters, and the large number of small docks and piers being built to accommodate residences, especially on the barrier islands.

Aerial seagrass surveys have been conducted bi-annually in Charlotte Harbor since 1982 and in Lemon Bay since 1990, with no significant trends in seagrass extent observed over the period of recording in either system. Though no trends in extent have been observed, trends in declining seagrass density are occurring.

The FDEP Charlotte Harbor Aquatic Preserves have conducted annual seagrass transect monitoring since 1999. A draft summary prepared by the Charlotte Harbor Environmental Center for data from the period 1999-2004 indicates declines in seagrass density for all species and all areas sampled within Charlotte County's coastal waters. Although a cause for this decrease in seagrass density is not known, water quality degradation is a likely source.

Tidal Flats

Tidal flat areas are periodically inundated flats located at the mouths of rivers, near inlets, along the shoreline of the harbors and bays, immediately waterward of tidal marshes or mangrove forest, or in dredge spoil disposal areas. They range from transient unstable areas used primarily by shorebirds and wading birds, to stable mudflats with extensive algal, mollusc, crustacean, and worm communities. Cuban shoalgrass, turtlegrass, red mangrove saplings, cordgrass, or other plants may occur sporadically, but these flats are generally devoid of

vascular vegetation. Fiddler crabs, spider crabs, horseshoe crabs, quahog clams, oysters, slipper shells, barnacles, moon snails, various sponges, and numerous additional molluscs, crustaceans, and worms are often abundant in such habitats.

Soft Bottoms

The bottoms of estuaries and bays are generally made up of soft, unconsolidated sediments. These unvegetated, soft bottoms are colonized by animals that live on or in the sediments (called “benthic” animals, or “benthos”), including fish and many invertebrates such as clams, worms, and blue crabs which are an important component in the estuarine food web.

Oyster Bars

Reefs or bars built by successive generations of the American Oyster (*Crassostrea virginica*) and other marine encrusting organisms are conspicuous features of the tidal creeks and shallow waters of Charlotte Harbor and Lemon Bay. Approximately 92 acres of oyster reefs were identified in Charlotte Harbor, Gasparilla Sound and Placida Harbor in 1982 (Harris, et. al., 1983). This represents a decrease of 60 percent in oyster reef habitat for these areas since 1945. The cause of the decline is uncertain, but may include changes in salinity, increased sediment and pollutant loading to the Harbor, and over-harvesting (Harris, et. al., 1983). As oyster reefs are not identified as a specific habitat on either the Game Commission or Charlotte County inventories, the data gathered by Harris in 1983 is the most recent available; the County is hoping to update this information in the next few years. Oysters and other shellfish may be harvested from surface waters classified by the State of Florida as Class II waters.

Tidal Creeks

Tidal creeks in Charlotte County are typically small, natural flowways that usually drain from freshwater marshes and wet prairies into larger estuaries and bays. Major tidal creeks in Charlotte County include Gottfried, Ainger, Oyster, Buck, Coral and Alligator Creeks. Typically these creeks have tidal marsh vegetation along their banks and mangroves at their mouths, and may contain oyster reefs and islands of marsh and mangrove vegetation. Tidal creeks represent a complex of wetland habitats that function as an integrated and unique habitat type.

Indian Mounds

For frequently identical reasons, the Native Americans and European colonists (and later homesteaders) tended to settle along waterways; reminders of their presence are scattered across the County. Pre-Columbian mounds and other sites form the basis of Charlotte County’s archaeological record. In coastal areas, the native inhabitants consumed large amounts of shellfish. Those shells that were not used for various tools were discarded in large mounds.

Though not truly “natural” habitats, these mounds form unique, well-drained, calcareous microhabitats which are colonized by tropical species such as gumbo limbo which can persist due to the warming influence of coastal waters along which the mounds are typically found. Less tropical species such as cabbage palm, coral bean, prickly pear cactus, and coontie are

also found in these areas. Indian mounds are utilized by many of the same faunal species which occur in cabbage palm hammocks, such as squirrel tree frog, rat snake, Carolina wren, fish crow, cotton mouse, and raccoon.

Coastal Strand

The coastal strand is a thin strip of fragile, wind-pruned herbaceous vegetation which lies between the beach and dune systems and the more forested coastal areas (often called Maritime forests). This important community often is composed of thickets of saw palmetto, sand live oak, cabbage palm, Spanish Bayonet, Florida rosemary and other plants.

Coastal Hammocks

Coastal hammocks may be defined simply as the forested areas between the dune and the mangroves on the barrier islands. In some places, coastal hammocks look like traditional mainland hammocks, with cabbage palms and live oaks. In other areas, these hammocks take on a tropical appearance and may include Hercules club, wild lime, saffron plum, prickly apple, Florida coontie, sea grape, gumbo limbo, and strangler fig.

Dunes

Dune lands include the active dunes, sand ridges, troughs, and flats lying behind the beach berms that mark the upper limit of the dry beach. Bounded at their seaward edge by the upper line of the beach at the annual highest tide mark, or a coinciding vegetation line, dune lands extend landward as far as the land is subject to active gain or loss of sand because of the sea or sea wind. The dune land may be quite narrow or may extend many hundreds of feet.

Dune lands in Charlotte County are generally low lying and are dominated by plants which are salt tolerant and able to grow in the dry nutrient-sparse habitat. The most dominant plant species of the dune lands is sea oats (*Uniola paniculata*), beach elder (*Iva imbricata*), beach berry (*Scaevola plumieri*), and railroad vine (*Ipomoea pes-caprae*).

Wildlife species utilizing dune lands for foraging and nesting habitat include ghost crabs, eastern indigo snakes, raccoon, and gopher tortoises. Sea turtles also commonly use the dune areas as nesting habitat. Charlotte County's primary beach system is found on a series of barrier islands which include, from north to south, Manasota Key, and Knight, Bocilla, Don Pedro, Little Gasparilla and Gasparilla islands. The beaches and dunes of these islands perform a vital role in that they serve as the primary source of natural protection for Gulf-front property against storms and hurricanes.

Beaches

Beaches and dunes are dynamic systems which are in a constant state of change, exhibiting both erosion and accretion (building up) trends at various times as a result of wind, waves, tides, storm events, and human activities. The beach is basically the unvegetated face of the shoreline that extends from the upper edge of the beach berm (the lower edge of dunelands)

seaward to the low water mark. The beach system consists not only of the foreshore area, but also of the unvegetated submerged near-shore area out to depths approaching 40 feet. Beaches are unique environments occupied by animals that have adapted to the constant motion of the sand, gravel or shell. Coquina clams and sand fleas fight for position and filter seawater for microscopic prey just below the sand's surface. A variety of shorebirds and wading birds (like sandpipers and herons) search for prey along the water's edge. A number of rare and endangered species utilize beaches for foraging or as nesting habitats, including least terns, American oystercatchers, and loggerhead and green sea turtles.

Charlotte County has about 12.5 miles of Gulf Coastal beaches running the length of its barrier islands and spits. Moving from north to south, Charlotte County's barrier islands include the southern 4 miles of Manasota Key; the 6.7 mile Don Pedro Island chain (Knight-Don Pedro-Little Gasparilla) which was separated by Bocilla Pass, Blind Pass and Little Gasparilla Pass in recent times; and the northern 1.8 miles of Gasparilla (Boca Grande) Island. The total acreage of active dune fields for these barrier islands is approximately 312 acres, with 59 acres of active dunes on Manasota Key, 228 acres on the Don Pedro Complex and 24.3 acres on the northern end of Gasparilla Island.

Active beaches within Charlotte County are largely composed of fine quartz sand and shell fragments. Where beaches are narrow and relatively steep, the composition consists of sand and a large portion of whole or coarsely broken shells. Islands in Charlotte County range from 200 to 2000 feet in width and the general elevation ranges from 5 to 8 feet. Manasota Key has a higher elevation with maximum height of 10 to 12 feet.

Wave action is relatively small with an average significant wave of about 1.2 feet. The dominant wave energy is from the north and those waves prevail in the winter, while waves from the south prevail in the summer. Due to relatively low wave energy, the yearly limiting depth of active sand motion can be as shallow as 11.5 feet. Under tropical storm conditions, waves with much higher heights are possible and a "seasonal closure depth" extends into deeper water. In Charlotte County, waves with heights between 1 and 2 feet are the most frequent. Erosion in parts of the beaches and flooding due to storm tides has been problems of major proportions.

Over the last 30 years, there has developed a widespread scientific consensus that global climate changes are associated with documented sea-level rises, which are directly associated with the County's five miles of critically-eroding beaches. This may cause considerable impacts to coastal shorelines, beaches, dune systems and surrounding properties.

Pursuant to the state-wide Beach Management mandate in Chapter 161, F.S., the FDEP periodically conducts surveys, collects data and analyzes information to determine shoreline sections that meet the statutory definition for designation as "critically eroded". Based on these findings, there are approximately five miles of State-designated "critically eroded" beaches in

Charlotte County. Please visit *2009 FDEP Critically Eroded Beaches in Florida* report for full details.

COASTAL WILDLIFE

The pages below briefly describe several listed wildlife species that are frequent habitants within the coastal areas of the County. Those species that are encountered County-wide are discussed in the Natural Resources Data and Analysis.

Bald Eagle (*Haliaeetus leucocephalus*)

Due to a triumphant recovery, the bald eagle was reclassified a Delisted Taxon-Recovered by the Federal government in 2007 and the State of Florida in 2008. Although the Bald Eagle is no longer on the endangered species list, it remains protected under various State and Federal regulations. Florida is home to the second-largest breeding population of bald eagles in the nation, and Charlotte County provides habitat for a substantial portion of that population. There are approximately 30 known bald eagle nesting sites in Charlotte County, concentrated in the Cape Haze area and along the shoreline of Charlotte Harbor. Protection of bald eagle nest sites is considered a critical issue, since some of these sites are located on lands which are subject to development pressure. Charlotte County does not have an ordinance which specifically protects bald eagle nesting habitat at this time; instead, the County relies on, and cooperates with, the Florida Game and Fresh Water Fish Commission and U.S. Fish and Wildlife Service (USFWS) in their enforcement of State and Federal regulations.

In Charlotte County, bald eagles usually build nests in stands of mature slash pine along coastal bays, estuaries, rivers, and in some cases subdivisions. Suitable eagle-nesting habitat should be identified and protected by public acquisition or by offering incentives to landowners to maintain their property in a condition suitable for eagle nesting. No nest trees may be touched in any way by development activities unless the nest site has been de-classified by the FFWCC. As development increases, the County may have to follow the route taken by nearby counties and municipalities such as Cape Coral, and develop and adopt an eagle protection ordinance.

West Indian Manatee (*Trichechus manatus*)

Listed as endangered by both the USFWS and FFWCC, these large marine mammals are found throughout Charlotte County's surface waters. A number of manatee surveys of Charlotte Harbor have been conducted over the years which indicate that the area is utilized by a large number of manatees, possibly by up to ten percent of the believed state-wide population.

Although manatees may be found in any given part of the Charlotte Harbor estuary at any time, they are typically found in those shallow water areas that have a high abundance of seagrasses and other aquatic vegetation. The areas exhibiting the highest concentration of manatees in Charlotte County are the Myakka River, Bull and Turtle Bays (around the Cape Haze Peninsula), Lemon Bay, and the eastern and western shore of Charlotte Harbor

Historically, manatee mortality in the Charlotte County portion of Charlotte Harbor has been fairly low. The mortality rate for 2005 was 22 deaths; two deaths were caused by watercraft collisions and five were by undetermined causes. A five-year average, from 2001 to 2006, shows that 24 percent of manatee deaths in Florida can be attributed to watercraft collisions. However, as the County's boating population is expected to increase, the number of boating-related manatee deaths may also be expected to increase unless preventative action is taken.

Research conducted by the FDEP, Mote Marine Laboratory, the University of Miami, and others finally determined that the manatees died of a cause related to the respiratory issues may be from the respiratory infection caused by brevetoxins i.e., toxins associated with *Gymnodinium breve*, a red tide organism (Steidinger, 1996). Though manatees and red tide have coexisted for millennia, the following four specific conditions combined produced circumstances lead to high die-off rates (Steidinger, 1996):

- Early manatee aggregation;
- Mid-winter dispersal;
- High salinities in the affected areas' waters;
- High concentrations of *G. breve*.

The FDEP determined that a Manatee Protection Plan is warranted for Charlotte County; this position concurred with that of the County's MAC which recommended that the following specific provisions for protecting manatees in Charlotte County's waters be included in the GOPs of the Comprehensive Plan:

- Designating areas in, and in the vicinity of, Bull Bay, Turtle Bay, Hog Island, Lemon Bay, the Myakka River, the Burnt Store area, the Peace River/Deep Creek, and Harbor Heights as "Slow-Speed, Manatee Protection Zones";
- Providing designated, well-marked channels for boaters which will curtail damage to seagrass beds (as well as manatees) by providing adequate depths as an alternative to the current, uncontrolled boaters' pattern of seeking deep water through any means possible; where these deep channels will also give manatees an opportunity to submerge and avoid boats if manatees cross or use the channels for transit;
- Posting signage at areas of high manatee concentration and public boat ramps;
- Continuing boater education programs targeted at both adults (current water users) and school-age children (future users).

