Chapter 3, Natural Resources and Coastal Planning Element

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Executive Summary

The Natural Resources and Coastal Planning Element provides an inventory and analysis of the current condition of the County's natural resources, and discusses potential opportunities and threats posed to these resources by existing and future land use activities. Included in this inventory are air, ground and surface waters, soils, commercially valuable mineral deposits, agricultural lands, native habitats, and flora and fauna. The element also provides an inventory and 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.

This element is done in fulfillment of Sections 9J-5.012 and 9J-5.013 of the Florida Administrative Code, and Chapter 163, *Florida Statutes* (*FS*). It is structured to be consistent with the State Comprehensive Plan and Southwest Florida Regional Comprehensive Policy Plan.

The inventory and analysis indicates that, both within and outside of the coastal area, Charlotte County's natural resources are still considered to be in generally good condition, though impacts from polluted run-off due to development continue. These impacts will require new management strategies to maintain level of service standards as well as protect the existing resources that make Charlotte County desirable to our residents and visitors.

Air quality is good, and continues to meet State and Federal regulatory requirements. Similarly, the County's surface waters continue to meet the standards of their classifications, though there is some evidence that anthropogenic impacts - including runoff from urban and other land use activities, alteration (sometimes drastic) 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, Charlotte County's groundwater resources are largely intact, though increasing urban development and past climate conditions (severe drought conditions in 1999 – 2000) may pose a threat to the direct recharge of the surficial (water table) aquifer.

On both public and privately owned lands, Charlotte County contains a variety of native communities which provide habitat for a number of listed plant and animal species such as the Florida scrub jay, bald eagle, gopher tortoise, red-cockaded woodpecker, and (in near shore waters) the West Indian manatee. With the acquisition of the Tippecanoe Scrub property (with financial assistance from the Florida Communities Trust), Charlotte County has made substantial progress toward acquiring some of the County's most significant stands of scrub habitat, and is pursuing the acquisition of additional tracts of scrub habitat (with the assistance of the Florida Communities Trust, Trust for Public Land, and other agencies) in an effort to protect what is arguably the County's most vulnerable terrestrial ecosystem. Through the Conservation and Recreation Lands and the Florida Forever programs, additional preserve areas (such as the Charlotte Harbor Flatwoods and Myakka Estuary properties) have been established within the County.

Charlotte County's Gulf coastal beaches continue to be subject to pressure both from the Gulf of Mexico (erosion) as well as development and recreational use. Areas identified in the Florida Department of Natural Resources' (now the Florida Department of Environmental Protection) 1987 erosion study continue to be 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 30± acre parcel on Don Pedro Island provided an opportunity to place a vulnerable and environmentally sensitive property in public ownership, thereby removing the threat of development from this portion of the barrier island chain while providing an opportunity for public enjoyment of the beach. 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 (aka "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.

Due to historic settlement and platting patterns, (see Map 3.1 Charlotte County Platted Subdivisions by Decade), the overwhelming majority of the County's infrastructure (public as well as private) occurs within its coastal area, with the majority of the population living on or in close proximity to the water. Charlotte County continues to struggle with regard to providing adequate shelter space in the event of a hurricane. The County's 18 hurricane evacuation shelters occur within the Category 3 (or less) Storm Surge Zone. Because of their locations, none of these shelters meet the certification requirements of the American Red Cross (ARC Rule 4496) and since 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. The County has added several refuge sites that are located within the Category 4/5 Storm Surge Zone, and continue to search for additional shelter options within the county. The "anticipated evacuees" is a moving target. The anticipated evacuees that will require public shelter is an even harder number to determine. The Emergency Management Office cites the percentages of residents that seek public shelters is anywhere between 5% and 15%. For Charlotte County that would be between 7,750 and 23,250. Recent storms in 2004/2005 have reflected even lower evacuation compliance (most notably Monroe County for Hurricane Rita).

The Goals, Objectives, and Policies of the Natural Resources and Coastal Planning Element provide the direction necessary for the County to address these concerns through:

- establishing incentives to maintain properties in natural habitat in lieu of land use activities which require these resources' destruction;

- timely public acquisition and management of native habitats and natural communities which are subject to development pressure;

- development of resource conservation (including habitat) plans which proactively direct, in cooperation with landowners, development and other land use activities away from sensitive areas;

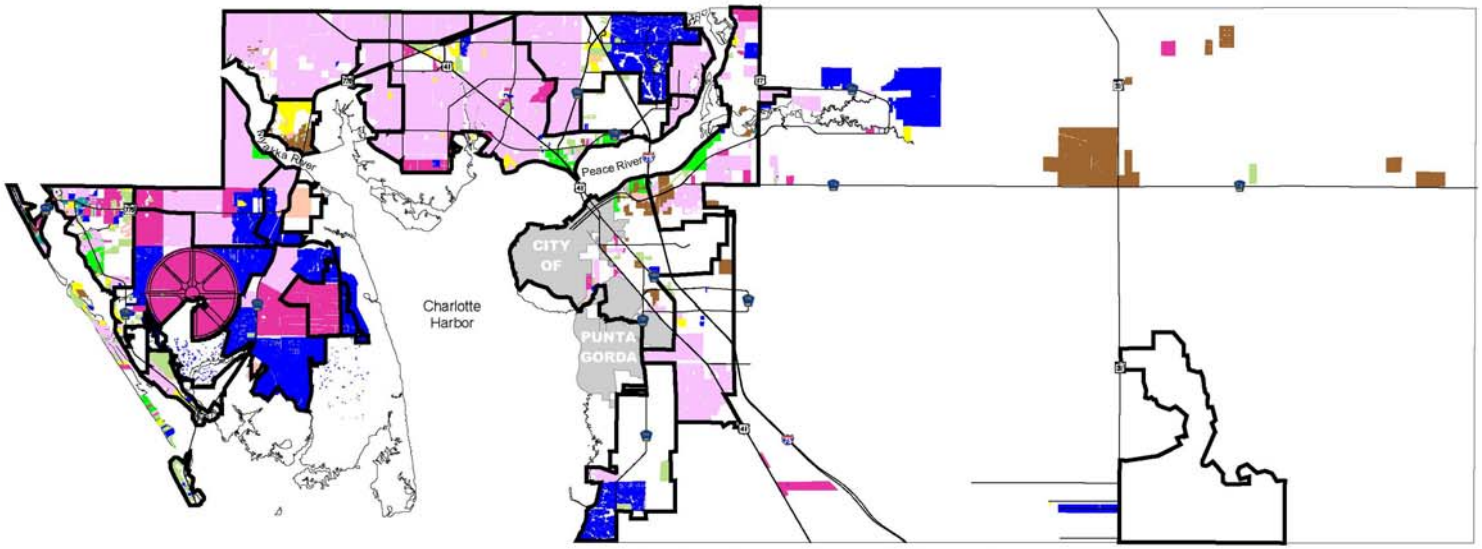
- incorporation of criteria for marine resource protection, including manatees, seagrass beds, and navigation channels;

- limiting the expenditure of public funds in the Coastal High Hazard Area;

- encouraging dialogue between government entities regarding the development of capital projects, particularly buildings and structures, to ensure that hurricane evacuation and shelter capacity needs are primary considerations of such projects;

- providing for land development regulations, where necessary, to protect the County's natural resources and safeguard the health, safety, and welfare of the general public.

Map 3.1 Charlotte County Platted Subdivisions by Decade



Charlotte County Community Development
Land Information Section
Draft Date: 10-06
Located: gig6\Comp_Plan_NEW\MAPS\Chapter_3\3_1_Subdivision_By_Decade.mxd
ArcMap Version 9

Stateplane Projection
Datum NAD83
Units: meters

Source: Charlotte County Permitting

1800's
1900's-1910's
1920's
1930's-1940's
1950's
1960's
1970's
1980's
1990's
2000's
Urban Service Area Overlay

N
W
E
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This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

I. Introduction

A. Purpose of the Natural Resource Conservation and Coastal Planning Element

In his 1882 work entitled *Florida for Tourists, Invalids, and Settlers,* George M. Barbour wrote:

> It is apparent that the time is near at hand when a vast winter "Coney Island" with Newport and Long Beach combined, must be established at some point in the southern part of the peninsula, beyond any possible danger of colds, frosts, or extreme changes, where a sea beach drive, islands for pleasure yachts, a race course, polo ground, base-ball park, etc., etc., can be established, and where the health seeker, the hunter, and the fisher, as well as the lover of strange scenes and excitement, may find special attractions. Charlotte Harbor, with a railroad, would present just such a location; and railroads must go there. Each season the army of tourists to Florida is increasing, and the farther south they can get the better they like it. And this spot offers attractions not possessed by any other in the whole country for such a resort. (Blake, 1980)

Today, over one hundred twenty years after Mr. Barbour penned his observations, much remains the same. The Gulf of Mexico continues to attract "an army of tourists" each season, and the County's Gulf-front beaches provide not only an attractive place for human recreation, but also critical habitat for nesting sea turtles, overwintering and nesting shorebirds, and other wildlife. 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. Further inland, the County contains a diverse array of native upland and wetland habitats, as well as vast agricultural areas, which support an abundance of wildlife, including many species listed by the State of Florida and the Federal government as endangered, threatened, or of special concern.