In the year 2000, two lawsuits were filed by 13 environmental groups and three individuals against the Army Corp of Engineers and the USFWS and another against the Florida Fish and Wildlife Conservation Commission (FWC). The lawsuits claim that the agencies were not protecting the species as outlined in the existing laws. As a result of the lawsuits, USFWS proposed rules for manatee refuges and sanctuaries. In addition, FWC proposed speed zones

state-wide. Although Charlotte County adopted the protection plan proposed by the MAC, as mentioned above, the FWC has indicated that it is not sufficient to protect the species. Therefore, the County will be held to the FWC rules once they are approved. To date, no new speed zones are proposed. Once they are approved, the County will map out the areas in question and follow the new manatee protection law.

Manatee protection speed zones were approved by the FWC in 2002; an amendment was approved in August 2006 to add a new channel to the southern section of Little Gasparilla Island. The Manatee Speed Zone Maps for Charlotte County can be found on the FWC website, located at <http://myfwc.com/psm/gis/Charlotte/Charlotteindex.htm>.

It is hoped that these measures will aid in maintaining and enhancing the County's manatee population.

Beach Nesting Birds

Beaches in Charlotte County host five beach-nesting bird species, four of which are listed as either endangered, threatened or species of special concern under State or Federal guidelines: American Oystercatcher (*Haematopus palliatus*), Black skimmer (*Rynchops nigra*), Least tern (*Sterna antillarum*), Snowy plover (*Chadarius alexandrinus*) and Wilson's plover (*Charadrius wilsonia*).

Black skimmers, and least terns nest in colonies in the open sand on beaches, sandbars, and dredge-material islands. Their nests are built on the ground and often consist of simple scrapes in the sand. (Due to habitat loss, a percentage of black skimmers and least terns also nest on gravel roofs.) Both species rely on camouflage or group mobbing to protect their nests.

The American oystercatcher, snowy plover, and Wilson's plover are solitary nesters usually nesting in shallow depressions on the beach. They are very sensitive to disturbance and susceptible to mammalian predators. Unfortunately, the availability of safe nesting places is declining.

Other Listed Species observed on Charlotte County beaches (*not inclusive*)

- Brown pelican (*Pelecnus occidentalis*)
- Pipping Plover (*Charadrius melodus*)
- Roseate tern (*Sterna dougallii*)
- Limpkin (*Aramus guarauna*)
- Reddish egret (*Egretta rufescens*)
- Snowy Egret (*Egretta thula*)
- Little blue heron (*Egretta caerulea*)
- Tricolored heron (*Egretta tricolor*)
- White ibis (*Eudocimus albus*)

- Florida sandhill crane (*Grus canadensis pratensis*)
- Wood Stork (*Mycteria americana*)
- Roseate spoonbill (*Platalea ajaja*)
- The burrowing owl (*Athene cunicularia*)
- Southeastern America kestrel (*Falco sparverius paulus*)
- Audubon's crested caracara (*Polyborus plancus*)

Sea Turtles

Five of the world's eight remaining sea turtle species - the Atlantic Loggerhead (*Caretta Caretta*), Green (*Chelonia Mydas*), Leatherback (*Dermochelys Coriacea*), Hawksbill (*Eretmochelys Imbricata*), and Kemp's Ridley (*Lepidochelys Kempii*) - may be found in Florida's coastal waters. Four of these species are classified as endangered in Florida by both Federal and State governments; the loggerhead is listed as threatened.

Sea turtles spend most of their lives in the ocean, feeding in seagrass beds, worm reefs, and other shallow coastal areas. Each year, female sea turtles crawl onto the County's beaches to lay their eggs in the loose dune sands. Several types of human activities can interfere with nesting activity and the ability of hatchlings to find their way into the Gulf. Artificial lighting can disorient the hatchlings that depend upon the illuminated horizon for direction. Night pedestrian traffic can cause the turtles to return to the ocean without nesting. Coastal development and beach renourishment activities that compact the sands can be equally detrimental. To address these problems, Charlotte County adopted a Sea Turtle Protection Ordinance (Ordinance 98-418) which provides standards and criteria for coastal development, and prohibits illumination of the nesting zone during the nesting season. The County is also supportive of citizen volunteers who monitor nesting activities nightly on area beaches during the nesting season (May-September).

Other threats to sea turtles include pollution, boats and jet skis, fishing lines and other ocean debris that can entangle them, floating balloons or plastic bags which resemble a part of their diet (jellyfish), and capture in nets. To decrease turtle loss to netting, net fishermen on offshore waters are now required to have Turtle Excluder Devices (TEDs) on their nets.

American Alligator (*Alligator Mississippiensis*)

The American alligator is listed as a species of special concern by FFWCC and as "threatened" by the USFWS. The alligator inhabits most permanent bodies of fresh water, including coastal marshes, swamps, lakes and rivers. The status of the alligator has improved greatly since the 1960's. Threats to the alligator include the destruction and pollution of wetlands, including lakes and rivers.

COASTAL PLANNING AREA PRESERVED LANDS

Charlotte County is fortunate to have significant areas set aside as publicly owned reserves which not only perform the functions mentioned above, but also provide an excellent opportunity for outdoor recreation and education. There are also large areas in Charlotte County in private ownership which provide many of the same environmental benefits and create opportunities for public enjoyment of the outdoors. The challenge facing Charlotte County is to ensure that its preserved areas continue to provide the functions and values so necessary to maintaining the quality of life enjoyed by residents and visitors, and to prevent such areas from becoming isolated islands of native habitat surrounded by incompatible land uses.

SPAM Series Map #52 identifies those areas that are owned by Federal and State agencies, and SPAM Series Map #91 identifies those areas that are owned by the County. These areas are discussed in detail in the Natural Resources Data and Analysis (Federal and State lands) and the Parks, Recreation and Cultural Resources Data and Analysis (County lands). The County remains committed to continuing participation in the State-wide effort to preserve, through the previously mentioned methods, those important segments necessary to complete wildlife linkages, habitat plans and conservation areas.

Over the last dozen years, with the assistance of the Florida Communities Trust, Trust for Public Land, SWFWMD's Save Our Rivers, the Conservation and Recreation Lands and Florida Forever programs, Charlotte County has made substantial progress toward protecting some of the County's most ecologically-important coastal properties, such as the Charlotte Harbor Flatwoods, Tippecanoe Preserve, Amberjack Preserve, Cape Haze, Coral Creek Preserve, Shell and Prairie Creek Preserves, and Myakka Estuary properties, which provide habitat for these species.

The following list identifies all the preserved lands that occur within the CPA. Greater details about each are presented in the Natural Resource element and the Recreation and Open Space element.

State, Federal Preservation - Conservation Lands (Spam Series Map #52)

- [Don Pedro Island State Park](#)
- [Fred C. Babcock/ Cecil M. Webb Wildlife Management Area \(WMA\)](#)
- [Charlotte Harbor Preserve State Park](#)
- [Don Pedro Island State Park](#)
- [Stump Pass Beach State Park](#)
- [Prairie Shell Creek Recreation Area](#)
- [Island Bay National Wildlife Refuge](#)

County owned Environmental Preservation – Conservation Lands (Spam Series Map #91)

- Cedar Point Environmental Park
- San Casa Park
- Oyster Creek/San Casa Environmental
- Buck Creek Preserve
- Thorton Key Preserve
- Rotonda Park
- Amberjack Environmental Park
- Tippecanoe Environmental Park
- Tippecanoe II Mitigation Area
- Charlotte Flatwoods Environmental Park
- Shell Creek Preserve
- Prairie Creek Preserve
- Deep Creek Property

COASTAL PLANNING AREA WATER-RELATED USES

Beach Access

Table CST-2: Public Beach Access Inventory				
Access Site	Ownership	Beach Frontage	Acres	Facilities/Comments
Englewood Beach Facility/Chadwick Park (Manasota Key)	County	1,630'	15.6+	This is the primary Gulf-access beach in Charlotte County with 395 parking spaces, restrooms, outside showers, picnic shelters, barbeque grills, concessions, volleyball and playground areas.
Stump Pass Beach State Park (Manasota Key)	State	6,400'	245	This is a Gulf-access beach with 45 parking spaces along with restroom facilities, walkovers, and picnic facilities
Don Pedro Island State Park (Don Pedro Island)	State	6,000+	165	This is a Gulf-access beach. The beach is only accessible by boat. Facilities include docks, two cabanas, rest rooms, and trails. Future facilities may include canoe launch/trail system and snack area
Knight Island beach (Palm Island/Knight Island)	County	3,000' +	5.2+	This is a Gulf-access beach. The beach is only accessible by boat. The beach varies in width from 50' to 100' from Mean High Water. This is not a park and there are no facilities.

Table CST-2: Public Beach Access Inventory				
Access Site	Ownership	Beach Frontage	Acres	Facilities/Comments
Coquina Lane (Manasota Key)	County	30'	0.3+	None Publicly dedicated right-of-way that ends at the beach
Wilhelm Drive (Manasota Key)	County	30'	0.3+	None Publicly dedicated right-of-way that ends at the beach
Friendship Lane (Manasota Key)	County	30'	0.3+	None Publicly dedicated right-of-way that ends at the beach
Sand Dollar Lane (Manasota Key)	County	30'	0.3+	None Publicly dedicated right-of-way that ends at the beach
Beachcomber Lane (Manasota Key)	County	20'	0.2+	None Publicly dedicated right-of-way that ends at the beach

Source: Florida Park Service, Charlotte County Parks, Recreation and Cultural Resources Dept. and Charlotte County Growth Management Department

To help promote better public access to the Gulf coastal beaches, the County continues discussions with the FDEP to provide a suitable mainland location for a public ferry service to Don Pedro Island State Park. Finally, the Port Charlotte Beach Complex located on Alligator Bay in Charlotte Harbor, though not a Gulf beach, provides County residents and visitors an additional opportunity for sunbathing, swimming, and other typical beach activities. This facility contains adequate parking (which is metered to help fund maintenance) for all but the heaviest user-days.

Water Access Points

Public access to the Gulf of Mexico was greatly enhanced by the County’s acquisition of the “Winward” peninsula directly across from the Englewood public beach to serve as an overflow parking and picnic area. The County received a grant from the Florida Communities Trust to aid in this acquisition. The addition of the Winward property served to add additional parking for this beach.

Stump Pass State Park was under-utilized due to inadequate parking facilities. Previously, parking was limited to 2-3 spaces at the end of the public road right-of-way. The State of Florida and Charlotte County jointly improved public access to and enjoyment of the Gulf of Mexico through the provision of further parking spaces, a boardwalk and rest facilities, by removing an area of exotic species and creating 45 parking spaces. This area also offers picnic areas. The facilities were carefully constructed on the subject property in order to avoid and minimize impacts to the dune, coastal strand, and mangrove communities which occur on site,

making it possible to develop a low-impact facility. Don Pedro State Park (located on Don Pedro Island) remains under-utilized because it is accessible only by boat, and adequate mainland parking facilities and public ferry service are not yet available.

Pedestrian access to Charlotte Harbor has been substantially increased through the development of the “Bayshore Linear Park” which, by serving as an attraction, compliments the efforts of the Charlotte Harbor Community Redevelopment Agency to re-invigorate their community. Finally, through its neighborhood/community planning initiatives, the County is facilitating grass-roots park planning efforts. Communities such as South Gulf Cove and Harbour Heights have already identified the acquisition of both nature preserves and active recreational facilities as top priorities.

Water Related Uses

Existing marinas, boat ramps, fishing piers, traditional use areas, and artificial fishing reefs are identified on SPAM Series Map #61 and 62 and listed in Table CST-3, below.

Charlotte County and the City of Punta Gorda currently maintain eleven salt-water accessible boat ramps with 14 lanes to serve Charlotte County’s boating population. The need for additional ramps, whether public or private (though publicly-owned facilities provide the only guarantee of public access) is underscored by the anticipated growth in trailerable-size boats as well as the County’s historic growth pattern in which waterfront properties, which can provide their own access, are developed prior to non-waterfront properties. Charlotte County has developed new boat ramp facilities and has added parking capacity as well as having purchased additional land for development of new facilities and parking for boat ramps. Additional boat ramps and parking are available at Hathaway Park (one lane), Ainger Creek Park (one lane) and South Gulf Cove Park (one lane). Additional parking has been added at Placida Boat Ramp (65 spaces), Spring Lake Boat Ramp (24 spaces) and Port Charlotte Beach (20 new spaces in permitting stage of development). Additional land awaiting development is at Hathaway Park (12 acres), Spring Lake Park (three acres), Ainger Creek Park (1.5 acres) and the West County Boat Ramp (4.5 acres).

Table CST-3: Marinas, Boat Ramps, Fishing Piers, Artificial Fishing Reefs, and Traditional Use Areas (as of October 2006)	
SPAM Series Maps #61 and 62	Name of Facility, Notes
Marinas¹	
1	Thunder Marina
2	Englewood Bait House
3	Sandpiper Key Docks
4	Rocky Creek Marina
5	Ainger Creek Marina
6	Captain’s Club
7	Chadwick Cove Boatel Resort

Table CST-3: Marinas, Boat Ramps, Fishing Piers, Artificial Fishing Reefs, and Traditional Use Areas (as of October 2006)	
SPAM Series Maps #61 and 62	Name of Facility, Notes
8	Englewood Beach and Yacht Club
9	Weston's Fish-n-Fun Resort
10	Stump Pass Marina
11	Cape Haze Marina
12	Palm Island Marina
13	Eldrid's Marina
14	Uncle Henry's
15	Gasparilla Marina
16	Gulf Coast Marine Center
17	Grassy Pointe Yacht Club
18	Charlotte Harbor Yacht Club
19	Sea Horse Marina
20	Fisherman's Village
21	Punta Gorda Marina
22	Isles Yacht Club
23	Gator Creek Marine
24	Riviera Marina
Public Boat Ramps	(parking spaces refer to tow vehicles and trailer parking)
1	West County Boat Ramp: newly purchased land, anticipate 1 ramp and 40 parking spaces
2 - Closed	Tom Adams Bridge Ramp: closed due to safety issues and no reopening is planned
3	Placida Boat Ramp: 2 lanes, 88 parking spaces
4	El JoBean Ramp: 1 lane, 15 parking spaces
5	Springlake Park Ramp: 1 lane, 40 parking spaces, purchased additional land to expand
6	Port Charlotte Beach Park: 2 lanes, 20 parking spaces, additional 20 in design
7	Ponce de Leon Park: 2 lane, 20 parking spaces
8	Laishley Park: 2 lane, 86 parking spaces
9	Darst Avenue Boat Ramp: 1 lane, 6 parking spaces
10	Riverside Park: 1 lane, 5 parking spaces
11	Harbour Heights Park: 2 lanes, 15 parking spaces
12	Hathaway Park: 1 lane, 12 parking spaces, additional land purchased for more
13	South Gulf Cove Ramp 1 lane, 30 parking spaces
14	Ainger Boat Ramp 1 lane, 20 parking spaces, additional land purchased to expand
Fishing Piers	
1 - Closed	Englewood Pier: Located on the Myakka, 1,240 linear feet, closed due to unsafe conditions
2	El Jobean Pier: 930 linear feet

Table CST-3: Marinas, Boat Ramps, Fishing Piers, Artificial Fishing Reefs, and Traditional Use Areas (as of October 2006)		
SPAM Series Maps #61 and 62	Name of Facility, Notes	
3	Port Charlotte Beach Park:	1 pier, 420 feet long, 312 parking spaces and part of a specialty Marine Park
4	Bayshore Live Oak Park:	1 pier, 570 feet long, 20 parking spaces and part of a specialty Marine Park
5	Barron Collier (Peace River) Bridge:	3,000 linear feet of fishing area alongside the US 41 (northbound) bridge spanning the Peace River, served by 75 parking spaces, plus additional spaces available Laishley Park and surrounding development
6	Gilchrist (Peace River) Bridge:	3,000 linear feet of fishing area alongside the US 41 (southbound) bridge spanning the Peace River,
7	Peace River (Laishley Park) Fishing Pier:	420 feet long, served by 24 parking spaces (additional parking is available from surrounding Laishley Park)
8	Placida Pier:	800 feet long, served by 15 parking spaces
9	Boca Grande Pier:	2,100 feet long, served by 20 parking spaces
10	Tom Adams Bridge Pier:	360 feet long, served by 20 parking spaces
11	Ponce de Leon Pier:	served by parking at Ponce de Leon Park in Punta Gorda
12	Coral Creek Pier:	250 feet long, served by 20 parking spaces
13	Chadwick Park Pier:	285 feet long, served by 40 parking spaces
Artificial Fishing Reefs		
1	Charlotte Harbor Reef	materials are concrete culverts at a depth of 12 feet
2	Novak Reef	material are concrete bridge sections at a depth of 30 feet
3	Tremblay Reef	materials are concrete bridge sections at a depth of 42 feet
4	Palm Island Ferry Reef	materials are a 60 foot steel ferry at a depth of 55 feet
5	Stump Pass 3 Mile Reef	materials of concrete culverts at a depth of 42 feet
6	Englewood Fish Haven	materials are of bridge rubble at a depth of 22 feet
Traditional Use Areas		
1	Stump Pass State Recreation Area	

Table CST-3: Marinas, Boat Ramps, Fishing Piers, Artificial Fishing Reefs, and Traditional Use Areas (as of October 2006)	
SPAM Series Maps #61 and 62	Name of Facility, Notes
2	Bird Key in Gasparilla Sound
3	Shoreline at North end of Gasparilla Island
4	West (South) Shore of Myakka River near El JoBean Bridge
5	Sam Knight Creek at S.R. 776 Crossing
6	Springlake Park
7	Shoreline at Ponce de Leon Park
8	Shell Creek at the Hendrickson Dam
9	Hathaway Park
10	Chadwick Park (Englewood Beach)
11	Peace River Fish Camp
12	Live Oak Point

Sources: Charlotte County Parks, Recreation and Cultural Resources Department

Note: Due to potential changes in ownership, changes in services, and other market considerations, facilities and services provided at private establishments (e.g., marinas) are not listed herein. Information regarding facilities and services may be obtained from the Boaters Guide to Charlotte Harbor available at County Tag Offices, the Cooperative Extension Service, or Florida Sea Grant program.

In 1981, Charlotte County had 7,735 registered boats; by 1991, that number increased by 79.4 percent (compared to the state-wide increase of 42.4 percent) to 13,876. In 2005, the number of registered boaters was 22,548. Dr. Frederick Bell of Florida State University’s Department of Economics projected that, by the year 2010, the number of registered pleasure craft in Charlotte County will exceed 43,000, an increase of approximately 310 percent. Table CST-4, below, provides a summary of boating registration for the County through the year 2005.

Table CST-4: Boat Registration for All Size of Pleasure and Commercial Craft for Charlotte County, 1991 – 2005				
	1991	1995	2000	2005
# of Boats	13,876	17,349	18,505	22,548

Source: Florida Dept. of Highway Safety & Motor Vehicles 2000 and 2005

The majority of Charlotte County’s existing boats are moored and stored on canal-front and waterfront residential lots that have navigable access to coastal waters (Bell, 1994). This may be due to the fact that waterfront property is generally considered to be highly desirable and tends to be built somewhat more quickly than landlocked parcels. The remainder of the boats are either kept at marinas or are transported by trailer to public or private boat ramps. As illustrated in Table CST-5, below, trailerable-size boats (less than 26 feet in length as grouped by the size classes established in the boating demand study) account for slightly more than three-quarters (87.5 percent) of the number of boats registered in Charlotte County through the year 2005. As evidenced by the Bell study, approximately 75 percent or more of the boats

registered in Charlotte County are, or would be, adequately served by navigable access of 5 feet at mean low water.

Table CST-5: Boat Registrations for All Sizes in Charlotte County for the year 2005* and Projected for the year 2010 *				
Size Class	Actual 2005	Percent of Boats	2010 Projected	Percent of Boats
Canoe	190	0.9	144	0.3
under 12'	3,122	14.3	7,311	17
12'-under 16'	3,476	15.9	4,507	10.5
16' - under 26'	12,305	56.4	20,597	47.8
26' - under 40'	2,413	11.0	9,448	21.9
40' and over	328	1.5	1,096	2.5
Totals	21,834		43,103	

Source: Florida Dept. of Highway Safety & Motor Vehicles 2000 and 2005.

*does not include commercial vessels

Private marinas providing boat ramps, parking, and dry storage slips are increasingly being redeveloped for other uses. This trend continues throughout the state, and continues to place additional pressure on public boat ramp facilities and infrastructure.

Fishing Facilities

As illustrated by SPAM Series Maps #61 and 62, fishing facilities include seven saltwater fishing piers, two bridges and eleven traditional fishing areas. Fishing piers have remained stable in numbers. Parking has been redefined and expanded at existing locations. The Englewood Myakka Fishing Pier was closed following the loss of parking as a result of a FDOT project but an additional pier was added in the West County area with the addition of the Chadwick Park Fishing Pier.

The County’s existing saltwater fishing piers should accommodate anticipated population growth through the year 2010. However, based on estimates of user occasions per day, up to 100 additional parking spaces may be required. This projected need for additional parking should be considered a liberal estimate as it assumes that each user would occupy a single parking space for the entire day. One fishing pier has closed and another has opened, providing a net decrease in the total number of linear feet and available parking spaces. To date, six artificial fishing reefs have been constructed in Charlotte County’s coastal waters.

Future Need for Public Access Facilities

As Charlotte County continues to grow, so too will the need to provide additional public access for its beach-going, boating, and fishing populations. The following discussions provide an

overview of these needs, and recommends possible actions which may help address the County's future needs.

NATURAL RESOURCES AND ACCESSIBILITY – ISSUES, CONCERNS, AND FUTURE ACTIONS

Native Communities

Coastal uplands are subject to a number of anthropogenic threats, including removal of beneficial native vegetation, development, shoreline hardening, recreational use, introduction and encroachment of exotic vegetation, and treasure hunting.

Invasion of coastal uplands by exotic vegetation such as Brazilian pepper and Australian pine may result in the displacement and replacement of the diverse native plant communities of these habitats with dense monocultures of these exotic species. Australian pines (*Casuarina* spp), while favored for shade they provide on the open beach, replace the native dune vegetation which can actually accelerate the erosion of dunes since the shallow roots of the Pine do not hold the soil together like the deep roots of sea oats and other native species.

In the past, little attention was given to the coastal hammock species in many areas as island tracts were cleared to provide housing. Outright elimination of the coastal hammocks has been a long-term trend. While undeniably better than outright clearing, selective clearing can open the canopy and expose the hammock to wind, salt spray, increased drying, and other debilitating factors.

In addition to causing stress to dunes and dune plants, recreational uses of beaches frequently displace the shorebirds and wading birds that, to various extents, rely upon beach habitat for foraging, nesting, overwintering, or as a resting point along migratory flyways. The human demand for beaches is so great that people often encroach upon isolated estuarine beaches not typically considered as prime recreational areas, which causes further displacement of wildlife.

Attempts to stabilize the exposed and submerged portions of beaches through the use of structures such as rock revetments, sea walls, and groins limit the beaches' natural ability to adapt to continuously changing conditions. Sand or stabilized beach is not free to be moved and stored under favorable conditions and may remain vulnerable to loss under storm conditions. Fortunately, the number and scale of such "improvements" to Charlotte County's beach system is relatively limited.

Charlotte County placed, via hydraulic dredge and pipeline, approximately 500,000 cubic yards of beach-compatible fill material along approximately 2.7 miles of critically-eroding coastline on Knight Island and Don Pedro Island. The beach fill areas correspond to two of the County's State-designated Critical Erosion Areas, specifically from FDEP monuments R-22 to R-26 and

R-29 to R-39. Stump Pass, located immediately updrift of Knight Island, is one designated borrow area. In August 2001, Charlotte County completed the “Stump Pass Inlet Management Study” (IMS) in accordance with FDEP guidelines, to identify a plan to “mitigate the erosive impact of the inlet”. The IMS evaluated the inlet system data and concluded that Stump Pass is a significant cause of erosion on the downdrift beaches of Knight Island and Don Pedro Island. The sediment budget determined that the current bypass quantity is negligible as the majority of sand is being trapped within the Manasota Key spit, updrift of Stump Pass, or within the inlet shoals. County objectives for the project include restoring/enhancing storm protection, natural resource habitats (create new habitat for nesting turtles and shore birds), and recreation beach areas to offset these historical inlet impacts.

Inlet shoaling and spit growth has adversely affected navigation through Stump Pass. The Manasota Key spit continues to elongate, deflecting the inlet channel and resulting in beach erosion along the northern interior shoreline of Knight Island. Consistent with the IMS, the secondary purposes of this project are:

- Restore and maintain safe navigation through Stump Pass;
- Provide erosion control measures by relocating the channel to its original 1980 location, thus reducing the erosion stresses along Knight Island’s northern interior shoreline;
- Provide long-term maintenance of the downdrift beaches, including transferring sand equal to the bypass quantity of 50,000 cubic yards per year (average) defined in the IMS, adjusting the beach fill areas to accommodate shifts in the nodal zone as the inlet system responds to channel relocation;
- Mitigating for any adverse impacts resulting from channel relocation.

Permit requirements include the County taking over the management activities on the new island created by the project such as debris removal, predator control and environmental monitoring. A comprehensive yearly monitoring program includes protecting sea turtle and shore bird nesting as well as implementing shore bird protection measures such as fencing off and creating buffer areas for documented nests. Other permit monitoring requirements include additional turbidity monitoring of the interior water body, Lemon Bay, which is an Aquatic Preserve; sea grass monitoring of the grass beds within the zone of influence of the project; and hydraulic monitoring to record the changes in the tides and currents in the restored channel allowing for post-project comparisons to the historical measurements and the predicted changes for the hydraulic parameters from channel restoration.

The midden and burial mounds left scattered throughout the State of Florida by prehistoric peoples are frequently plundered and destroyed by amateur archaeologists who, alone or in organized groups, are often simply pot hunters looking for souvenirs. In addition to the loss or degradation of cultural and historic resources, such activities also result in adverse impacts to the unique vegetative communities which form in, and on, these micro-habitats. Midden and burial mounds have also been destroyed by development activities, including the intentional use

of the shell material for road and railroad beds. Though these resources are subject to nominal protection, their loss continues at the time of this writing.