While much remains the same, over a century of growth has brought numerous changes to the County as well. Though a "winter Coney Island" never materialized, the first train arrived at Punta Gorda in 1886, and rail lines extended all the way to Boca Grande by 1904. The Florida Land Boom of the 1920s did not miss Charlotte County, and brought a flurry of platting and development schemes ranging from small residential developments carved into tiny lots to grandiose and visionary ideas such as the hexagonal, master-planned (but never developed) community of El JoBean. The Second World War saw the development of an Army Air Corps airfield near Punta Gorda, and post-World War II prosperity re-kindled the furious platting of the 1920's, culminating in developments such as Port Charlotte, Gulf Cove, Gardens of Gulf Cove, South Gulf Cove, Rotonda, and other large subdivisions intended for residential development, primarily as "retirement communities". Charlotte County's population has grown from 58,460 in 1980 to 110,975 in 1990 (Florida Statistical Abstract, 2004), to approximately 130,998 in 1996 and to 139,817 in 2004 with a projected high growths of 192,800 by the year 2010, 220,700 by the year 2015, nearly 250,000 by the year 2020 and over 311,000 by the year 2030 .

The county's rapid growth has been, and remains, in part driven by the beauty of its natural environment: the open spaces and abundant wildlife, mild climate, and the amenities and lifestyle associated with living on Florida's coast. Realization of the importance of striking a balance between growth and the protection of natural resources led the State of Florida to adopt the Local Government Comprehensive Planning and Land Development Regulation Act which is also known as Chapter 163, *Florida Statutes* (*FS*). Chapter 9J-5, Florida *Administrative Code* (*FAC*), which provides the standards and criteria for local government comprehensive plans, requires that all counties within Florida's coastal area (such as Charlotte County) include Conservation and Coastal Management elements within their local Comprehensive Plans.

This Natural Resources and Coastal Planning Element fulfills that requirement. Its purpose is to plan for, promote, and manage the conservation and protection of Charlotte County's natural resources; to plan for and, when appropriate, restrict development activities where such activities would damage or destroy upland or coastal resources; and, because Charlotte County's coastal location makes it vulnerable to the threat of damage from tropical storms and hurricanes, this element also addresses measures to protect human life and limit public expenditures in areas that are subject to destruction by natural disaster.

B. Relationship of the Natural Resource Conservation and Coastal Planning Element to Other Elements in the Comprehensive Plan.

The following narrative describes the relationship between the Natural Resources and Coastal Planning Element and those other elements of the Comprehensive Plan with which it is most closely connected.

- While the Natural Resources and Coastal Planning Element provides the foundation and detailed policies regarding the conservation, use and protection of natural and coastal resources, it is through the **Future Land Use Element** and its accompanying **Future Land Use Map** that the County's growth management strategy is fully implemented. Therefore, it is essential that the uses prescribed by the Future Land Use Map be consistent with sound coastal policy, and that the policies of the Future Land Use Element promote compatibility between development activities and the conservation of natural resources.

- The Natural Resources and Coastal Planning Element identifies and describes the County's existing and proposed natural reservations and preserves which typically represent large tracts of the County's ecologically valuable natural habitats. The **Recreation and Open Space Element** identifies the potential recreational opportunities for which these natural reserves and preserves may be utilized. Such uses typically include passive recreation, outdoor education, and resource-oriented activities such as hiking and camping.

- The **Infrastructure Element**, which is divided into sections pertaining to Aquifer Recharge, Drainage, Solid Waste and the provision of Sewer and Potable Water services, is directly related to the Natural Resources and Coastal Planning Element. The impacts of existing and proposed facilities (drainage works, water supplies, waste disposal) on natural systems must be taken into consideration during the establishment of levels of service for water and sewer facilities, facility siting criteria, and overall policies regarding the County's growth-related infrastructure. For example, the protection of estuarine systems, which is discussed in this element, may influence the siting of a water treatment plant, particularly if it is determined that on site waste treatment facilities are having a negative impact on the County's surface and ground water resources. Similarly, storm water run-off is a known contributor of pollutants to estuaries and other receiving waters. Dealing with this problem, which is identified in the Natural Resources and Coastal Planning Element, is accomplished through the policies of the drainage section of the Infrastructure Element.

- The **Transportation Element** deals primarily with the County's road network, but also addresses port and aviation facilities, as well as transportation enhancements such as bicycle paths and pedestrian walkways. The impacts of roads on Florida's natural communities and their dependant fauna—fragmentation, isolation, in-breeding and direct mortality (i.e., road-kill) -- are well known. The policies of the Transportation Element must reflect those of the Natural Resources and Coastal Planning Element to ensure that

roads are sited in the least sensitive areas possible and are designed in a manner which minimizes impacts to the surrounding environment. Further, the policies of the Transportation Element are critically related to maintaining adequate hurricane evacuation times and shelters, and ensuring that public funds are utilized in areas prone to natural disaster only for those purposes which provide direct public benefit consistent with the County's growth management strategy.

C. Legislation

The following is an assessment of existing regulations and programs which affect land use decisions and regulate development impacts to the natural environment and coastal planning area.

1. *Federal Legislation*

- Adopted by Congress in 1973, the **Endangered Species Act** (ESA), and subsequent updates, establish criteria for the listing of plants and animals as threatened or endangered. The ESA also provides a permitting program which helps ensure that ecosystems upon which listed species rely are conserved during development activities. The Act also provides the impetus for the creation of species-specific Habitat Conservation Plans intended to address the long-term viability of populations of endangered or threatened species.

- The **Marine Mammal Protection Act of 1972** gives the U.S. Department of the Interior the responsibility for the management and protection of marine mammals found within the territorial boundaries of the United States, including the West Indian Manatee.

- The **Coastal Zone Management Act (CZMA) of 1972** establishes a cooperative state and federal program to manage coastal zones in the United States. Implementation of the CZMA may be delegated to individual states which adopt their own programs which meet the criteria of the federal program. The Florida Coastal Management Program, which was approved in 1982, is administered by the Florida Department of Community Affairs.

- The **Clean Water Act** establishes a permitting program and criteria for the discharge of pollutants into the country's waters, including minimum water quality standards. The Act focuses primarily on surface waters, and provides the greatest protection for wetlands of any federal legislation.

- The **Rivers and Harbors Act (1899)** regulates all activities affecting the navigable waters of the United States, including the approval of dredging and filling activities in wetlands. This regulation affects the construction of bridges, roads, wharves, and just about every activity which could be interpreted as affecting navigable waters. The primary enforcement agency is the U.S. Army Corps of Engineers which may solicit comments from other agencies during its review of activities which fall under this Act.

- The **Clean Air Act (1970, 1990)** establishes emission standards for point source emitters of airborne pollutants as well as motor vehicles. It also sets pollution controls which require communities and industry to meet ambient air quality standards for a number of air pollutants.

- The **National Flood Insurance Act of 1968** establishes the National Flood Insurance Program (NFIP) which makes Federally-subsidized flood insurance available in communities which adopt and adequately enforce floodplain management ordinances that meet NFIP requirements. The Act also required that the Federal Emergency Management Agency establish flood risk zones in all flood prone areas. Charlotte County has participated in the NFIP since 1974 through the adoption and implementation of Section 3-9-67 of the County Code.

- The **Coastal Barrier Resources Act (1982)** prohibits new federal expenditures for new or expanded development on undeveloped coastal barriers which are included within the Coastal Barrier Resources System.

- The **Marine Turtle Protection Act (1991)** strengthened marine turtle protection measures by requiring states to consider turtle protection in all permit applications for coastal construction and excavation.

- The **Safe Drinking Water Act of 1974** charges the U.S. Environmental Protection Agency with ensuring that drinking water meets established criteria.

2. *State Legislation & Policies*

- The **Florida Endangered and Threatened Species Act** and the **Preservation of Native Flora of Florida Act** establishes criteria for the listing, protection and management of plant and animal species considered to be endangered, threatened, or of special concern.

- Also known as Chapter 39, *FAC*, the **Florida Wildlife Code** restricts the pursuit, molestation, harm, harassment, capture, or possession of a listed species. The Code establishes a permitting program for such activities, including permits for the "incidental take" (lawful killing "incidental to" otherwise allowable activities) of individual animals.

- The **Florida Manatee Sanctuary Act** establishes protective measures for the endangered West Indian manatees, and establishes manatee sanctuary areas throughout the State.

- The **Water Resources Act** establishes state water policy and implementation measures, which include the creation of the five regional water management districts. This act also mandates the formulation of a state water use plan. Charlotte County is divided between the South Florida Water Management District and Southwest Florida Water Management District.

- The **Florida Water Quality Assurance Act** requires the Florida Department of Environmental Protection to maintain a statewide groundwater quality monitoring network and data base.

- The **Florida Safe Drinking Water Act** establishes a statewide framework for regulating drinking water quality.

- The **1984 Groundwater Protection Rule** establishes guidelines for the restoration, conservation, and management of the State's groundwater resources. Florida was the first state in the nation to adopt such a rule.

- The **Florida Solid Waste Management Act (1988)** requires each County and City to include recycling programs in their comprehensive plans and to develop and initiate recycling programs with the goal of reducing the waste stream by 30% by the end of 1994.

- **Chapter 161, *FS*, and Chapter 62B-33, *FAC,*** establish the State's beach and shore preservation regulations including structural requirements, Coastal Construction Control Line (CCCL) guidelines, and sea turtle protection regulations.

- **Chapter 370, *FS*, and Chapter 16N-35, *FAC,*** established the state's salt water fishing license requirements.

- **Chapter 163, *FS* (Local Government Comprehensive Planning and Land Redevelopment Act)** requires that each city and county prepare and adopt a comprehensive plan containing mandatory elements that address growth management issues including conservation and coastal zone management.

- **Rule 9J-5, Florida Administrative Code (FAC)** establishes the minimum criteria for local government comprehensive plans, and is used by the Florida Department of Community Affairs to determine whether such plans fulfill the requirements of the State's Growth Management Act. This rule prescribes the minimum requirements for each element of the comprehensive plan.

- The **Surface Water Improvement and Management (SWIM) Act of 1987** - requires each of the State's five water management districts to identify those surface waters most in need of restoration or preservation. The act mandates the development of management plans ("SWIM plans") for each waterbody so identified, including detailed schedules of implementation.