Threats to Marine and Estuarine Wetlands

An estimated 51 percent of the salt marsh habitat that once adjoined the estuary has been lost in the past 30-45 years, primarily due to the dredging of man-made finger canals and the construction of other facilities for residential and commercial purposes (Harris et al. 1983). In addition, many miles of existing shoreline along the rivers and, to a lesser extent, the Harbor proper has been sea-walled or otherwise hardened. If undertaken, restoration of these areas to their natural condition will be a difficult and expensive process.

Destruction of coastal wetlands has been a significant factor in the deterioration of South Florida's natural resources. Filling for residential or commercial use encroaches on the edges of the bays and tidal streams by replacing productive mangrove swamp or tidal marsh with upland habitat, greatly impacting the productivity of the estuarine system. Dredging of boat basins and channels has a similar impact. The use of seawalls, rip-rap and other forms of shoreline stabilization replaces the estuarine edge and results in a direct loss in the amount of detritus produced and available to estuarine organisms. Ditching for mosquito control has had a significant impact in that the mangrove ditching may have actually created more mosquito habitat; the associated fill has clogged natural tidal channels, and has encouraged the invasion of exotic species such as Brazilian pepper and Australian pines.

Although State and Federal regulations offer some forms of protection, these habitats continue to be conditionally disturbed by the above-described activities and by the destruction of adjacent upland communities which have historically provided clear freshwater inflow. (The shortsighted gutting of Local, State, and Federal regulations and guidelines in recent years is not a good trend.) For example, the 1995 Mangrove Trimming and Preservation Act, which amended Section 403, F.S., provided numerous exemptions and general permitting criteria which allowed the alteration of mangroves in natural and man-made waterways, including aquatic preserves and State-owned lands. Though the Act was further amended during the 1996 Legislative Session to provide better protection for mangrove systems, significant damage occurred as a result of this brief-lived but unfortunate piece of legislation. Such regulations undercut all of the time, money, and effort that have been devoted over the years to education of the public and the preservation of the valuable ecosystem. If the State continues to enact such legislation, it will fall upon local governments to develop and implement more stringent regulations, before the functions of these habitats are forever altered, resulting in the loss of the very habitats that draw hundreds of thousands of residents to the state and region. Since mangroves are, in the United States, a Florida phenomenon, it is pointless to expect the Federal government to protect them.

Threats to seagrasses as a result of propeller scarring are also on the rise. In 1995, the FDEP's Florida Marine Research Institute (FMRI), now known as the Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute (FWRI), undertook the mapping

of seagrass areas which had experienced scarring. Using 1993 aerial surveys and aerial photography data, the FWRI designated seagrass scarring as light, moderate, or severe, and has produced a series of maps which illustrate the state-wide occurrence of seagrass scarring. Scarring of seagrass beds within Charlotte County, from this 1995 report, is illustrated by SPAM Series Map #63. According to FWRI Technical Report TR-1 (FDEP/Sargent, Leary, and Crewz, 1995), more than 173,000 of Florida's 2,700,000 acres of seagrass have suffered varying degrees of scarring. According to the same study, approximately 7,440 acres (or slightly more than half) of Charlotte County's seagrass beds have sustained some degree of scarring, with some 5,910 being moderately or severely scarred. This report goes on to note that areas which have high human populations and large numbers of registered boats, including Charlotte Harbor, have the greatest acreages of moderate and severe scarring. In 2004, FWRI updated the 1995 report for Charlotte Harbor using the same methods employed in the 1995 study. This effort which used 2003 aerial survey and photography data determined 8,236 acres or 58 percent of Charlotte County's seagrasses have some degree of scarring. Though the extents of moderately scarred areas were similar in the two studies, the degree of severe scarring increased over the ten year period from 286 acres in 1993 to 1,840 acres in 2003.

Based on the uncertainties regarding the noted decline in seagrass areas, the County should, in cooperation with the SWFWMD, FDEP, FFWCC and NEP, initiate further investigations to determine what actions may be taken to help stop or reverse this problem.

Chapter 9J-5 of the F.A.C. provides that a County's designated Coastal Area (referenced herein as the Coastal Planning Area) shall be of the local government's choosing, but must encompass hurricane vulnerability zones; estuarine and coastal waters, including adjacent shorelines; beaches; wetlands; living marine resources; water-dependent and water-related facilities; and lands whose development would impact the quality of these waters. The County's CPA is illustrated on FLUM Series Map # 13.

Pursuant to the state-wide Beach Management mandate in Chapter 161 F.S., the FDEP periodically conducts surveys, collects data and analyzes information to determine shoreline sections that meet the statutory definition for designation as "critically eroded". Based on these findings, there are approximately 5 miles of State-designated "critically eroded" beaches in Charlotte County.

In 2001, respective Boards of County Commissioners from Charlotte and Sarasota County approved an interlocal agreement to co-sponsor The Sarasota-Charlotte County Beach Restoration Study ("Study"). The purpose of the Study was to investigate the extent and nature of Gulf shoreline erosion on a larger, regional basis and examine the technical, regulatory and financial feasibility of large-scale erosion control actions to address any problem locations identified. The Study Area included all of the unincorporated shoreline of Sarasota and Charlotte County to Gasparilla Pass, totaling 32 miles of shoreline. Barrier islands within the

Study Area included Little Gasparilla Island, Knight/Don Pedro Island, Manasota Key (Charlotte and Sarasota counties), Casey Key and Siesta Key.

Analysis of the Study supported FDEP findings and found both strong accretional and strong erosional trends measured throughout Manasota Key, as well as areas on Knight, Don Pedro, and Little Gasparilla and Gasparilla Islands. Based on findings, erosion control alternatives were designed and presented for areas covering Manasota Key through Gasparilla Island. Erosion control measures were instituted just north of Stump Pass Beach State Park on Manasota Key and portions of Knight and Don Pedro Islands. The remaining portions of Manasota Key and Gasparilla Islands did not institute erosion control alternatives.

In 2003, Charlotte County instituted the Charlotte County Erosion Control Project and placed via hydraulic dredge and pipeline approximately 833,000 cubic yards of beach-compatible sediment on approximately 3.5 miles of critically-eroding beaches on Knight Island, Don Pedro Island, and Manasota Key. The beach fill areas correspond to three of the County's State-designated Critical Erosion Areas, specifically from FDEP monuments R-12.5 to R-16.5 (Manasota Key), R-22 to R-26 (inside Stump Pass on Knight Island), and R-29 to R-40 (Knight Island, Don Pedro Island).

In 2006, the second phase of sand placement was conducted and placed, via hydraulic dredge and pipeline, approximately 341,000 cubic yards of beach-compatible sediment on approximately 3.5 miles of critically-eroding beaches on Knight Island, Don Pedro Island, and Manasota Key. The County conducted the project for the primary purpose of restoring storm protection, natural resource habitats, and recreational beach areas to offset the storm damage caused by the 2004 Hurricanes (Charley, Frances, Ivan and Jeanne).

In 2010, Charlotte County is proposing a third maintenance project under the Erosion Control Project including a post-storm recovery component to offset the erosion impacts from Tropical Storm Fay in 2008.

Perhaps the most important function of the beach and dune areas is to continuously adapt to the changing hydrogeologic conditions operating at the beach. Sand movement is the key to the continuous adjustment of the beach. Moving sand can be washed over the island, adding height, or blown into the backshore and trapped by plants. During major storms, the stored sand can move off the upland beach and form an offshore bar that reduces the impact on the remaining beach. Gentler post-storm waves can move the offshore bar back onto the beach face. Practices such as removal of dune vegetation, dune destruction, stabilization of the submerged beach, and stabilization of the exposed beach all interfere with the natural system of sand movement, collection, storage and use. Two main factors are responsible for the coastal erosion problem along the coast, including Charlotte County: Human activities that either increase erosion or increase the impact of erosion, and rising sea level.

Maintained in a natural state, beaches and dunes provide the temporary storage of sand required for the natural processes of shoreline building and erosion that are critical to the existence of barrier islands. The deep roots of sea oats and other native vegetation stabilize active dunes, providing moderate protection from shoreline erosion.

These coastal ecosystems also provide habitat for a number of plant and animal species, many of which thrive nowhere else. Terns, gulls, plovers and sandpipers are common along the sandy beach where they feed on small fish and invertebrates. Many shorebirds nest on the open beach and in the dunes, including the following listed species: least tern, roseate tern, piping plover and southeastern snowy plover. The threatened loggerhead sea turtle uses the beach and dunes as nesting habitat. The scrubby back-dunes are occupied by beach mice, grey foxes, bobcats, raccoon, skunk, gopher tortoises and eastern indigo snakes. In addition, the coastal hammocks play key roles in the migration of many birds that summer in the north. They rely upon the fruits and berries of the hammock species during their biennial trips along the coast.

Coastal areas, in particular beaches, are among the most in-demand natural resources in the State of Florida. This is due mainly to the ideal recreational opportunities afforded by these areas, as well as their scenic, aesthetic value which makes them attractive places to live.

Whenever native dune plants are removed, either intentionally as an end unto itself, or incidentally due to pedestrian or other forms of traffic, the ability of the dune system to collect and hold sand is reduced and erosion results. Total habitat destruction may occur. Dune vegetation also acts as a buffer to the more landward, less salt-tolerant plants, and removal of seaweed vegetation can cause salt-spray damage to the less resilient species. Thus, removal of dune vegetation may have an ecological ripple effect in addition to the direct physical impacts.

Public Access Areas

Charlotte County's Gulf beaches continue to be subject to pressure from shoreline erosion, development and recreational use. Areas identified by the FDEP pursuant to the state-wide Beach Management Program, includes five miles of coastline subject to severe erosion. Numerous coastal storms have caused severe erosion which has resulted in the loss of structures as well as important coastal nesting habitat. The County's acquisition of a 31-acre parcel on Thornton Key has placed a vulnerable and environmentally-sensitive property in public ownership, thereby removing the threat of development from this portion of the barrier island chain.

Public access to the Gulf of Mexico was greatly enhanced by the County's acquisition of the Winward peninsula directly across from Englewood public beach (also known as Chadwick Park) to serve as an overflow parking and picnic area. The State of Florida and Charlotte County also jointly improved public access to and enjoyment of the Gulf of Mexico through the

provision of parking spaces, a boardwalk, and rest facilities at Stump Pass Beach State Park (formerly known as Port Charlotte Beach State Recreation Area). Pedestrian access to Charlotte Harbor has been substantially increased through the development of the Bayshore Linear Park which, by serving as an attraction, compliments the efforts of the Charlotte Harbor Community Redevelopment Agency to re-invigorate their community. Land use/water use conflicts are still a concern, though the County is revisiting the Charlotte County Marine Land and Water Use Siting Study, which will help direct water-dependent development, particularly marinas and boat ramps, to appropriate areas.

As Charlotte County's population continues to grow, the amount of vacant waterfront property suitable for providing public access to the County's estuarine and coastal waters will decline. Inevitably, the public's potential for access to the County's coastal and estuarine waters will decrease with the development of each successive property, unless such development is of a type which incorporates public access as a consideration during design and construction. In order to ensure that access remains available, Charlotte County undertook a comprehensive Marine Land and Water Use Siting Study which resulted in a parcel-by-parcel analysis of all of Charlotte County's salt-water accessible parcels. The study identified appropriate locations for docks and marinas based on anticipated boating demand through the year 2010, and provided an overview of marine access issues, including the need for and availability of private residential dockage. In addition to its field and cartographic portions, the study also included a regulatory overview and boating demand projection.

During the course of the study, 30,560 lots were surveyed on an individual basis for both landside and waterside (environmental) constraints. Landside constraints include availability of water and sewer service, parcel size, whether the lot is vacant or currently used for a ramp or marina, and whether the parcel is served by a road capable of dealing with the level of traffic generated by either a boat ramp or marina. Waterside or environmental constraints include the presence or absence of seagrass beds, mangroves, wetlands, and whether the parcel is served by a channel which can be maintained at a navigable depth. The overall study also includes a review and discussion of the local, State, and Federal regulations which affect the ability to permit various activities (such as dredging) associated with marine activities.

This study was presented to the Board of County Commissioners but never adopted. It is being revisited through the cooperation of the department responsible for parks and recreation, the Environmental & Extension Services Department, and Growth Management with input from numerous advisory committees.

NATURAL DISASTER PLANNING

The Coastal High Hazard Area (CHHA), which is illustrated on FLUM Series Map #14, occurs within the CPA and encompasses those areas which would require evacuation in the event of a

landfalling Tropical Storm or Category I Hurricane as designated by the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model developed by the National Hurricane Center (SPAM Series Map #64). The areas encompassed by the CHHA also includes the Velocity Zones designated by the FEMA's Flood Insurance Rate Maps, and all areas seaward of the CCCL established by the FDEP.

With regard to land use in the CHHA, there is a basic perceived conflict between the duty of government to protect the health, safety and welfare of its citizens and the rights of property owners to the use and disposition of their property. One way, perhaps the best way, to resolve this issue is for government to acquire properties deemed as having high hazards with regard to hurricane flooding, in accord with the Constitutional Law. An acquisition program is perceived to be particularly necessary when the protection role of government removes most commonly agreed-upon reasonable uses from land which would normally be suitable for such use. (SWFRPC, 1984)

There are several characteristics which, individually or collectively, give land a high hazard designation (regarding hurricane). These are: proximity to large bodies of water; the location of the property in relation to shifting channels; and the height of land in comparison to adjacent water bodies and tracts of land.