- The **Mangrove Trimming and Preservation Act** was enacted during the 1995 legislative session and amended during the 1996 session. This act provides standards for the selective trimming of mangrove trees, and establishes a permitting program to allow such activities. The 1995 version allowed trimming of mangroves by private persons on publicly owned lands, preempted local permitting programs, and prohibited the adoption

of local standards more stringent those provided within the act. The 1996 amendments restored protection of publicly owned mangroves, relaxed the preemptions of local authority, and provided clarification regarding the trimming standards.

3. *Local Legislation.*

- The **Charlotte County Soil Conservation Ordinance (#98-054)** ensures that land development activities are conducted in a manner which minimizes the loss of topsoils, controls windblown dust, reduces pollution (primarily siltation) of Charlotte County's surface waters, and ensures the application of "best management practices" for agricultural land uses.

- The **Sea Turtle Protection Ordinance (#98-41)** amends Ordinance #89-31 by updating definitions, requires development to obtain approval from the Department of Environmental Protection pursuant to 62B-33, Florida Administrative Code, Chapter 161, Florida Statutes and Section 370.12, Florida Statutes, updates beachfront lighting requirements, provides remedies for compliance issues. This ordinance continues to implement local regulations which complement federal and state sea turtle protection laws, thereby reducing the impacts of uncontrolled construction activity and beachfront lighting on sea turtle reproduction.

- The County's **Shoreline Protection Ordinance (#98-42)** amends Ordinance #89-35 and continues to preserve 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 shall be consistent with Chapter 62B-33, Florida Administrative Code, and Chapter 161, Florida Statutes, and permitted by the Department of Environmental Protection. Specific regulations continue to apply to the operation of motor vehicles on beaches and dunes, and require dune walkovers at beach access points.

- The **Excavation Ordinance** was amended by Ordinance 2003-003 and Resolution 2003-024 and continues to regulate excavation activities in order to minimize the detrimental effects of such activities on groundwater, surface water, wildlife, and surrounding land use and property values.

- The **Special Surface Water Protection Overlay District** was created through the adoption of Ordinance 89-53 and subsequently amended by Ordinance 92-25. This special designation is applied to the lands surrounding Shell Creek and Prairie Creek, which have been deemed as having special economic, ecological and recreational significance. The intent is to establish a level of development control for such areas in order to minimize the disruption of natural hydroperiods, flows and water quality.

- The **Surface Waters and Wetlands Protection Ordinance (#89-54)** provides guidelines and standards for development within or adjacent to wetlands and surface water areas within unincorporated Charlotte County. The ordinance requires the creation of an

upland buffer with a minimum average width of fifteen feet which must be maintained in natural vegetation.

- The **Open Space/Habitat Preservation Ordinance (#98-43)** was amended in 1998 and requires that all applicable development within the Special Surface Water Protection Overlay District must include open space/habitat reservation equal to 20% of the total area of the parcel. The ordinance continues to require other applicable development to include 5% of the land area of parcels undergoing development activities which meet or exceed the County's development review committee thresholds (established by Section 3-9-5.1 of the County Code) and which contain habitats suitable for use by endangered or potentially endangered species be preserved in a natural state for perpetuity. In lieu of setting aside 5% of the development site, developers may fulfill the requirements of the ordinance by contributing $300 per acre or fraction thereof (of the subject property) to the County's Open Space/Habitat Reservation Trust Fund. This fund continues to accrue monies that are then used to acquire environmentally sensitive lands.

- The County's **Landscape Buffer Ordinance (#2003-062)** merged Article XVIII Landscaping Regulations (Ordinance 98-046) and Article XXII, Landscaping Buffers and Screening regulations (Ordinance 2001-031) producing an effective code. This merger removed inconsistent and redundant provisions; provided new language and definitions while continuing to maintain standards for landscaping on all commercial, industrial, and multi-family development in unincorporated Charlotte County.

- Originally adopted in 1992, the **Tree Ordinance** was amended in 1998 **(#98-045)** and continues to provide for enhanced tree preservation and replacement within unincorporated Charlotte County. Trees are assigned values ("tree points") based on their characteristics and desirability. Every 2,000 square feet of development, including single family residential, is required to have one point of preserved or planted trees. An ordinary 10,000 square foot lot would require five points. Only bona fide agricultural activities are exempt from the ordinance.

- Adopted in 2000, the **Tower Code (Chapter 3-9-71.1 of the Charlotte County Codes)** established setbacks from the mean high water line of the Gulf of Mexico, Lemon Bay, Gasparilla Sound, Placida Harbor, Red Fish Cove, the Myakka River, or the Peace River, and protected nesting birds. The ordinance also prohibits towers from being placed on lands with a preservation or conservation land use designation (or similar designations), on land zoned environmentally sensitive or resource conservation, on land designated for preservation with a conservation easement, or within several rare vegetation communities. The ordinance also provides for landscaping around towers and adherence to the Open Space Habitat Reservation Ordinance.

- Adopted in 2004, the **Transfer of Density Units Code (Ordinance #04-067)** repealed the Transfer of Development Rights Code and created a new code which provides for the transfer of density units associated with real property: provides for intent and purpose as well as providing for definitions. Most importantly the ordinance allows for the

application, review and approval of transfers of density units while providing for a procedure for measuring and granting density units. This ordinance continues to provide limitations and conditions for transfer of density units and provides for the establishment of a land acquisition trust fund.

- Adopted in 2006, the **Conservation Easement Program** (**Ordinance 2006-039)** resolution amended the original program approved in 1999. It encourages property owners who meet specific criteria set forth in the ordinance to grant the County an easement over a portion or all of their land; thereby qualifying for a reduction in the Equivalent Residential Unit count assigned to the subject property for street and drainage, stormwater utilities, waterways, and fire municipal service benefit unit assessment purposes. This promotes green space within the urban areas.

II. Inventory and Analysis

A. General

Charlotte County is located on the coast of Southwest Florida and is bounded on the west by the Gulf of Mexico, on the north by Sarasota and DeSoto counties, to the northeast by Highlands County, on the east by Glades County, to the southeast by Hendry County, and to the south by Lee County. Charlotte County encompasses an area of approximately 823 square miles, including roughly 129 square miles of inland surface waters. Topography ranges from sea level at the coast to a maximum elevation of 74 feet in the northeastern corner of the County. Charlotte County is composed of portions of the following four physiographic provinces:

- *Gulf Barrier Chain.* This system of lagoons and islands was formed by the erosion of headlands and sediment transport along shore by wave energy (littoral drift). It is a very dynamic system consisting of sand and shell deposits. Elevations are generally less than 15 feet.

- *Gulf Coastal Lowlands*. This is a low lying area which covers most of Charlotte County. It is a broad, gently sloping marine plain that is characterized by karst flatlands with many swamps and sloughs. Elevations range from near sea level to about 35 feet at its eastward limit. The area is mainly covered with unconsolidated sand that becomes clayey with depth, except for wetland areas which are typified by organic soils.

- *Caloosahatchee Incline*. This is a transition zone that marks a steeper incline with elevations from near 35 feet at the toe to 60 feet at the crest.

- *DeSoto Plain.* Portions of this plain are found in northeastern and eastern Charlotte County. It is characterized by wet prairie, cypress swamps, and flatwoods. Elevations range from 60 to 74 feet.

Charlotte County has a humid, subtropical climate with a mean annual temperature of 74 degrees Fahrenheit, with monthly averages ranging from 64 degrees Fahrenheit in January to 82 degrees Fahrenheit in August. Charlotte County's average annual rainfall is approximately 50 inches, the majority of which occurs during the summer months.

B. Air Quality

Air quality is generally good in Charlotte County and well within the standards set by State and Federal regulatory agencies. Florida's statewide air quality monitoring network is operated by both state and local environmental programs. The air is monitored by the Florida Department of Environmental Protection (FDEP) for carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulfur dioxide. The USEPA and the FDEP established the ambient air quality standards for these six pollutants. These pollutants are referred to as "criteria air pollutants." As a result of legislation and various control measures carbon monoxide, lead,

nitrogen and sulfur dioxide have come into acceptable levels or better. Although still monitored, these pollutants are not considered a major threat of air pollution.

Not all pollutants are monitored in all areas. The one air quality monitoring station in the county, which was located at the FDEP's Punta Gorda office in the vicinity of the Charlotte County Airport monitored only particulate matter. However, the Punta Gorda station is no longer monitored because monitoring standards have changed and monitors tend to be concentrated in areas with the largest population densities. FDEP now only monitors the size of certain particulate matter (PM) particles linked to their potential for health problems in areas with greater density than Charlotte County.

Charlotte County's air quality remains good primarily due to the predominantly residential nature of the County's development and lack of *major* point sources of emissions. There are a variety of permitted point sources which are monitored through FDEP. These projects include concrete and asphalt plants, yard waste incinerators, and a crematorium). Charlotte County, and indeed most of Southwest Florida, is listed as an attainment area by the US Environmental Protection Agency (USEPA), which means that air quality is well within the limits of various parameters established by the Clean Air Act.

The FDEP does not routinely monitor or inspect those facilities for which it has issued permits, though it does require monitoring reports and will respond to complaints from neighboring property owners, if needed. Charlotte County has improved it's development siting and design standards within its Code of Laws and Ordinances to control the placement and operation of such facilities which will help avoid land use conflicts between incinerators (and other potential point sources of air pollution) and neighboring properties, as well as safeguard the health, safety, and welfare of the general public.