The proximity to large bodies of water is the most important single factor in defining high hazard areas. Most of the region's shoreline falls into this category. The National Hurricane Center has indicated that those areas within 150 feet of such shorelines will suffer the greatest damage in the event of a storm.

The location of shifting channels also contributes to the high hazard designation. This is a very important factor for the barrier island chain, where the channels (passes) have been known to make sudden major shifts. This is less important for inland areas in Southwest Florida due to the relatively slow flow of freshwater streams.

Relative height of the land in relation to adjacent lands is the last factor contributing to the high hazard designation. In the event of hurricane flooding, such low-lying lands will receive the first impacts of floods being deflected from other, higher tracts. This may result in localized "surge" or seiche conditions which would not be a consideration for the overall area.

COASTAL PLANNING AREA EXISTING LAND USE (SPAM Series Map #65)

Nearly all of Charlotte County's urban development lies within the CPA. With appropriate corrections for outlying rural areas, the existing land use inventories of residential, commercial, industrial, public and other non-industrial land uses. Many of the existing structures in the CPA were built prior to the County's participation in the FEMA National Flood Insurance Program in 1974. As such, many structures do not meet the current standards for ground floor elevations

specifically formulated to protect against the loss of life and property from flooding. The Housing element provides a detailed discussion of dwelling units by age for Charlotte County (including Punta Gorda).

The requirements of the FEMA regulations, which are incorporated into the County Code as Section 3-9-67 of the Zoning Regulations, specify that substantial improvements of existing structures shall have the lowest habitable floor of such structure elevated to or above the applicable level of the 100-year flood as shown on the Flood Insurance Rate Maps. "Substantial improvement" means any enlargement of a structure, the area of which equals or exceeds 50 percent of the existing enclosed area of the structure. This does not include projects for improvement of a structure to comply with existing state or local health, sanitary or safety codes, or alteration of a structure listed on the National Register or Historic Places or a State Inventory of Historic Places.

In 1992, the Board of County Commissioners declared the turn-of-the-century community of Charlotte Harbor to be a Community Redevelopment Area after making an official finding of blight. This designation was created at the behest of area residents who had become concerned over falling property values, increasing crime, and a general perception that the community was becoming rundown. In November of 1994, the Future Land Use Map was amended to create specific land use classifications intended to help revitalize the Charlotte Harbor Community by directing more appropriate types of growth into the area. Among the most significant changes to the FLUM in the CRA was the creation of a "Coastal Residential" category which lowered the density of the central, residential portion of the community from 15 dwelling units per acre to 3.5 units per acre. As its name implies, the Coastal Residential area occurs almost entirely within the Category I Hurricane Vulnerability Zone; clearly, 3.5 units per acre is far more appropriate than the density previously allowed.

Realizing the advantages and opportunities of community-specific planning efforts (as exemplified by the Charlotte Harbor CRA), other communities have expressed to the Board of County Commissioners (BCC) an interest in developing neighborhood or community plans. In fact, the BCC recently approved a Future Land Use Map amendment presented by the Rotonda Property Owners Association which changed several hundred acres of high and medium-density residential land to low density, resulting in a reduction of allowable dwelling units. While none of the communities expressing interest in neighborhood planning (including Harbour Heights, Rotonda, and South Gulf Cove) have experienced the conditions which led to the finding of blight within Charlotte Harbor, this approach would certainly help create a sense of place, foster a community spirit, and perhaps prevent the onset of blight within the affected areas.

Several of the communities interested in neighborhood planning occur all or partially within flood prone areas. Community or neighborhood planning may provide an excellent platform for addressing coastal planning issues.

In August 2004, Charlotte County was hit with a Category IV hurricane. The impacts from Hurricane Charley changed much of the City of Punta Gorda as well as the areas south of the Peace River and those between the Peace and Myakka Rivers. Many of the older building units were damaged or destroyed, not by flooding but by wind. A discussion of these properties is found in the Housing element.

COASTAL PLANNING AREA FUTURE LAND USE (SPAM Series Map #66)

By channeling growth into areas which have existing infrastructure and which are substantially built-out (in-filling) and directing growth away from areas that are sparsely built, impacts to the natural systems and to the County's financial bottom-line may be reduced. Serious consideration should also be given to the future impact on coastal resources of platted lands that have not yet been committed to development (i.e., no existing infrastructure). Development of platted lands in the Cape Haze area would result in the direct loss of wetland habitats and, because of their proximity to the shoreline, would require special measures to protect the quality of adjacent surface waters. In addition, development of these lands would require major expenditures for upgrading hurricane evacuation times. The discussion on platted lands in the Future Land Use element considers some of the options available (e.g., transfer of development rights, fee simple acquisition, etc.) to reduce the land area that is potentially committed to development.

Most of the coastal platting (if not actual development) in Charlotte County occurred prior to any serious consideration of the need for evacuation. Notable periods of platting and land speculation include the turn of the century, the early Florida Land Boom of the 1920s, and then throughout the 1950s and 1960s as a result of post-World War II prosperity. Unfortunately, the County's ability to reduce the density of these existing plats is seriously hampered by the provisions of the Bert Harris Private Property Rights Act which entitles property owners to a variety of forms of compensation (including cash payment) if any action of government diminishes a property's value. Because of this, and because so much of the County was platted and developed (at least partially) prior to any real planning or regulatory efforts, the land use designations established by the Future Land Use Map and Future Land Use element do not substantially vary from the County's historic growth pattern.

Notwithstanding, the Future Land Use element describes in detail a Growth Management Strategy currently utilized to direct growth into suitable areas. The strategy is intended to curtail urban sprawl outside the Urban Service Area and help prevent the expenditure of public funds in areas vulnerable to flooding. The Transportation and Capital Improvements elements of the Comprehensive Plan provide additional, detailed discussions of the County's scheduled road improvements and funding allocations for road and other capital projects. The County has addressed future density by limiting the number of dwelling units of new subdivisions within the Category I Hurricane Vulnerability Zone to 3.5 units per acre.

Even with the adoption of policies which affect the density of future development, the previous platting and sale of massive residential subdivisions in the coastal area makes retroactive hurricane-evacuation planning difficult. Unless major changes occur which eliminate many of the older plats, it may be reasonably anticipated that hurricane evacuation times will remain the same at best. Further, unless major new evacuation routes are opened (an expensive proposition for which State and Federal funds seem to be diminishing), evacuation times will probably increase.

Areas Prone to Coastal Flooding

Areas prone to coastal flooding are defined as those areas which would require evacuation during a storm event. Using the SLOSH model developed by the National Hurricane Center, the Southwest Florida Regional Planning Council (SWFRPC) has developed a map (SPAM Series Map #64) of all anticipated flooding which would occur in the event of a tropical storm or Category 1, 2, 3, or 4/5 hurricane. Table CST-6 below, shows the estimated number of dwelling units which would be affected in each storm surge zone.

Table CST-6: Storm Surge Vulnerable Dwelling Units	
Storm Surge Level	Number of Dwelling Units
Tropical	7,823
Category 1	9,414
Category 2	32,692
Category 3	23,315
Category 4/5	13,913
TOTAL	87,157

Source: Growth Management Department, 2007

COASTAL PLANNING AREA INFRASTRUCTURE (SPAM Series Map #65)

Infrastructure is a broad term which may be applied to any physical improvement to the land which generally serves growth or a public need. Infrastructure may include roads, bridges, parks, sanitary sewer facilities, potable water plants, public coastal shore protection structures, public buildings, and public beach renourishment projects.

Nearly the entire County’s existing network of roads and bridges, water lines, and sewer lines occurs within the CPA. This is consistent with the County’s historical development and platting patterns, which tended to locate communities near the coastline and major surface water bodies (a practice in common with the earliest natives). Because of this, nearly all of the County’s other forms of infrastructure (including schools, fire stations, libraries, government buildings, and hospitals, many of which may be used as hurricane evacuation shelters) also occur in the CPA. SPAM Series Map #65 illustrates the location of such infrastructure relative to the CPA.

The Recreation and Open Space element provides maps which clearly illustrate the location of the County's park facilities (most of which occur in the urbanized portion of the County) as well as a thorough discussion of the County's park needs and expansion plans.

The Potable Water and Sanitary Sewer sub-element provides a detailed discussion of expansion programs, customer base, and other factors pertaining to the operation of the services for which the sub-element is named, while the Capital Improvements and Infrastructure elements provide a thorough examination of the budgeting constraints and long-term costs associated with providing the infrastructure (including parks, government structures, etc.) needed to support the County's growth. The Capital Improvements and Transportation elements thoroughly examine the County's (as well as the State's) plans and schedules for road improvements, including estimates of associated costs.

Water Facilities

Charlotte County's water supply is derived from two sources: 95 percent of the County's potable water comes from the Peace River facility, while the remaining 5 percent comes from our Burnt Store reverse osmosis plant, which serves customers along the Burnt Store corridor.

Water supply sources are of two types: groundwater (like the Burnt Store plant) and surface water (like the Peace River facility). Surface water sources, are potentially vulnerable to storm-related contamination. For groundwater sources the primary concern would be facilities damage rather than contamination of the source water, which is located deep underground.

In both cases, the facilities are located in close proximity to the water source. In the case of severe storm damage, relocating of these facilities would require a conveyance system to transport the source water to the new location or finding new source water. In the case of severe storm damage, these facilities would have a number of options:

1. Wait through an emergency period until the source quality is restored;
2. Switch to an alternative treatment technology;
3. Attempt to connect to a better water source.

Connecting to a better water source would involve either physical relocation or a phasing out of the existing system in favor of regional suppliers. Some of these alternatives, however, could be either infeasible or too costly to utilize.

Preferred relocation areas would include inland areas, such as Categories (zones) 2-5 and also areas outside hurricane flood zones. Moving to some areas, especially in the furthest inland zones (where fewer people reside) may create additional problems of economy of scale.

Interconnecting water supply facilities is another option. The 1997 Comprehensive Plan identified the importance of water supply interconnects and provided the example of connecting

the Peace River Manasota Regional Water Supply Authority (PRMRWSA) Peace River Facility to the City of Punta Gorda Shell Creek facility. This proposal is currently under consideration. This interconnect would serve as a backup water supply for the City in the event of any natural or man-made disaster and would make the City's supply available to the PRMRWSA when the Peace River is unavailable for pumping, typically during periods of low flow or when algal blooms are present near the intakes.

Charlotte County Utilities has identified several key interconnects for Charlotte County:

1. Charlotte County and City of Punta Gorda
2. Charlotte County and City of Cape Coral
3. Charlotte County and Lee County
4. Charlotte County and Englewood Water District
5. Charlotte County and City of North Port.

Most of these interconnect projects are in the planning and feasibility study phase. Several small interconnects currently exist between Charlotte County and the City of North Port; however, the two entities are investigating the possibility of a larger interconnect pipeline.

Any or all of these interconnects could potentially be part of a larger regional system being planned by the PRMRWSA. This regional system would lessen the dependency of each area on its individual water supply sources.

Wastewater Facilities

Wastewater facilities in the Category I Storm Surge zone are provided by a combination of small, privately-owned facilities and community facilities. The threat to these facilities and, consequently, to the public well-being differs from the threat to public water systems.

Large-volume wastewater treatment plants (more than 100,000 gallons per day) typically provide service to many individual users over a large area. These systems have, as their major investment, the sewage collection infrastructure system. Any question of relocation depends upon the ability to continue to move the volume of sewage to the new location.

Charlotte County Utilities currently has four wastewater facilities: East Port, Burnt Store, West Port and Rotonda. The West Port and Rotonda systems are interconnected to allow the transfer of untreated wastewater from Rotonda to West Port as needed, such as during periods of heavy rains. Three of the four plants are scheduled for immediate expansion, with an additional West Port expansion to follow in several years.

As discussed in great detail in the Sanitary Sewer sub-element, Charlotte County continues to focus expansion of its central sewer service within the County's Urban Service Area. This strategy continues to be one of the major features of the Growth Management Strategy

presented in the Future Land Use element. In 1996, Charlotte County Utilities took the Southport Wastewater Treatment Facility off-line, transferring wastewater to the Eastport plant for treatment. The Eastport facility occupies significant acreage and is well-buffered from surrounding land uses. Unlike the Southport plant, which was located entirely within the 100-year flood plain, the Eastport plant is located largely outside of flood zones, except for a small portion of its sprayfield area.

Transportation Facilities

Few transportation facilities other than roads are located in the most vulnerable (Category I) areas in Southwest Florida. Major facilities (such as airports, etc.) are outside the vulnerable zones and thus relocation would not be necessary. Those facilities located in Category I Storm Surge zone are divided into three categories: ports, railroads, and roads. Port facilities, of necessity, must be located in the Category I zone. Southwest Florida has one major port facility at Boca Grande and a large number of minor port facilities, primarily marinas. The port facility at Boca Grande is owned and operated by the Florida Power and Light Company and has been noted before as an exposed location with regard to the oil storage tanks at that location. The issue of relocating these facilities, using the same system of oil delivery, has been met in counterpoint by the environmental impacts, both at and to the proposed new site, and the costs of relocation. As a result, there has been no agreement reached on relocation. The possibility of changing the delivery system and eliminating the primary need for oil storage at the port is still an option, but would involve the voluntary participation of the port operation.

Rail facilities in the Category I Storm Surge Zone are primarily those primarily crossing the flood zone at river crossings. Most rail-related facilities are located outside of the Category I Storm Surge Zone; the need for relocation of these is minor.