Automobile exhaust was identified as the most significant individual threat to Charlotte County's air quality. Long-term monitoring in Florida shows a significant decrease in carbon monoxide concentrations. Urban areas which use to suffer occasional high levels of carbon monoxide are no longer violating the air quality standard. Improved technology has reduced that threat. FDEP reports that as the result of vehicle emissions controls and local measures to reduce traffic congestion, Florida has not recorded a violation of the carbon monoxide standard since 1986

Open burning, in the form of either prescribed fire or wildfire, is a common occurrence in Charlotte County, and may represent a source of air emissions. The major pollutants that result from open burning are suspended particulates and carbon monoxide.

However, the emissions produced from controlled, open burning are short-term and localized in nature. Controlled, open burning (also known as prescribed fire) is conducted for a variety of reasons, including wildfire control, prescriptive burns for land management purposes, for waste reduction related to land clearing, and for cold and frost protection for agriculture. In Florida, open burning is regulated by the State Division of Forestry and FDEP. While open burning is not usually permitted in or near residential areas, it is important to recognize that controlled or prescribed burning is employed in forestry, agriculture, and wildlife management as an essential

land management tool. Prescribed burns are conducted under conditions favorable to controlling the extent and intensity of the burn.

One of the major benefits of prescriptive burning is the reduction of fuel loads (dry leaf litter and other dead plant matter) which prevents the occurrence of highly destructive wildfires. This is important for protecting not only large public preserve areas, such as the Webb/Babcock Wildlife Management Area, but also for houses and properties in areas which, though developing, still retain significant levels of canopy and brush. To reduce this risk, the Florida Division of Forestry undertakes a series of controlled, fuel load reduction burns in Charlotte County. Not only does this reduce the threat to developed and undeveloped properties, it is taken into consideration for the County's insurance rating. Thus, prescriptive fire provides direct, tangible economic benefits in addition to its ecological values.

The County must also consider the impacts of activities in adjacent communities on local air quality. The urbanized areas of Lee and Sarasota Counties represent the most likely source of air emissions that could impact Charlotte County. Unfortunately, there are no hard and fast policies at the local, regional, or state level which guarantee that the County's concerns are addressed during the permitting process. As provided by the Intergovernmental Coordination Element, the County should consider entering into agreements with surrounding counties as well as regulatory agencies to ensure that local concerns are addressed during the permitting stages of potential impacting development.

C. Water Resources

1. Surface Water Systems

As provided by Chapter 403, *FS*, Florida's surface waters are classified into five categories according to their "present and future most beneficial uses". Section 62-302.400, *FAC*, divides surface waters into the following 5 categories:

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

Category I surface waters are, generally speaking, of the highest quality and subject to the most stringent protective measures. Because of their intended uses, Category II and III waters may, for certain uses and water quality parameters, receive equal or even greater protection. Class II waters are further divided into three categories by the FDEP on the basis of their safety for harvesting shellfish for human consumption. These categories include approved or conditionally approved for shellfish harvesting (i.e., safe), prohibited for shellfish harvesting (i.e., polluted and unsafe), or lacking significant shellfish resources. These categories apply generally to shellfish species (e.g., oysters and scallops) that feed by filtering microscopic particles from the water,

and are thus capable of filtering bacteria, viruses and red tide organisms (dinoflagellates) from the water and concentrating these organisms in their tissues (a process referenced as bioaccumulation). These shellfish can also concentrate dissolved contaminants such as heavy metals and organic compounds from polluted waters. As occurrences of red tide continue to increase, various agencies monitor the events. The Fish and Wildlife Research Institute reports current conditions around Florida on-line. The website address is:
http://www.floridamarine.org/features/
The Department of Agriculture monitors red tide as the occurrence and severity effects the harvesting of shellfish. The website address is:
http://www.floridaaquaculture.com/index.htm

Special consideration is also given to waters classified as Outstanding Florida Waters or Outstanding National Resource Waters which are defined by Chapter 62-302, *FAC*, as:

> Outstanding Florida Waters - waters designated by the Environmental Regulation Commission as worthy of special protection because of their natural attributes; and
>
> Outstanding National Resource Waters - 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.

Finally, the Florida Legislature may, as provided by Chapter 258, *FS*, declare submerged lands and associated waters that are of "exceptional biological, aesthetic, and scientific value" to be Aquatic Preserves which are "set aside forever...for the benefit of future generations." (Section 258.36, *FS*). Charlotte County 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.

Map 3.2 generally depicts Charlotte County's surface water features which include both natural and man-made systems, while Map 3.3 illustrates the boundaries of the above-referenced aquatic preserves. The following discussions briefly describe conditions within some of Charlotte County's major surface waters 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.

Map 3.2 Major Surface Waters

Charlotte County Community Development
Land Information Section
Draft Date 10/06
Located:
M:\comdev\gig6\Comp_Plan_NEW\MAPS\Chapter_3\3_2_surf_wat.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

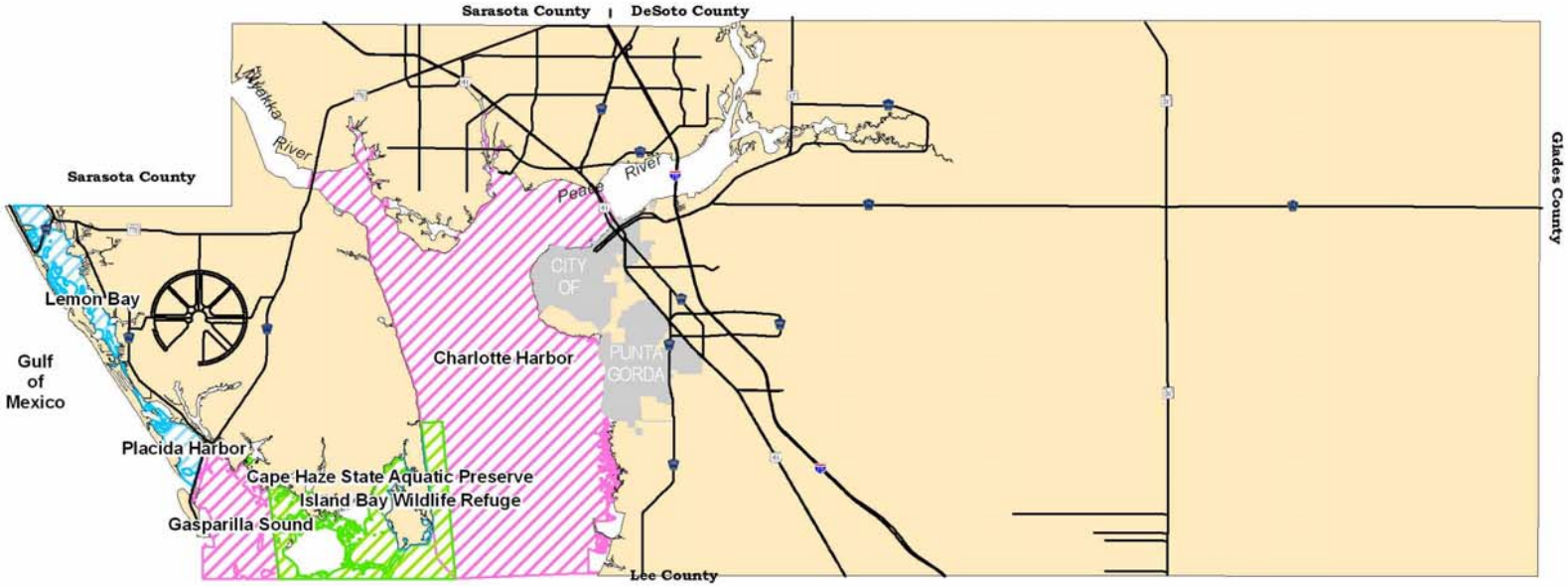
Source: Charlotte County GIS

Urban Service Area

Scale: 1:320,000
1 inch = 4.9 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Map 3.3 Aquatic Preserves



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Stateplane Projection
Datum NAD83
Units: meters

Source: Charlotte County GIS

Cape Haze
Gasparilla Sound & Charlotte Harbor
Lemon Bay

Scale 1:320,000
1 inch = 4.9 miles

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Charlotte Harbor

Charlotte Harbor (including the waters around the Cape Haze peninsula and Gasparilla Sound) is designated as an aquatic preserve, a priority waterbody of the Southwest Florida Water Management District's (SWFWMD) Surface Water Improvement and Management (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 Map 3.4, 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.