Road facilities in the Category I Storm Surge Zone exist to serve urban areas located in such zones, as well as providing access to the recreational opportunities associated with those areas. These are most notably beach use, boating, and fishing. The question of relocating the roads is then related to relocation of the overall urban area, as well as limitations on the availability of recreational uses.

The SWFRPC study accurately describes conditions in regard to Charlotte County's road and other transportation facilities network. Because of the County's historic (i.e., pre-planning) development pattern, relocating major road infrastructure is virtually impossible. Fortunately, the County's airport, which was developed by the U.S. Army Air Corps during World War II, is located entirely outside of the 100-year flood zone. There is currently one active rail-line in Charlotte County. Again consistent with the SWFRPC study, the line only passes through flood zones where it crosses or comes in proximity to creeks, rivers, or the Harbor. The railroad to Boca Grande is no longer active; its trestles now serve as fishing piers and an eight-mile segment of the abandoned right-of-way was developed into a bike path/greenway through the Rails-to-Trails program.

Environmental Resources within the Coastal Planning Area are illustrated on SPAM Series Map #68.

Flood Zones within the Coastal Planning Area are illustrated on SPAM Series Map #69.

Historic Resources within the Coastal Planning Area are illustrated on SPAM Series Map #70.

HURRICANE EVACUATION PLANNING

The Charlotte County Hurricane Evacuation Plan, prepared by the SWFRPC, provides an analysis of hurricane evacuation routes, times and available shelter space for the County. As previously discussed, the SWFRPC uses the National Hurricane Center's SLOSH model to predict storm surges for various hurricane scenarios, for which the anticipated number of evacuees, evacuation routes, evacuation times, shelter availability, and other factors are determined.

Hurricane preparedness and growth in the coastal areas are not only a major regional issue, but a local issue as well. As a coastal community bisected by two rivers, these issues are well in the forefront of resident's minds. Throughout the public workshops held pursuant to this Plan update, and during the debates regarding the extension of the one percent (aka "one cent") sales tax, hurricane evacuation and shelters were consistently raised as one of the issues citizens wish to see addressed. Their concerns are well-founded.

Floodplains encompass much of the County's developed area as development has, historically, occurred in proximity to the coast and rivers (FLUM Series Map #17). According to the Hurricane Evacuation Study 2001, completed by the SWFRPC, Charlotte County is probably the most vulnerable County in the state to the impacts from hurricanes and tropical storms. This is particularly true of the Cape Haze Peninsula which is entirely within the Tropical Storm, and Category I, II, and III Storm Surge Zones, and yet hosts more than one-third of the County's platted lot inventory (approximately 50,000 lots). In addition to concerns associated with landfalling storms, Charlotte County has many low-lying, poorly-draining areas that are subject to periodic flooding which can result not only from tropical weather, but also from prolonged periods of heavy rains which may inundate the soils and overwhelm natural and man-made drainage systems.

Regardless of the storm, Charlotte County is susceptible to flooding, and because of this, residents are concerned with hurricane preparedness, evacuation, and shelters.

Evacuation Routes

Charlotte County was platted for development according to a 1950's-vintage pattern which emphasized winding streets and few through roads. This has left Charlotte County with a road

system that provides few options for evacuees who must leave areas along the coast and areas in which most of these subdivisions were platted. This situation is exacerbated by the County's geography, which is divided into three geographic regions separated by two major rivers and a harbor, requiring the use of bridges over either river to access the mid-section of the County. Since roads are the foundation of an evacuation plan, the County must maintain a level of service for roads. However, it must be realized from the onset that neither the County nor the State can build the amount of roads necessary to evacuate the population during the worst-case storm event.

The County's evacuation problem is greatest in the area west of the Myakka River, which includes all of the subdivisions platted on the Cape Haze Peninsula as well as the County's barrier islands. Transportation in the west County area is based on three major roads: State Road 776 and County Roads 771 & 775. S.R. 776 plays a critical role in West County evacuation in that both C.R. 771 & 775 connect with it and evacuees must travel at least a portion of S.R. 776 to get out of harm's way. Evacuation north along S.R. 776 through Sarasota County tends to follow the coast, and so in itself S.R. 776 is not a good alternative. Alternatively, moving east then north, S.R. 776 connects to I-75 at Exit 170 and on to Kings Highway which moves inland. However, this route entails crossing the Myakka River Bridge which could become a choke point in an evacuation. Fortunately, this bridge was expanded to 4 lanes in 2001 and the County's evacuation plan calls for making all lanes one-way away from the coast, a strategy which would reduce the choke potential for this bridge.

The other route off the Cape Haze peninsula also involves S.R. 776 which intersects with the recently-constructed Winchester Road, which was conceived from the start as an evacuation route. Winchester Road runs north from S.R. 776 in Charlotte County to River Road in Sarasota County. It passes through State-owned lands which will not contribute to an increased number of evacuees. Phase II involves connecting Winchester Road to C.R. 775.

The County's other two primary evacuation routes are U.S. 41 and Interstate 75. These roads also serve as primary evacuation routes for other counties. The number of vehicles exiting other Counties will increase the number of vehicles traversing the Charlotte County portion of roadways. The County has reviewed alternate routes such as US 17 and County Road 74, for Charlotte County evacuees to use for evacuation. All of the County's evacuation routes are illustrated on FLUM Series Map #14.

In addition to storm surge, Charlotte County's evacuation routes are susceptible to factors such as high winds or inundating rainfall and non-surge flooding that can render them non-functional. For example, on June 23, 1995, several miles of I-75 as well as portions of US 41 and many of the County's local collectors and arterials were closed due to flooding from two weeks of constant rain that culminated in an 8 hour downpour, which has been called a 500-year storm. Fortunately, there were no high winds or storm surge associated with this event; if there had been the loss of property and (potentially) life would certainly have been much greater. Part of

the problem is that the County's platting and development pattern has placed many of the major roads and evacuation routes within the 100-year floodplains or other lower areas, which makes them highly prone to flooding.

Since the adoption of the Comprehensive Plan in 1997, Charlotte County has completed many road improvement projects and identified several other projects which would improve evacuation. Charlotte County has programmed money to address the bridge replacements previously recommended in the Transportation element. For example, Aqui Esta Blvd., which is an urban roadway serving a large population center in Punta Gorda, has been identified for improvements in the MPO's Transportation Improvement Plan. The proposed improvements include raising the road's elevation and replacing a substandard bridge that is subject to flooding. The location of the bridges will be mapped based on criteria in the 2030 Long Range Transportation Plan which requires critical bridges to be either replaced or repaired.

US 17 also serve as an evacuation route for local residents. US 17 lies east of the Peace River and serves as a major corridor for commercial traffic, particularly freight, produce, and fill-dirt trucks. This commercial use intensified with the development of a regional Wal-Mart Distribution Facility on US 17 in DeSoto County just north of the County line. The commercial use will further intensify when Charlotte County's Airport Commerce Park begins to develop. The Florida Department of Transportation completed the widening of US 17 from within the boundary of the City of Punta Gorda to the DeSoto County line in FY 2004/05. In addition to improving evacuation conditions in the south County area, this project provides regional benefits, notably to Lee County evacuees, as well.

Improvements are also underway for the area of the County between the Myakka and the Peace Rivers, or mid-County area. Concurrent with the adoption of the 1997 Comprehensive Plan, and as discussed in its Transportation element, the County funded a signalization program to improve traffic flow along U.S. 41. The system was to include traffic signal timing for efficient evacuation, but currently the County is still working toward completion of the Computerized Traffic Signal System project. Once completed, the project should improve evacuation times and routes for residents in Mid-County.

Evacuation Times and Trends

Evacuation routes generally occur along arterial roads which form the backbone of any evacuation effort (SWFRPC, 1995). Evacuation time is the sum of the greatest clearance time and the greatest travel time to either the nearest shelter or out of the County. Table CST-7, below, summarizes total evacuation times for various storm events. Despite the increasing population and vehicle load, a comparison of evacuation times between the 1995 and 2001 Hurricane Evacuation Studies clearly illustrate that times have generally improved during the last planning period. This can be attributed to several factors, most importantly the road improvements discussed in greater detail in the Transportation section of this Comprehensive Plan; the widening of S.R. 776 (and the increase in lanes over the Myakka River), the

construction of Winchester Blvd., the widening of US 17, and the widening of Veterans Blvd. have all increased the capacity of the County's road network. Other non-structural improvements not available for the 1995 Hurricane Evacuation Study include the County's improved traffic management strategy and better hurricane tracking and movement forecasting technology which give Emergency Managers better data and longer preparation times if a storm approaches.

Table CST-7: Total Evacuation Time Exiting Storm (hours)

Storm Surge Category	Evacuation speeds	Evacuation Time 1995		Evacuation Time 2001		Evacuation Time 2005*	
		July	Nov.	July	October	July	October
		1	Slow	3.7	4.1	2.3	2.4
Intermediate	3.0		3.3	2.1	2.3	2.4	2.6
Quick	2.8		3.1	2.0	2.2	2.3	2.5
2	Slow	12.8	14.2	7.8	8.4	8.6	9.3
	Intermediate	10.4	11.5	7.2	7.8	8.0	8.6
	Quick	9.6	10.7	7.0	7.6	7.7	8.3
3	Slow	13.8	15.2	8.0	8.8	9.3	10.2
	Intermediate	11.2	12.3	8.0	8.8	9.3	10.2
	Quick	10.4	11.4	8.0	8.8	9.3	10.2
4/5	Slow	13.8	15.2	12.9	14.3	15	16.6
	Intermediate	11.2	12.3	12.9	14.3	15	16.6
	Quick	10.4	11.4	12.9	14.3	15	16.6

Source: Hurricane Evacuation Studies in 1995 and 2001 by SWFRPC.

*Forecasted numbers

Evacuation times are subject to a number of variables, such as weather and road conditions, individuals' driving habits, and other forces beyond any government's control, which may negatively (or positively) affect evacuees' ability to flee an on-coming storm.

It is important to realize that, in the event of a storm, the progress to get Charlotte County's evacuees out of harm's way will be greatly affected by conditions in neighboring counties, particularly Sarasota, DeSoto, and Glades. Even if Charlotte County's arterial and other important roads provide adequate evacuation capacities, bottlenecked or flooded roads along any of the routes through neighboring counties could effectively negate any road improvements which stop at the Charlotte County line. For this reason, it is essential that Southwest Florida's coastal counties cooperate in road improvement planning and construction in order to ensure that hurricane evacuation, which is a regional issue, is always given due consideration.

Notwithstanding this positive change, the County must still do everything in its power to ameliorate the threat posed by tropical systems as growth will continue to occur in vulnerable

areas due to the over-abundance of platted lands. Fortunately, the County is well aware of this need, and has made progress in this area.

Shelters

The Southwest Florida Regional Hurricane Evacuation Study 2001, (SWFRPC, 2001) identifies Charlotte County as probably the most vulnerable County in the state to the impacts from hurricanes and tropical storms. This is in part due to the geographic makeup of the County which is bisected by two rivers and contains roughly 129 square miles of inland surface waters, and in part to the County’s historic platting which created large population centers near or on the water (miles of canals were included as part of the platting). The majority of the platting in Charlotte County occurred in areas vulnerable to storm surges; Table CST-8, below, identifies 73 percent of the County’s 258,709 (entire County) platted lots occur within the Category 3 or less storm surge zones. The overwhelming majority of this platting occurred well prior to the passage of the Growth Management Act in 1985.

Table CST-8: Number of Platted Lots within Storm Surge Zones		
Storm Surge Zones	# of Platted Lots	Percent of Lots w/in Hurricane Vulnerability Zone
TS	18,292	7
1	15,218	6
2	97,612	38
3	57,573	22
TOTAL	188,695	73

Source: Growth Management and the Land Information Services 2002

All of Charlotte County’s primary shelters are school facilities and are located close to the populations they are intended to serve. This is consistent with state, regional, and local policies which encourage, if not mandate, the joint use of public facilities, and also with the recent amendments to the Growth Management Act of locating public schools within population centers where they are both needed and where they can become the focal point of their communities (see Chapter 163.3177(6)(a), F.S.). Hurricane shelters, being located close to the County’s existing and future population centers, places the County’s schools (and nearly all public facilities which could serve as shelters) within the Category 3 or less hurricane vulnerability zones. Because of their locations within the Category 3 or less zones, none of these 18 shelters meet the certification requirements of the American Red Cross (ARC Rule 4496). Because the state has adopted ARC 4496 as part of its criteria for safe hurricane shelters, none of Charlotte County’s shelters meet the State requirements, either.

Evacuees

Charlotte County Emergency Management Department worked with the SWFRPC to create evacuation zones that would effectively assess the timing and shelter needs of the existing and future populations during both land-falling storms and exiting storms. This was a very detailed

analysis that used the Charlotte County GIS analysis of the Property Appraiser’s records to determine the number of units by type in each of the evacuation zones that would need to evacuate during each Category storm event. The overall occupancy of each type of unit County-wide is provided in Table CST-9 below.