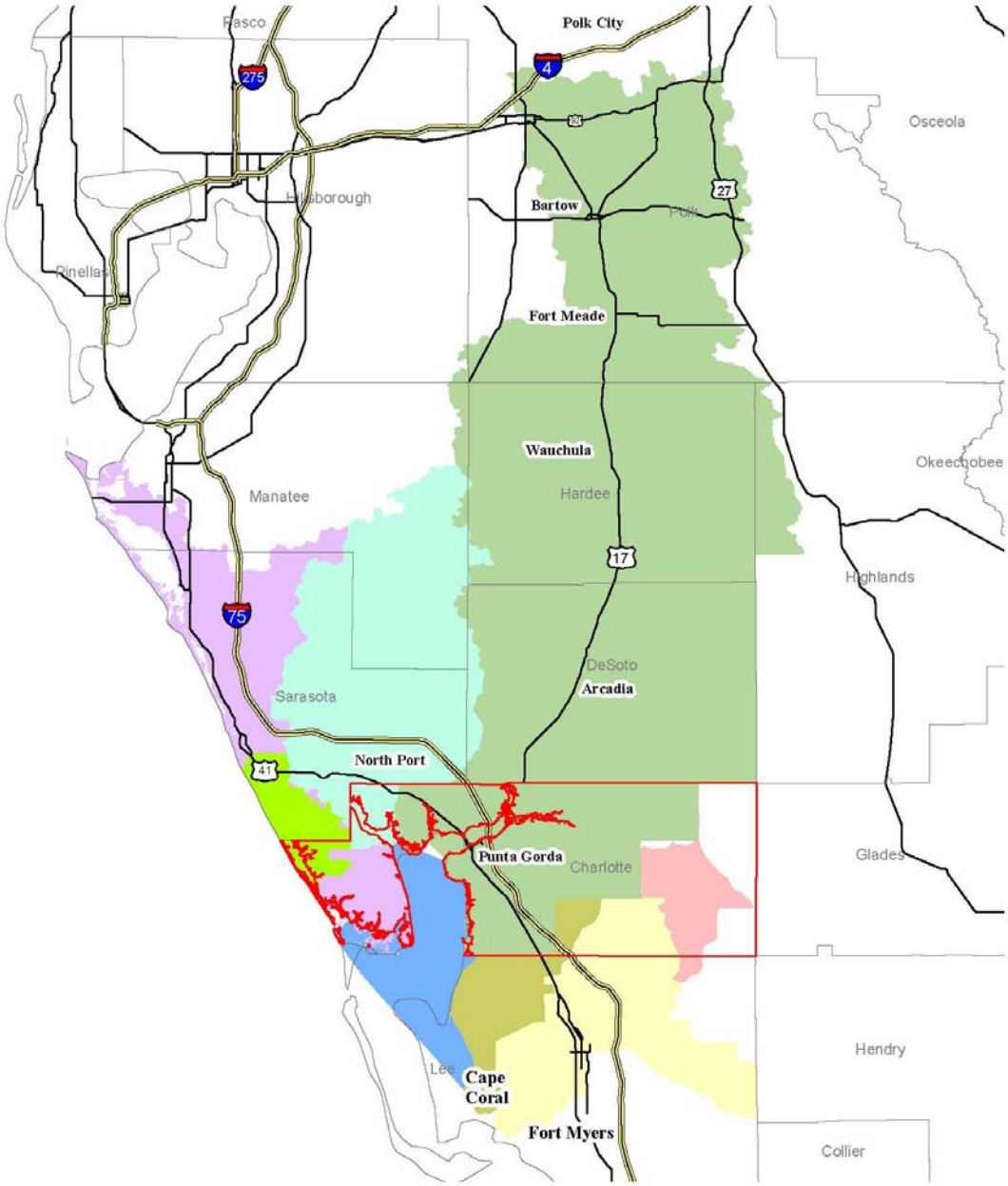
Charlotte Harbor is separated from the Gulf of Mexico by a chain of barrier islands and connected to it through a series of passes, the largest of which are Boca Grande Pass and San Carlos Pass (in Lee County). Including its southern portion, Charlotte Harbor has an average depth of approximately seven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

The 2002 *Southwest Florida 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 to the east from several small coastal creeks and canals. Charlotte Harbor is significantly influenced by the flows from the Peace River to the north. The northern portion of Charlotte Harbor is a SWIM body under the jurisdiction of the SWFWMD while the southern portion of the Harbor is under the jurisdiction of the South Florida Water Management District (SFWMD), which is in the process of developing a SWIM Plan for that portion of the Harbor. The Charlotte Harbor National Estuary Program study area covers the entire Charlotte Harbor Ecosystem including Lemon Bay and Estero Bay and their watersheds.

Charlotte Harbor's Shoreline

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.

Map 3.4 Charlotte Harbor Watershed



Charlotte County Community Development
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ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: Southwest Florida Water Management District & Charlotte County Stormwater Department

Charlotte County

Major Drainage Basins

- NORTH COASTAL
- TELEGRAPH SWAMP
- TIDAL CALOOSAHATCHEE
- CHARLOTTE HARBOR

Watersheds

- MYAKKA RIVER
- SOUTHERN COASTAL
- PEACE RIVER
- LEMON BAY WATERSHED

Scale: 1:934,154

1 inch equals 14.7 miles

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Water Quality Issues/Concerns.
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 elevated. 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.

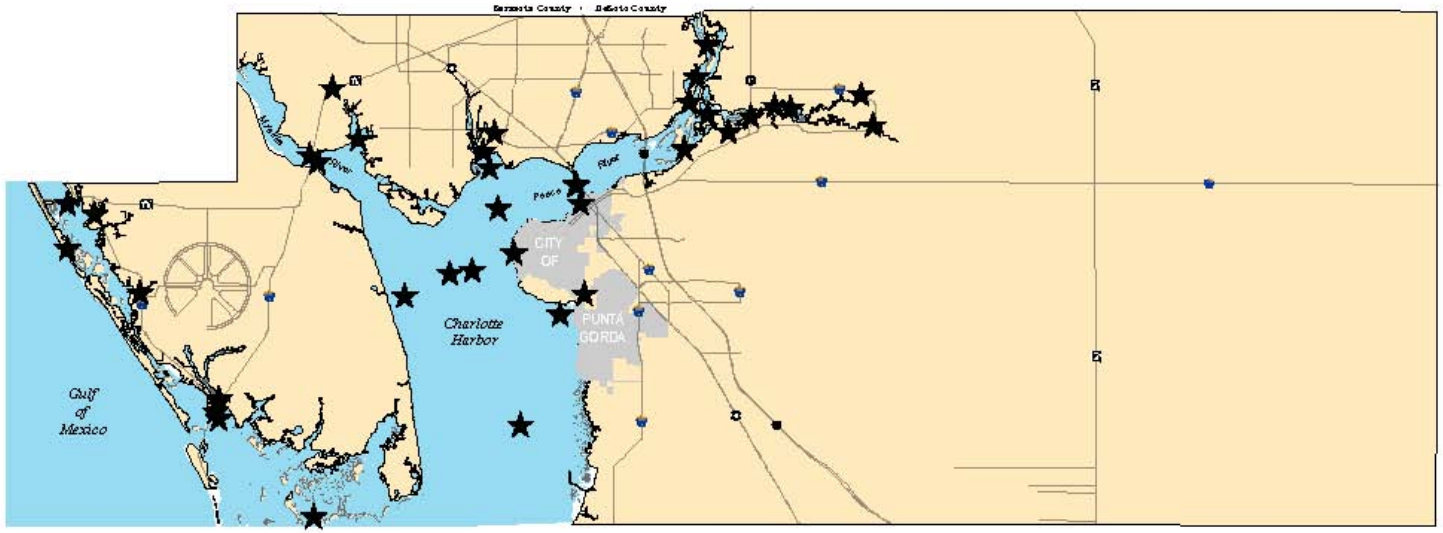
Excessive surface water withdrawals from rivers and creeks for purposes of water supply may also degrade estuaries that receive freshwater inflows. Changes in historic/natural duration, seasonality and volume of water may affect important sport and commercial saltwater fisheries and other estuarine species.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

The Charlotte Harbor estuary provides many benefits and opportunities to Charlotte County. With the establishment of the CHNEP program, goals were developed to provide guidance to protect this estuary. The goals developed include short and long term commitments to be achieved. Some of the goals of the Charlotte Harbor National Estuary Program include improving the environmental integrity of the Charlotte Harbor study area; preservation, restoration and enhancement of seagrass beds, coastal wetlands, barrier beaches, and functionally related uplands; reduction of point and nonpoint sources of pollution to attain desired uses of the estuary; development and implementation of a formal Charlotte Harbor management plan with a specified structure and process for achieving goals for the estuary.

Map 3.5 Charlotte County Water Quality Monitoring Stations



Charlotte County Community Development
Land Information Section
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ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units: meters

Source: Florida STORET

★ Charlotte County Monitoring Stations

N

Scale 1:320,000
1 inch = 4.9 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guarantees, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Ongoing Water Quality Monitoring

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. 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. Sampling sites can be seen on Map 3. 5: 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 DEP) sample 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.

Per the SWFWMD agreement, it is recommended the following lab methods be used to obtain water quality data:

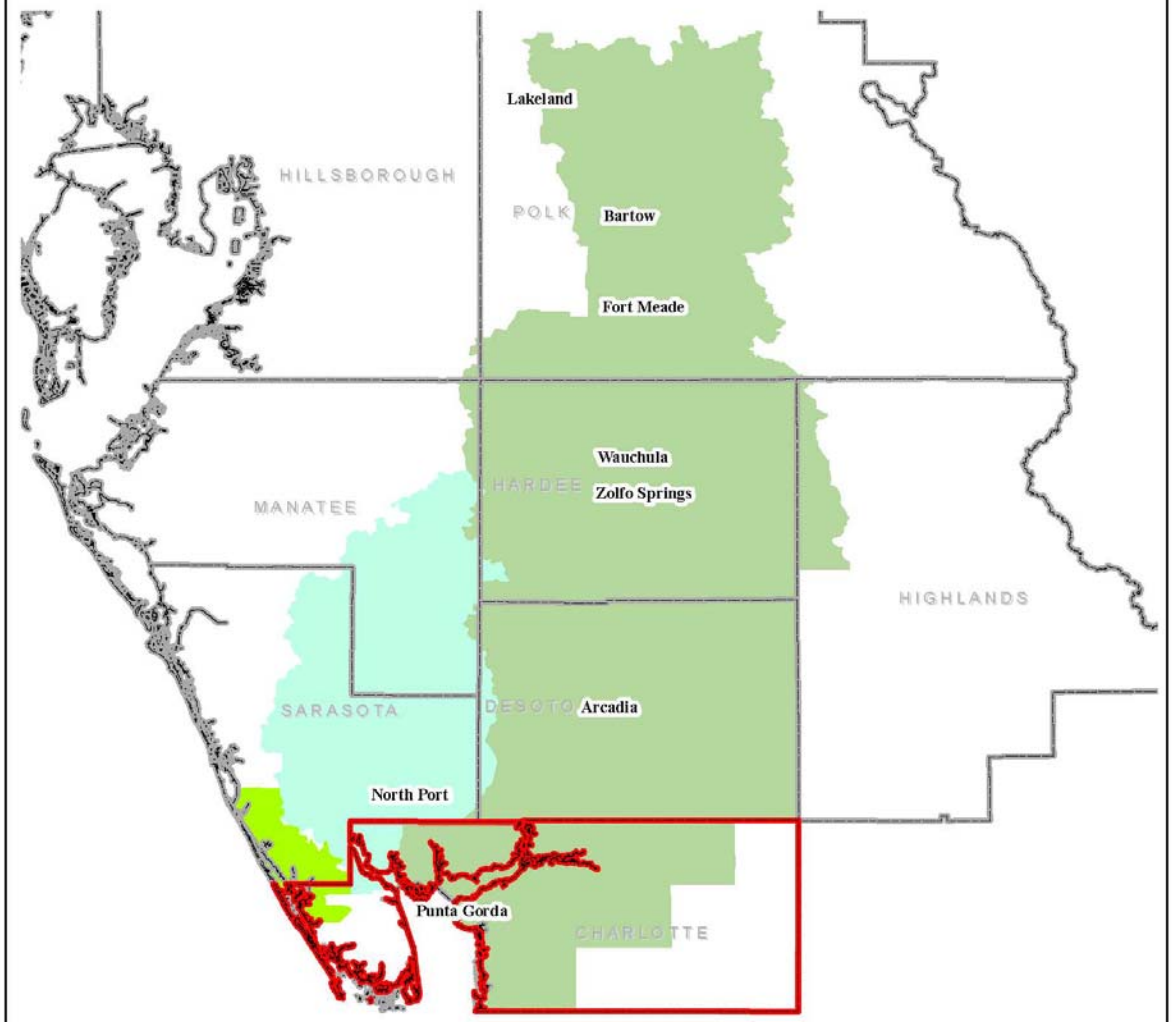
pH	EPA (1983), 150.1
color (PCU)	EPA (1983), 110.3
turbidity (NTU)	EPA (1983), 180.1
TSS	EPA (1983), 160.2
Chlorophyll a corrected	SM 16th Ed., 1002G
	SM 17th Ed., 10200H
Total Nitrogen	Calculation (TKN+NO2-NO3-N)
Total Kjeldahl Nitrogen	SM 17th Ed., 4500-N org B or C
Dissolved ammonia	EPA (1983), 350.1
Total nitrite+nitrate	EPA (1983), 353.2
Dissolved nitrite+nitrate	EPA (1983), 353.2
Dissolved Orthophosphate	EPA (1983), 365.1
Total Phosphorus	EPA (1983), 365.1 or 365.4
Dissolved Silica	USGS 1-2700-85 (autoanalyzer)
5-day BOD	EPA (1983), 405.1

In addition to the County agreement with the SWFWMD, other groups also do water sampling. For the past two years, Charlotte Harbor Environmental Center (CHEC) has submitted test results to the database on the World Water Monitoring Day web site. However, 2005 proved to be a challenge due to the hurricanes that passed through the area. When testing recommenced, the volunteers found that the waters were full of sediments and other debris (including a refrigerator!) churned up by the storms. With help from local volunteers, CHEC 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.

The latest water testing information is compiled from a sub committee from the CHNEP which is mapping all the monitoring sites from the various groups and agencies monitoring the Harbor.

The following monitoring programs include 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, SFWMD, SWFWMD, and Peace River Manasota Region Water Supply Authority. All groups monitor particular sections of the River.

Map 3.6
Lemon Bay, Myakka River, & Peace River Watersheds



Charlotte County Community Development
Land Information Section
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ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: Southwest Florida Water Management District & Charlotte County Stormwater Department

Watersheds
- LEMON BAY
- MYAKKA RIVER
- PEACE RIVER

Scale: 1:891,719
1 inch equals 14.1 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

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 Map 3.6, 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. Seven shallow, tidal creeks—Lemon, Buck, Oyster, Ainger, Godfried, Forked, and Alligator—drain into Lemon Bay; the latter two, Forked and Alligator, occur in Sarasota County. Waterward of the bridges over County Road 775, these tributary creeks are considered part of the aquatic preserve.

Water Quality

Degradation of water quality in the Lemon Bay Aquatic Preserve has become an issue and has been attributed to several non-point sources. Historically, clear-cutting of the pine flatwoods and cattle grazing on Cape Haze, as well as improper disposal of dredged material from the Intracoastal Waterway has resulted in increased siltation and nutrient levels in the estuary. More recently, land development activities are cited as contributing factors to the overall degradation of water quality in the Lemon Bay estuary. These include the extensive destruction of wetlands and sloughs within the headwaters of Oyster Creek and Buck Creek, the channelization of Oyster Creek, and the construction of dead end finger canals along with contamination by cattle and septic systems.

Ongoing Water Quality Monitoring

The Lemon Bay Aquatic Preserve is not currently subject to the same level of monitoring as the Charlotte Harbor Aquatic Preserve. However, there are ongoing monitoring efforts undertaken by many different agencies which are tabulated by FDEP through its Water Quality Assessment Report which is required by Section 305 (b) of the Clean Water Act. Lemon Bay is being monitored on a monthly basis as part of the cooperative agreement between SWFWMD and Charlotte County.

Many plans and programs have been developed independently and by a variety of agencies including Sarasota County, Charlotte County, the City of North Port, the Charlotte Harbor National Estuary Program (CHNEP), the Southwest Florida Water Management District (SWFWMD), the Englewood Water District (EWD), the Lemon Bay Conservancy, the Charlotte Harbor Environmental Center, and the Lemon Bay Aquatic Preserve. These programs are planning and implementing programs and projects in the Lemon Bay watershed and may or may not be considering the existing programs.

Similar to the CHNEP approach of providing a comprehensive study of the Charlotte Harbor area, the Lemon Bay League (LBL), a not-for-profit organization that is a collaboration of over 80 homeowner associations and business representatives in Sarasota, Charlotte, and Lee Counties, are focusing on a comprehensive approach to produce an integrated plan for the

Lemon Bay area. The approach is proposed to be consistent with the recent federal and state ecosystem management plans and is intended to be an extension of the SWFWMD's Comprehensive Watershed Management (CWM) Program and the EPA's Watershed Protection Program. The SWFWMD considers the CWM Program one of their top priorities for both internal resource allocation and cooperative funding proposals and projects.

The LBL expresses the need to tie all agency plans and programs together in order to more efficiently attain the desired watershed outcomes. The organization promotes many of the ideas that other agencies do, such as proactive watershed management, irrigation of the community, and comprehensive regional coordination of future water supply.

A program started in 1996 utilizes volunteers to collect monthly water quality samples. Called the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network, the program is managed by the Department of Environmental Protection, Charlotte Harbor Aquatic Preserves in Punta Gorda.

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 Map 3.6, 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.

Land use in the upper Peace River Basin is predominantly agricultural, with large areas of barren land left over from phosphate mining activities which have occurred near the river or its tributaries. In the lower portion of the Peace River Basin, land use consists primarily of agriculture and rangeland, with citrus groves being present in the middle reaches. The urbanized areas of Port Charlotte and Punta Gorda occur at the mouth of the river where it joins Charlotte Harbor. As noted by Hand (1994), Hammett (1988), and others, pollution sources in the Peace River Basin include discharges from phosphate mining activities, chemical and citrus processing plants, and surface runoff from urban, agricultural, and mined lands.

The Strategic Regional Policy Plan reports that further down stream the nonpoint sources are related to agricultural and rangeland runoff. This less intensive land use and the confluence of Horse Creek (a relatively undisturbed tributary system) contributes to the Lower Peace River exhibiting relatively good water quality as compared to the upper reaches of the river. The only exception as it enters Charlotte Harbor is the high phosphorus content.

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.

Although the main body of Charlotte Harbor and its adjacent estuarine systems are reported to be in relatively good condition compared to severely damaged areas, 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. The challenge for the County is to assist the CHNEP in the protection of all the basins by implementing the NEP's goals of managing mangrove areas, protecting seagrass areas from boat damage and water pollution, securing new water supply sources for growing populations and businesses managing waste generated by septic tanks and sewer outfalls, protecting wetland areas for water retention, groundwater recharge, and wildlife habitat, and improving the efficiency of freshwater usage.

The CHNEP states that development in Charlotte County, including the harbor's watershed, will continue to increase over the next 20 years, putting more pressure on the area's resources. Land use decisions may increase hydroperiods (the time it takes rainwater to travel to a water body), increase nutrient concentrations (nitrogen and phosphorus loading rates) and lessen habitat areas. Local governments are facing serious land development and management issues which include securing a reliable water supply, treating residential wastewater, and preserving local habitat. All of which become increasingly difficult to manage as the population increases. It is important to address long term management of the harbor's resources and quality of life. The CHNEP continues that "Given the rate and scale of land use decisions in the study area, a continuing program effort will be needed in the general subject area of land use management." Also, the program must address the problem of incomplete information on particular topics. Certain topics in certain geographic areas may be important but lack definitive data.

Water Quality

Flows from the Peace River are vital to the estuarine health and overall productivity of Charlotte Harbor. Land within the basin has been considerably altered from the natural state by phosphate mining, agriculture, and other development. Additionally, considerable amounts of water are withdrawn each day to support these land uses. Ground water has historically provided the majority of this water, but surface water use for public supply is increasing in the southern part of the basin.

According to the SWFWMD, the cumulative effects of land use changes due to urbanization, agriculture, and mining can change stormwater runoff and baseflow contributions to the river. Drainage of wetlands through ditching and canal construction can affect surface water storage and runoff patterns. Historic phosphate mining and reclamation of mined lands can alter the timing and magnitude of runoff, surface water storage, recharge, and evapotranspiration. All of these factors contribute to changes in hydrology and ecology within the Peace River basin.