Table CST-9: Occupancy Rate by Unit Type		
Unit Type	Seasonal Occupancy Rates	
	July	October
Single family/Duplex	95 percent	100 percent
Multi-family	61 percent	71 percent
Mobile Home	43 percent	75 percent
Travel Trailer	18 percent	41 percent
Hotel/Motel	40 percent	50 percent

Source: Hurricane Evacuation Study, Southwest Florida/2001
Southwest Florida Regional Planning Council

What does this mean to Charlotte County’s evacuees? The number of people needing to evacuate depends on the severity of the storm event and, due to the County’s seasonal population, the time of year in which it occurs. As shown by Table CST-10, Charlotte County will generate anywhere from 17,089 evacuees in a landfalling Tropical Storm in July to 206,457 in the event of a landfalling Category 5 hurricane in October. From the standpoint of shelter planning, the percentage of these potential evacuees that will need to seek shelter other than with friends, family, or other private arrangement is the critical issue.

Table CST-10: Population Displacement Ratio*						
Storm Category	Displaced		Not Displaced		Ratio	
	July	October	July	October	July	October
TS	17,089	30,285	164,041	176,190	0.1	0.2
1	45,070	60,822	136,060	145,653	0.3	0.4
2	122,923	144,142	58,208	62,333	2.1	2.3
3	158,265	181,987	22,865	24,489	6.9	7.4
4/5	181,130	206,475	0	0	Infinity	Infinity
Outside			0	0		

Source: Hurricane Evacuation Study, 2001 by SWFRPC

*Data is forecasted for 2005

According to a behavioral analysis study undertaken as part of the 2001 Hurricane Evacuation Study (HES) by Hazard Management Group, Inc as well as other pre- and post-hurricane behavioral studies, the County will require shelter space for between 12-24 percent of the population seeking shelter. For Charlotte County, the SWFRPC used an averaged figure of 15 percent based on a number of factors including demographics and the County’s location. The breakdown of anticipated evacuees and the surplus or deficit of shelter capacity is illustrated by Table CST-11.

In addition to primary and secondary shelter space, the County has also identified a number of secondary refuges which, according to the 2001 HES, adds 2,800 additional spaces. The effect of these refuge spaces is illustrated on the second half of Table CST-11. As illustrated by Table CST-11, even with the inclusion of secondary shelters and refuges, and keeping shelters open during the Category storm in which zone the shelters occur (i.e., keeping Category 3 shelters open during a Category 3 storm), Charlotte County still has a substantial deficit in shelter capacity for anything greater than a Category 1 Hurricane.

There are, however, alternative options of hazard shelter available to the residents. These include both hotels/motels and friends/families. Of the 2,455 estimated hotel/motel rooms available in the County, 1,094 units would be available for a Category 1 storm and 319 units available for a Category 2 storm. The remaining 1,361 rooms are located along the shoreline within the Category 1 Storm Surge zone and are not counted. Table CST-12 shows the additional capacity available to evacuees if hotels and motels are used as secondary shelters.

Table CST-11: Public Shelter Capacity Landfalling Storm - Primary Refuges									
Storm Category	Space	Evacuees		Percent Met		Space Needed to Open		Surplus/Deficit	
		July	Oct.	July	Oct.	July	Oct.	July	October
TS*	10,800	17,089	30,285	63.2	35.7	2,563	4,543	8,237	6,257
1	10,300	45,070	60,822	22.9	16.9	6,761	9,123	3,539	1,177
2	6,200	122,923	144,142	5.0	4.3	18,438	21,621	-12,238	-15,421
3	1,000	158,265	181,987	0.6	0.5	23,740	27,298	-22,740	-26,298
3**	6,200	158,265	181,987	3.9	3.4	23,740	27,298	-17,540	-21,098
4/5***	1,000	181,130	206,475	0.6	0.5	27,170	30,971	-26,170	-29,971
*Mobile home and RV Residents will likely receive advisories to go to shelter									
**Assumes shelters in the Category 2 zone remain open.									
***Assumes shelters in the Category 3 zone remain open.									
Secondary Refuges									
Storm Category	Space	Evacuees		Percent Met		Space Needed to Open		Surplus/Deficit	
		July	Oct.	July	Oct.	July	Oct.	July	Oct.
TS*	13,600	17,089	30,285	100.0	100.0	2,563	4,543	11,037	9,057
1	13,100	45,070	60,822	29.1	21.5	6,761	9,123	6,339	3,977
2	9,000	122,923	144,142	7.3	6.2	18,438	21,621	-9,438	-12,621
3	2,800	158,265	181,987	1.8	1.5	23,740	27,298	-20,940	-24,498
3**	9,000	158,265	181,987	5.7	4.9	23,740	27,298	-14,740	-18,298
4/5***	2,800	181,130	206,475	1.5	1.4	27,170	30,971	-24,370	-28,171

*Mobile home and RV Residents will likely receive advisories to go to shelter
**Assumes shelters in the Category 2 zone remain open.
***Assumes shelters in the Category 3 zone remain open.

Source: Hurricane Evacuation Study, 2001 by SWFRPC

*Data is forecasted for 2005

Table CST-12: Percent Shelter Space Increase Due to Hotels/Motels*		
Storm Category	Percent	
	July	October
TS	37.2	21.0
1	6.3	4.7
2	0.7	0.6
3	0.3	0.2
4/5	0.0	0.0

Source: Hurricane Evacuation Study, 2001 by SWFRPC

*Data is forecasted for 2005

The 2001 HES states that the friends and family option although limited, provides additional shelter capacity which diminishes as the ratio of evacuees to those not affected increases, as shown in Table CST-13. Given that assumption, all of those evacuees from a Category 1 storm wishing to stay with friends will be able to do so. However, during a Category 2 evacuation only 6.2 percent of the evacuees in July and 5.6 percent in October will be able to stay with friends. Therefore, out-of-County evacuation loading will be reduced by only approximately these percentages or less by sheltering with a friend for a Category 2 evacuation. Table CST-13 summarizes the percent shelter space increase due to friends or relatives.

Table CST-13: Percent Shelter Space Increase Due to Friends/Relatives*		
Storm Category	Percent	
	July	October
TS	13	13
1	13	13
2	6.2	5.6
3	1.9	1.7
4/5	0.0	0.0

Source: Southwest Florida Regional Planning Council's Report on Hurricane Evacuation Study 2001

The preceding discussions are summarized in Table CST-14, below, which presents the shelter capacity situation for Charlotte County.

Table CST-14: Total Public and Private Shelter Satisfaction in Charlotte County*				
Storm Category	Percent Met			
	July	July ⁽¹⁾	October	October ⁽¹⁾
TS	113.4	150.2	69.6	134.0
1	42.1	48.3	34.6	39.2
2	11.9	14.1	10.5	12.4
3	2.8	3.9	2.5	3.5
3 ⁽²⁾	6.1	7.8	5.4	6.9
4/5 ⁽³⁾	0.6	1.5	0.5	1.4

Source: Southwest Florida Regional Planning Council's Report on Hurricane Evacuation Study 2001

*Data is forecasted for 2005

⁽¹⁾Includes secondary refuges open

⁽²⁾Assumes shelters in Category 2 Zone remain open

⁽³⁾Assumes shelters in Category 3 Zone remain open.

In order to alleviate this problem, the County should evaluate all the property it owns to determine whether any parcels occur outside of the Category 3 Hurricane Vulnerability Zone which might be suitable for development as an evacuation shelter. The County should also initiate discussions with other governmental agencies to determine whether any other properties under public ownership within, or within a reasonable distance of, Charlotte County might be available for such use. If such properties exist, the Board of County Commissioners may decide to pursue intergovernmental agreements or memoranda of understanding with the properties' controlling entities to cooperatively develop evacuation shelters, or to ensure that any development on such properties would include shelter capacity. The Charlotte County School Board's vacant, 67± acre Bachman Tract, located in the Category 5 zone along the County Line, represents one such opportunity.

POST DISASTER REDEVELOPMENT

As previously stated, the CHHA incorporates the "V" (velocity) zones depicted on the FEMA's Flood Insurance Rate Maps (FIRM), areas seaward of the Charlotte County CCCL, and areas which, according to the SWFRPC, would require evacuation in the event of a landfalling Tropical Storm or Category 1 hurricane. Redevelopment of these areas, including assistance programs, strategies for redirecting high-density growth, and prioritizing of redevelopment concerns were discussed at great length in the SWFRPC'S 1984 Hurricane Loss Study and identified as a major issue in the County's 2003 Evaluation and Appraisal Report. Many excerpts from the 1984 study, along with commentary regarding how or to what extent such measures have been or will be undertaken, were presented in the 1997 Comp Plan and are still considered valid today.

With approximately 74 percent of the platted lots of Charlotte County located within the Category 3 or less Hurricane Vulnerability Zone, Charlotte County is well aware of the ramifications that a natural disaster could have on the CHHA.

Charlotte County has approximately 118 miles of coast line, not including canals. Much of the natural shoreline along Charlotte Harbor is designated as Preservation on the Future Land Use Map due to aggressive land acquisition efforts by the State and Charlotte County. Even with these efforts, however, a significant amount of the County's developed and developable but vacant properties still remain within the CHHA. Many of these lots were platted long before Growth Management was even a concept because people wanted to be near the water and Charlotte County provided that opportunity.

Although the concepts embodied in the Growth Management Act have provided many alternatives when the County considers new plats and development, they do not provide relief to the problems that exist after years of extensive previous platting. As with all local governments with lands located within a CHHA, Charlotte County must balance the property rights of current residents with public safety considerations in the event of a major disaster. In a platted lots context, this means attempting to ensure that post-disaster redevelopment does not simply follow the historically established pattern (which would also be the path of least resistance). This is and will continue to be a daunting task.

There is no doubt that redevelopment will occur in the CHHA following a natural disaster. The question facing Charlotte County, and indeed all counties with coastal high hazard areas, is what will be the nature of the redevelopment? It is a generally accepted theory of land use and zoning law that, if a property is lawfully developed in accordance with all existing regulations in force and effect at the time of development, and then those regulations change, the development which took place prior to the change is considered a lawful non-conformity. In Charlotte County, as in most jurisdictions, lawful non-conformities are typically allowed to remain in existence, including regular maintenance as long as they are not enlarged or expanded, provided they are not destroyed by more than 50 percent of their value, at which time they have to be brought into compliance with existing codes. While this rule was applied in the wake of Hurricane Charley, Charlotte County gave careful consideration to any vested rights which may apply to the property and circumstances. The benefit was given to the property owners in the assignment of the 50 percent rule. Several methods were available to calculate the 50 percent and many structures that may have otherwise been demolished were allowed to be gutted down to four standing walls and rebuilt.

The uncertainty surrounding what the vested rights that would impact post-disaster redevelopment is complicated by the 1997 Comprehensive Plan which does not provide specific policies to reduce densities in the wake of a disaster, but instead focuses on ameliorating the scale of future potential disasters. It does this by limiting the density of future plats within the

CHHA to 3.5 units per acre, and by seeking to direct future growth away from the most vulnerable areas through the land acquisition and Transfer of Density Units (TDU) programs. Because this policy guidance is limited to future platting but is silent in regard to construction not requiring platting, an applicant would most likely be able to rebuild in accordance with the property's underlying zoning and future land use designations.

As illustrated by FLUM Map #1, Low Density Residential (which allows for a maximum of 5 dwelling units per acre) is the dominant development use for roughly the western half of the County, including all the areas within the CHHA. Additional land uses within the CHHA include Coastal Residential (which allows for development from one dwelling unit per acre up to a density of 3.5 dwelling units per acre), Medium Density Residential (which allows lands to be developed up to ten dwelling units per acre), and High Density Residential (which allows lands to be developed at a density up to 15 dwelling units per acre). Resource Conservation designations allow residential densities of one dwelling unit per 40 acres. Preservation designations are generally maintained as aquatic preserves, wilderness areas, wildlife sanctuaries or similar uses. Residential densities may occur in privately owned areas but are limited to one dwelling unit per ten acres within the USA, and one dwelling unit per 40 acres within the Rural Service Area (RSA). The RSA is well outside the CHHA and is not part of this discussion.

In reviewing the FLUM against existing development within the CHHA, there are currently only four instances in which existing developed properties might be affected if redevelopment becomes necessary due to a natural disaster. Three of these properties are located within the West County Planning Area and one is within the Charlotte Harbor Community Redevelopment Area. While excess built density is the common issue, each development is unique in respect to why its density is now non-conforming. In one instance, the subject property's FLUM designation no longer allows residential uses. In two other instances, the subject properties are located on a bridgeless barrier island and built at a density far in excess of the one unit per acre or platted lot which became effective in 1990. The other one is in the Mid-County Planning Area but nonetheless has a density in excess of what is allowed under their FLUM designations. In each case, the County would, following a disaster, have to make a vested rights determination prior to redevelopment.

Charlotte County will continue to implement the following current strategies in an effort to reduce densities within the CHHA at the time of redevelopment:

1. Limiting the platting of new residential subdivisions to a maximum of 3.5 units per acre in the Tropical Storm and Category 1 Vulnerability Zones;
2. Continuing to implement the 50 percent rule as described above;
3. Continuing to utilize the Flood Insurance Rate Maps (FIRM) from the Federal Emergency Management Agency (FEMA) and Floodplain Management of DCA. In addition to the FIRM maps identifying those areas susceptible to flooding because they

lie within the 100-year and 500-year floodplains, the maps also designate areas which are located within coastal floodplains with velocity;

4. Continue to ensure, through the development review process, that new structures meet the minimum floor-elevation standards established by FEMA and that special construction procedures are followed within velocity zones such as elevation with pilings or columns, breakaway walls, and other techniques;
5. Charlotte County will include a discussion of all the relevant legal issues, including but not limited to vested rights, as part of the post-disaster redevelopment plan. The post-disaster redevelopment plan will include recommended strategies for reducing post-disaster density consistent with vested rights, the Growth Management Act, and the Bert J. Harris Private Property Rights Act.