The potential effect of these activities in the basin, the Florida Legislature directed the Florida Department of Environmental Protection (DEP), in its 2003 legislative session, to assess the cumulative impacts to the Peace River basin. This study, called the Peace River Cumulative Impact Assessment, will form the basis for preparation of a resource management plan. The subsequent resource management plan (not a part of this study) will identify regulatory and non-regulatory means to minimize future impacts for the basin.

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 Map 3.6 (Hunter Services/FDNR, 1990). A 34 mile segment which begins at the crossing of County Road 780 (river mile 41.5 in Sarasota County) and ending 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.

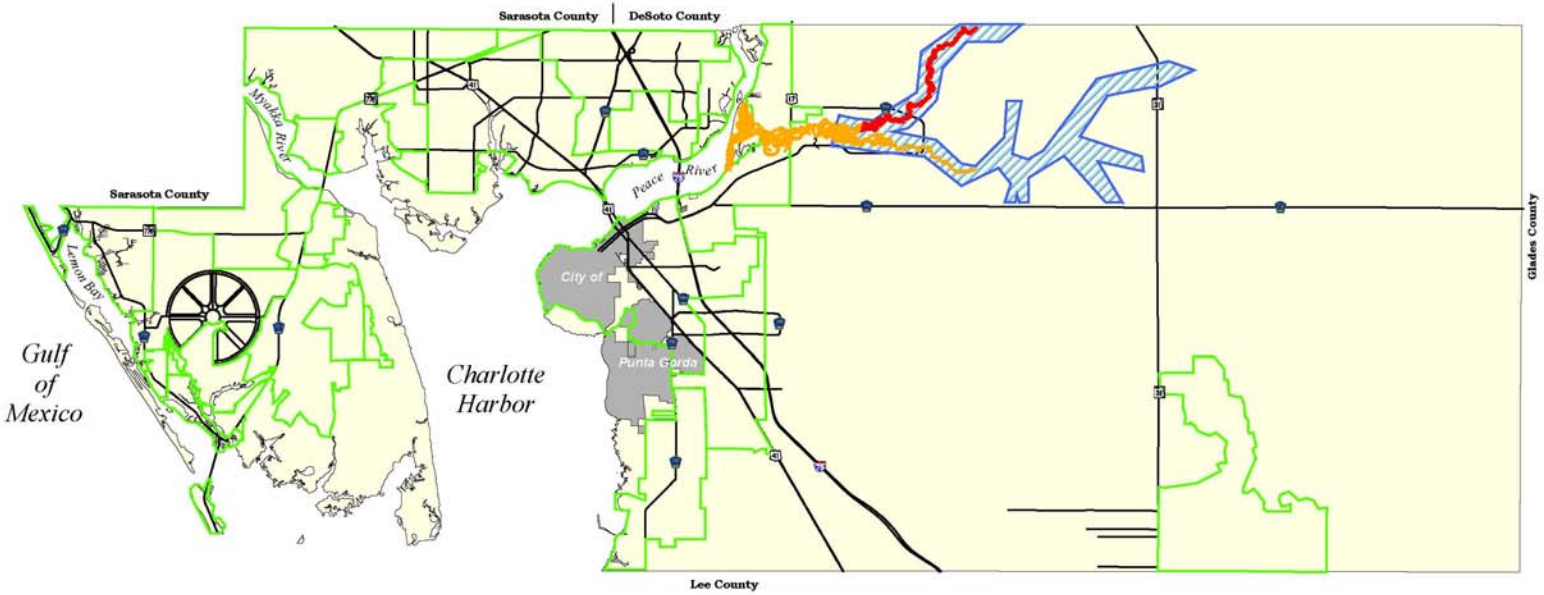
From the Manatee County line to river mile 20, the Myakka River is designated a Class I Water; from river mile 11 to Charlotte Harbor, it is designated a Class II Water. The segment between the State Road 776 in Charlotte County and the start of Charlotte Harbor proper is considered part of the Charlotte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

Water Quality

Although the river is sluggish and often does not flow during the dry season, the basin is considered to have very good water quality. Dissolved oxygen levels are typically low: tidal influence on flows and salinity can affect the system 20 miles upstream. As with Charlotte Harbor, nutrient levels are elevated due to the upper basin draining phosphorus rich areas combined with agriculture and rangeland run-off.

The lower basin of the Myakka, which include Deer Prairie Creek and the Myakkahatchee Creek (Big Slough Canal), drains rangelands. Although some areas have been channeled to improve drainage and other portions receive drainage from residential canals, the estuary maintains much of its shoreline in a pristine mangrove state. The Myakkahatchee Creek is a potable water supply and is classified as a Class I body of water. Although little development has occurred within the estuary, it is threatened by encroaching development to the east. The lower basin, specifically the Myakkahatchee Creek, also shows elevated nutrient and coliform levels as a result of the runoff from the existing pastureland and residential development.

Map 3.7 Prairie Creek and Shell Creeks
"Special Surface Water Protection Overlay"



Charlotte County Community Development
Land Information Section
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ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units: meters

Source: Charlotte County GIS & Land Information Services

- Shell Creek
- Prairie Creek
- Urban Service Area Outline
- Special Surface Water Protection Overlay District

Scale 1:205,920
1 inch equals 3.4 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Prairie and Shell Creeks

Though they follow separate channels until their confluence just east of the Peace River, Shell and Prairie Creeks are jointly discussed in this section as together they have supplied potable water for the City of Punta Gorda since 1965 following the construction of a dam across Shell Creek.

Prairie Creek rises in east central DeSoto County, draining a basin of approximately 233 square miles which occurs in both Charlotte and DeSoto counties. Shell Creek rises in north central Charlotte County and drains a basin of approximately 373 square miles (Black, Crow and Eidsness, 1976). Shell and Prairie Creeks, shown on Map 3.7, are both classified as Class I Outstanding Florida Waters from the reservoir to their headwaters.

The City of Punta Gorda monitors a number of stations both up and downstream of the dam (EQL, 1995). Data collected at these stations indicates that water quality in the system was generally good and met all the requirements of its classifications. However, as a result of a prolonged drought in 1999-2000, monitoring identified elevated amounts of total dissolved solids. In 2001, a group was created to address these water quality issues under the guidance of the FDEP. However, supervision was transferred to the Southwest Florida Water Management District after it was decided that the group would pursue a water management plan to address the water quality concerns. For more detailed information on projects associated with the Shell and Prairie Creek Water Management Plans please see the following website:
http://www.swfwmd.state.fl.us/documents/plans/spjc_wmp.pdf

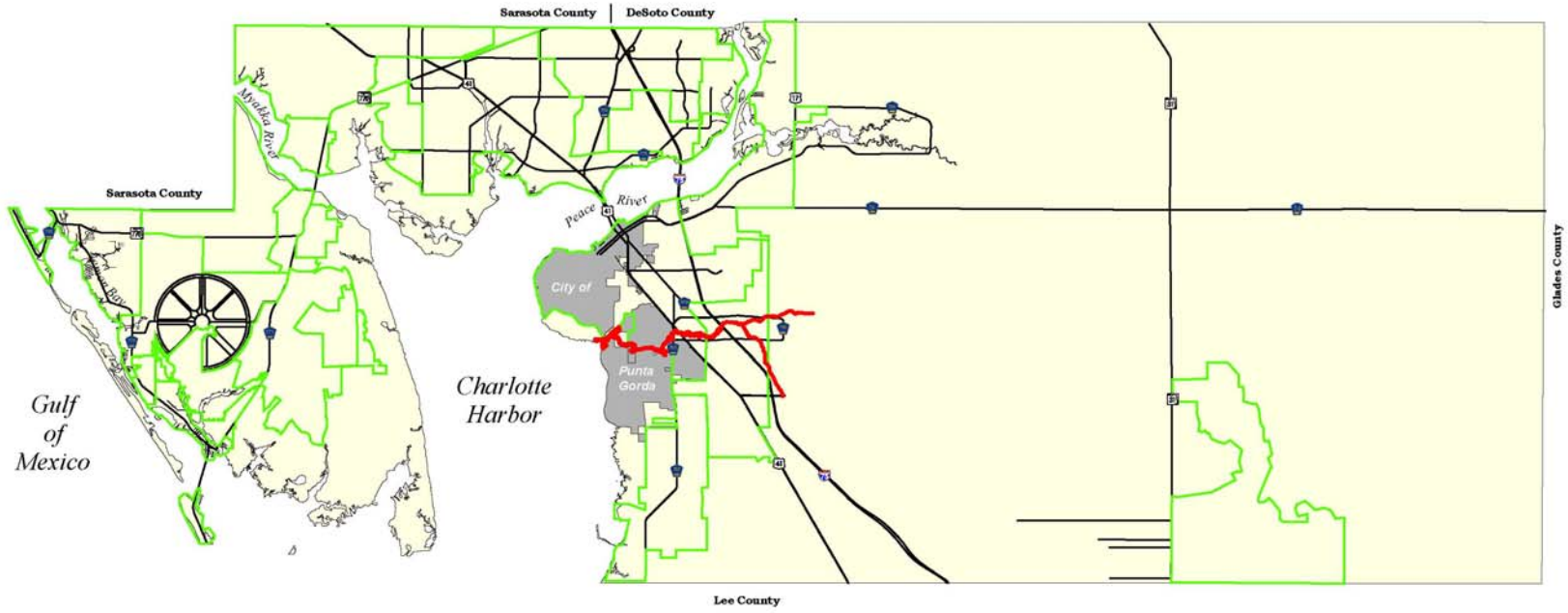
Notwithstanding the current water quality, increased urban development occurring in the area of Prairie and Shell Creeks may pose a threat to the generally good water quality of these creeks if not managed properly. The growing use of septic tanks constitutes one such threat, as does increasing use of fertilizers, pesticides, and other anthropogenic impacts associated with urbanization. To help protect the City's drinking water, the County created the Special Surface Water Protection Overlay District (SSWPOD) around these creeks as an overlay to the Future Land Use Map which is illustrated by the previous Map 3.7. As provided by the SSWPOD's implementing ordinance which was adopted in 1989, all land use activities within any portion of the SSWPOD, including agricultural, must be reviewed and approved prior to issuance of County development approval.