Potential Relocation Sites

After a hurricane or other type of natural disaster occurs, a period of rebuilding will take place. The pattern of rebuilding may or may not be similar to the pattern of development that existed before the disaster. It may, in some instances, be more appropriate to relocate certain land uses to avoid a re-occurrence of destruction in the future.

To determine potential sites suitable for relocation of various land uses, two factors must be considered: Safety and economics. The safety factor is assessed by the degree of danger to lives of individuals and to the public at large through continual exposure to some hazard, such as a hurricane. The economic factor concerns whether it is ultimately less expensive to move a particular facility to a safer location than to rebuild it, with the probability of having to rebuild it again before it serves its useful life. The facilities facing the greatest degree of threat (in terms of economy, i.e., potential dollar damage) are those located in the Tropical Storm and Category I (most vulnerable) Storm Surge zones. These facilities are subject to damage from all categories of storms, and, therefore, are the most appropriate candidates for relocation.

There are five categories of land uses being examined for their relocation, potential and desirability. These are housing, water facilities, sewer facilities, electrical facilities, and transportation facilities. The criteria for each Category are different, and will be discussed individually below.

Housing

Hurricanes can destroy housing and also endanger the lives of individuals. Consequently, identifying potential sites for relocation of housing in non-vulnerable or less vulnerable areas would reduce the overall damage in the community resulting from storm flooding (both in terms of economy and human life). However, only two types of residential buildings (mobile homes and some types of single family) are capable of being relocated. Multiple-family housing will not be considered, since it is impractical, if not impossible, to move larger buildings such as condominiums and apartment complexes.

Finding adequate sites for the relocation of single-family housing and mobile homes is not a problem for most of Southwest Florida. There are in each coastal County of Southwest Florida, large subdivisions with vast expanses of undeveloped lots with rudimentary services.

According to the Future Land Use element, Charlotte County contains an estimated 233,438 platted lots inside the Urban Service Area, the majority of which remain undeveloped. Many of the undeveloped lots are located outside of the Category 3 Hurricane Vulnerability Zone. In the event that a major storm destroys much of the existing housing, the County may be able to re-direct development into more suitable areas using the methods described later on in this section.

Growth Management Techniques in the Coastal High Hazard Area

One manner in which the impacts of hurricanes can be mitigated is through the use of growth management. This section defines and identifies applicable growth management tools or mechanisms that local government can use to promote the location and relocation of hurricane vulnerable development. In addition, it will include a discussion of the various techniques that are currently used by the region's local governments.

There are numerous techniques available to address the issue of growth. Several mechanisms can be utilized especially with regard to natural hazards such as hurricanes. These can be divided into the following categories: building codes, subdivision regulations, zoning (these are derived from police power), land use and comprehensive planning, fiscal policy (financial incentives and disincentives, taxing policies, etc.), public acquisition (compensation programs), public improvements (public facilities location), development rights transfer, and environmental controls.

Building Codes

Building codes protect the health, safety, and general welfare of the public as it relates to the construction and occupancy of buildings and structures. The codes govern the design and construction practices of residential and other development. An adequate building code which is properly administered and enforced can help mitigate potential hurricane damage. Building codes are required by the State Legislature. Charlotte County has adopted the Standard Building Code (formerly the Southern Standard Building Code) developed by the Southern Standard Building Code Conference.

Subdivision Regulations

Subdivision regulation is a very commonly-used development control device. These regulations guide the division of large parcels of land into smaller lots for sale or development. Subdivision regulations can be an effective means for local governments to supplement hurricane hazard protection by incorporating specific measures into these regulations.

In general, subdivision regulations can reduce hurricane hazard losses by the following methods:

1. Prohibiting the subdivision of lands subject to hurricane hazards unless hazards are overcome;
2. Requiring the designation of hurricane hazard areas on subdivision plats and the insertion of restrictions in purchase deeds to control land unsuitable for residential or other uses;
3. Prohibiting encroachment in hurricane hazard areas by fill or structures;
4. Requiring that a portion of each lot be filled or otherwise protected to provide a safe building site with adequate areas for sewage disposal (i.e., septic tank drainfield), if on-site facilities are used, at an elevation above flood heights;
5. Requiring the installation of streets, sewers, water and other facilities which are hazard-proofed, elevated or otherwise protected against the hazards of a hurricane.

Conventional Zoning and Land Use Planning

A functioning community needs to provide the options for virtually all types of development to occur. The manner in which this development may locate is commonly accomplished through the various steps of the planning process.

Zoning is a commonly-employed development control device. Zoning regulates the use of buildings and land, the area of a lot which may be developed, the density of development, and the height and bulk of buildings or other structures. Zoning is one of the most effective means of protecting residents and their property from hurricane or flood damage. One important aspect of zoning is the ability to specifically regulate land uses in flood hazard areas.

Comprehensive plans are also an effective means of protecting persons and property from potential hurricane impacts by designing general land uses in specific areas. The allocation of land uses to areas that can accommodate those uses can mitigate potential hurricane damage.

If communities incorporate disaster preparedness considerations into their overall planning and zoning process, then the threat to a great deal of future development may be avoided. The uses to be directed away from hazardous areas include moderate- to high-density residential development, population-related intense commercial development, most forms of industrial development, and population-related institutional uses (schools) and utility development. The uses which would be permitted or encouraged in hazard areas are water-dependent commercial and industrial development (marinas, canneries, ports), water-oriented tourist development, recreation, agriculture, and estate housing.

Zoning ordinances are used by the region's local governments, and comprehensive land use plans have been adopted for all counties and municipalities in Southwest Florida.

Fiscal Policies

The use of fiscal policy in hazard areas is somewhat related to the provision of public improvements but with one major difference, which is the ability to make it more expensive to develop in hazard areas, regardless of the normal cost of services. The rationale for the imposition of additional costs is that the cost of services for hazard areas is greater than normal due to several factors, including the need for shelters and for adequate traffic flow on evacuation routes. Fiscal policy may take several forms, such as exactions, fees, and special taxes. Each type of policy may apply during different times in the life of a development.

Exactions are a form of fiscal policy, in which cash or cash-equivalent dedications (land, capital facilities, etc.) are provided by a developer as a condition for approval of the proposed development. Common hazard-related exactions include dedicated road rights of way, cash for roadway improvement or offsite shelters, and the provision of on-site shelter.

Tax and fee systems are set up to generate revenues, but they also have an impact on development. Fees are a form of fiscal policy which is applied during the construction phase of an approved development. Fees (such as impact fees) are normally charged for project-specific public costs. The primary difference between exactions and fees is that the “purchaser” of the building permit is the one who pays. This may not necessarily be the developer who received the initial approvals.

Special taxes are a form of fiscal policy which, applied through time, may extend beyond the life of the development. Such taxes are perhaps most appropriate for unusual ongoing maintenance programs (e.g., shoreline protection programs) or to retire bonds which require a consistent revenue level. Such taxes would normally be applied to the owner(s) of the completed development. Special assessments and preferential taxation fall into this category.

Preferential taxation, one form of fiscal and financial incentives, can be used to prevent development in hurricane-prone areas. Fiscal and financial policies can be formulated which discourage development in high hazard coastal areas, while at the same time encouraging development to take place in less disaster-prone locations. To accomplish this task, local governments could provide fiscal and financial incentives, including subsidies and loans to landowners who comply with land use regulations that reduce disaster risk. In addition, tax measures may be used to discourage development in areas where open spaces are needed for other beneficial, low density uses. Land left as open space is needed for other beneficial, low-density uses. Land left as open space or for agricultural uses could be taxed favorably, to encourage the land owner to maintain his land in that state.

Negative taxation policies would be confined to various kinds of taxes on land itself, land improvements or the income earned from land developed in areas that promote population congestion in hazardous places. Positive taxation policies such as capital grants for specific

types and location of buildings, or interest rate subsidies on land development and building, would be used to enhance development in more suitable areas.

It should be noted that fiscal policies do not inhibit the development of hazard areas. Such development that does occur, however, is more costly; consequently, some users will be crowded out by economic market conditions.

With the exception of exactions and taxation policies (other than the higher value assigned to waterfront properties by the Property Appraiser's Office), Charlotte County employs all of the techniques (via the Comprehensive Plan) discussed above to regulate, control, and influence growth and development in flood prone areas. By limiting the density of new plats (subdivisions) in the Category 1 Hurricane Vulnerability Zone to 3.5 units per acre, the Future Land Use element directs high-density development to more suitable areas.

By incorporating the requirements of the FEMA's regulations into the County Code, the Zoning Regulations also address development in flood-prone areas. Though a reactive, development-driven measure, development comply with the more restrictive standards of the FEMA regulations provides a mild disincentive to development in flood prone areas, and certainly helps insure that such development, when it occurs, is suited to the coastal area.

Public Improvements

Growth is influenced by the location of specific public facilities and services. The location of infrastructure will have an impact on a community's development patterns. One benefit is that it can be used to direct growth away from areas prone to adverse hurricane impacts. Public improvements include both the location of facilities to influence growth (such as roads, sewer, water and other essential support facilities), and access to existing facilities (such as the permit to tap into a sewer or water line).

The uses of lands which are most endangered by hurricane flooding are urban uses. These uses are dependent upon services and facilities normally provided by public agencies. Both the location of facilities and access to these facilities can be used to limit development in hazard areas by not providing or expanding services in such areas. To a certain extent, Governor Graham's Executive Order #81-105 is an example of public policy in this regard. However, most local governments and State government in Florida do not directly prohibit private agencies from providing services in such areas. Consequently, the approach of public improvement limitations is not of great value by itself. When used in coordination with other approaches, however, public improvement limitations have greater utility.

As mentioned several times throughout this element and discussed at great length in the Future Land Use and Capital Improvements elements, as well as the Sanitary Sewer and Potable Water sub-elements, the provision of public improvements is the core of the County's Growth Management Strategy. Realizing that development tends to follow roads and water lines and, to

a lesser extent, sewer lines, the Growth Management Strategy seeks to control the location and timing of such improvements, thereby controlling the location and timing of growth.

Transfer of Density Units

One method of removing density and the associated impacts from other areas less appropriate for development to more suitable areas is the TDU process. In this process, which is described in the Charlotte County Code of Laws and Ordinances and the Future Land Use element, residential development rights are severed from one parcel of land and transferred to another.

The intent of the TDU code is to protect ecologically-valuable, historic and archeological resources, direct growth from areas less suited for development to areas better suited for development, promote creative and compact development, and reduce substandard lots. The TDU code has also enacted land use controls on properties within those areas designated as the CHHA. Density within the CHHA is capped at the existing allowable density unless it is moved from another property within the CHHA; density cannot be transferred from outside a CHHA to inside. All properties within the CHHA automatically qualify as sending zones. Density is even more restricted in West County, the area west of Charlotte Harbor and the Myakka River. Density can be moved between properties within this area but cannot be transferred from outside West County to inside. This was created due to the vulnerability of West County inhabitants to catastrophic events. The majority of West County is considered a flood zone and evacuation of the area is difficult because of geographic restrictions.

Environmental Controls

These controls have emerged to protect natural processes such as flooding, stormwater runoff, groundwater recharge, or to prevent development in sensitive resource areas such as flood plains, stream valleys, wetlands, and shore lands, where problems could occur with development. Much of the area subject to a high degree of hurricane hazard also has recognized environmental values. Examples of such areas are beaches, dunes, and salt- and fresh-water wetlands. Strong adherence to effective environmental controls would remove the possibility of intense development in such areas.

There are other environmental areas which have less recognition and less regulatory protection. These are floodplains and drainage ways for stormwater runoff. Such areas, which are expected to be flooded by hurricanes, have only moderate developmental controls, with those being primarily performance standards.- Typical examples of such performance standards include the requirement of minimum building elevations in flood zones and storage capacities in drainage ways. Consequently, many environmental controls that have been enacted have limited utility in preventing development in the hurricane flood-zone.

Charlotte County has adopted a number of land development regulations, including a Shoreline Protection Ordinance, a Sea Turtle Protection Ordinance, a Stormwater Ordinance and a number of others which, while intended to address specific environmental concerns, have an

overall affect of limiting development in certain areas, and in particular on small parcels. By establishing minimum lot sizes, setback requirements, and building height restrictions, the Zoning Regulations have a similar influence on development, as well.

Land Acquisition is another tool used by the County as an environmental control. To accomplish this, the County has embarked on a land acquisition program which emphasizes properties which benefit a number of County priorities (protection of environmentally sensitive areas, reduction of platted lots, recreational opportunities, etc.). Charlotte County has acquired in excess of 1,900 acres of land while reducing by 3,499 the County's platted lot inventory.

In addition to the reduction of lots caused by the County's projects, the State has reduced the County's platted lot inventory by nearly 18,000 units, with one project (the Cape Haze/Charlotte Harbor project, which closed in 1998) accounting for 12,000 lots which had been platted entirely within the Tropical Storm Vulnerability Zone.