A proposal submitted by the Southwest Florida Pipeline Company (SWFPL)(owned by the GATX Corporation) in early 1990 to cross Shell and Prairie creeks' drainage basins with a petroleum products pipeline was a grave concern to Charlotte County as well as the City of Punta Gorda and several citizens' organizations. Concerns regarding the proposed pipeline centered on the potential contamination of the City of Punta Gorda's water supply, but also include the ecological health and productivity of not only the Shell/Prairie Creek system, but also the Peace River and, ultimately, Charlotte Harbor into which these creeks flow.

These concerns included the applicant's inability to quantify (prior to construction and calibration) how large a leak could remain undetected within the operational tolerances of the pipelines mass balance detection system; the lack of specificity regarding response times and clean up plans; the lack of commitment to specific actions to mitigate or remediate

environmental damage in the event of a leak; and the lack of commitment to measures acceptable by the County and City of Punta Gorda (e.g., construction of an interconnect with the Peace River Water Facility, development of a back up system such as a reverse osmosis plant, etc.) to provide potable water to the City should the Shell Creek reservoir become contaminated in the event of a leak. Because of these and other concerns which were becoming apparent early in its review, the County amended its Special Surface Water Protection Overlay Ordinance in 1992 (County Ordinance 92-25) to specifically prohibit petroleum pipelines within the SSWPOD. The application was eventually withdrawn due to the parent company's administration changes.

Map 3.8
Alligator Creek



Charlotte County Community Development
Land Information Section
Draft Date: 10/06
Located: M:\comdev\gig6\Comp_Plan_NEW\MAPS\Chapter_3\3_8_Alligator_Creek.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units: meters

Source: Charlotte County GIS & Land Information Services

Alligator Creek
Urban Service Area Outline

Scale 1:205,920
1 inch = 3.4 miles

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Alligator Creek

Alligator Creek, shown on Map 3.8, 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.

Though it is no longer a potable water supply, the City of Punta Gorda continues to monitor once per month for following parameters, alkalinity, pH, chlorides, total hardness, sulphates, iron, TDS, color, NTU, and Conductivity. The monitoring occurs at the Taylor Road Bridge near the salinity barrier along the South Prong (personal communication, City of Punta Gorda Public Works Department, 1993). The City uses their lab facilities and therefore results are not certified.

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 a potable water supply and Class I designation, Alligator Creek was included in the Special Surface Water Protection Overlay District. During 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 presented in the Future Land Use Element.

Land uses along Alligator Creek range from native range and undeveloped woodland (both in private and public ownership) to residential and some commercial uses within and south of the City of Punta Gorda. Charlotte County operates a cemetery (Indian Springs Cemetery) along the north bank of the creek in the area between Taylor Road and US 41. 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 an 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.

The water quality testing in South Gulf Cove and the Manchester Waterway was replaced with the agreement that Charlotte County has with the SWFWMD for the water quality monitoring in Charlotte Harbor and Lemon Bay.

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.

Analysis of existing data indicates that water quality within Charlotte County's canal systems is generally good, although problems are becoming apparent. In a study of the Port Charlotte canal system completed in 1994, Mote Marine Laboratory found dissolved oxygen levels below State standards, and other studies have indicated that levels of nutrients in the water column and metals in bottom sediments are increasing.

Surface Water and Drainage Basin Summary

Charlotte County's surface waters have been and continue to be the focus of a great deal of research and study, through both regulatory (permit compliance monitoring) and scientific (SWIM, NEP) programs. Volumes of information and data are available regarding most of the surface waters discussed in this section. The CHNEP, the LBL and other organizations are moving towards collecting and organizing the monitoring efforts being implemented by a variety of efforts.

With this in mind, it is possible to say that Charlotte County's surface water resources are generally in good condition. The enforcement of State, Federal, and local regulations, coupled with the public's generally increased awareness of the need to conserve and protect water resources have combined to protect these waters from the types of point and non-point sources of pollution which have degraded surface waters in other parts of the state. The primary threats to Charlotte County's surface waters continue to include non-point source pollution generated by urban and agricultural runoff, leachate from septic tanks and package wastewater treatment plants, erosion from improper land clearing activities, upstream sources of contamination (particularly phosphate mining in the Peace River Basin), and historic construction of dead end finger canals.

As the designation "non-point" implies, it is difficult to isolate the source of these pollutants, other than to identify their proximate causes as stated above. It is even more difficult to develop and successfully implement programs to reduce the amount of such pollutants which enter the

surface water system because such programs (for example, the Florida Yards program administered by the County Extension Service) usually rely on public education and voluntary compliance. The challenge facing Charlotte County and all of Florida is to continue to provide water for all the various human needs (residential, agricultural, and industrial) without damaging the natural systems which supply the water and make Florida a desirable place in which to live.

Surface Water Management Activities

Charlotte County's surface waters have been the focus of numerous studies throughout the previous decades. The 1970s brought the Section 208 studies mandated by the Clean Water Act, the 1980s saw special attention drawn to Charlotte Harbor through the Charlotte Harbor Resource Planning and Management and Surface Water Improvement and Management programs, and the 1990s continued this trend with the inclusion of Charlotte Harbor in the National Estuary Program and a resurging interest in Lemon Bay through both the Charlotte Harbor and Sarasota Bay NEP efforts. Finally, concern over balancing the needs of natural systems with humans' water-oriented recreational and commercial activities resulted in the undertaking of a Marine Land and Water Use Siting Study by Charlotte County as well as the Charlotte County Marine Advisory Committee's initiative to develop an overall Marine Resource and Waterway Management Plan. Although the Marine Land and Water Use Siting Study was completed in 1997, the report was never adopted by the Board of County Commissioners. The Study is being revisited as part of the Evaluation and Appraisal Report recommendations.

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 l976-77 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 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 Charlotte Harbor Resource Planning and Management Plan (CHRPM) outlined many issues relevant to the preservation of water and land resources and to wise land development for both the l980s and l990s. 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; and
- to identify and address the impacts of growth so as to minimize or eliminate adverse effect on the Charlotte Harbor area.

The CHRPM 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 CHRPM 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 ranked sixth on SWFWMD's priority list of SWIM waterbodies. 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 waterbody. 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; and
- 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.

Charlotte Harbor National Estuary Program

In l995, 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 Charlotte Harbor NEP 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.

Charlotte County Marine Resource and Waterway Management Plan

In 1995 the Board of County Commissioners endorsed a proposal presented by the Charlotte County Marine Advisory Committee (MAC) to develop a comprehensive management plan for the County's network of canal channels and other surface waters. The MAC is a 21 member advisory board established by the Charlotte County Board of County Commissioners. The MAC has determined that the most expeditious way to protect and manage marine resources is directly through the Comprehensive Plan, rather than developing and adopting a wholly separate marine resources and waterway management plan. Working with County staff, the MAC has recommended that the following concerns be addressed and implemented by the Goals, Objectives, and Policies (GOPs) of the Comprehensive Plan:

- listed species, most particularly the West Indian manatee but also other species including wading and colonial water birds, fish, and others;
- habitat protection, most significantly seagrass beds, oyster bars, and mangrove communities;
- waterway maintenance, including the provision of reliable navigable depths for boaters which may entail new dredging as needed to achieve a target depth of 5 feet mean low water within select channels;

- water quality assurance through provision of passive water quality protection measures at new ramps and marinas as well as retrofitting existing ramps and marinas during expansion or maintenance activities; and
- waterway safety, including continuation and expansion of boater and school children education programs regarding the importance of protecting the natural environment, staying within channels and out of seagrass beds, and basic boater safety.

As recommended by the MAC, this Comprehensive Plan incorporates the GOPs necessary to coordinate waterway management activities with resource protection, and to reconcile the often competing and even contradictory goals and intentions of the system's many users. This approach is the waterward extension of the coordinated approach to land and water use planning begun through the County's Marine Land and Water Use Siting Study conducted by the University of Florida/Florida Sea Grant program. Although the Study was completed, it was never adopted by the County Commissioners.

Peace River Cumulative Impact Assessment

In 2003, the Florida Legislature directed the FDEP to assess the cumulative impacts in the Peace River. This study is being performed by the Florida Department of Environmental Protection (DEP) at the direction of the Florida Legislature and in accordance with Chapter 2003-423, Laws of Florida. The purpose of the study is 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) will identify regulatory and non-regulatory means to minimize future impacts to the basin. SWFWMD staff are providing technical assistance and are part of a project management team with the DEP.

The project's objective is to assess the cumulative effects of historical land use, water use, and climate changes within the study area on Peace River stream flows, water quality, and ecological factors. To this end, the project will develop a database of existing information and apply 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 is outlined in six specific tasks each building that database.

At the conclusion of this study, the consultant will likely assist the DEP in the development of a management plan. Decisions regarding funding for this aspect and whether consultant services will be needed in the development of a management plan will be made at a later date at the discretion of DEP staff. The project duration was from September 2004 through June 2005 and was be extended by the DEP until August 2006 due to technical issues related to producing a 1940s-era baseline period of GIS-based land use/cover from aerial photographs. This information is 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 is $750,000, funded entirely by the DEP.
For updated information regarding this study, go to
http://www.swfwmd.state.fl.us/waterman/peaceriver/index.html

2. Drainage Basins and Natural Drainage Features

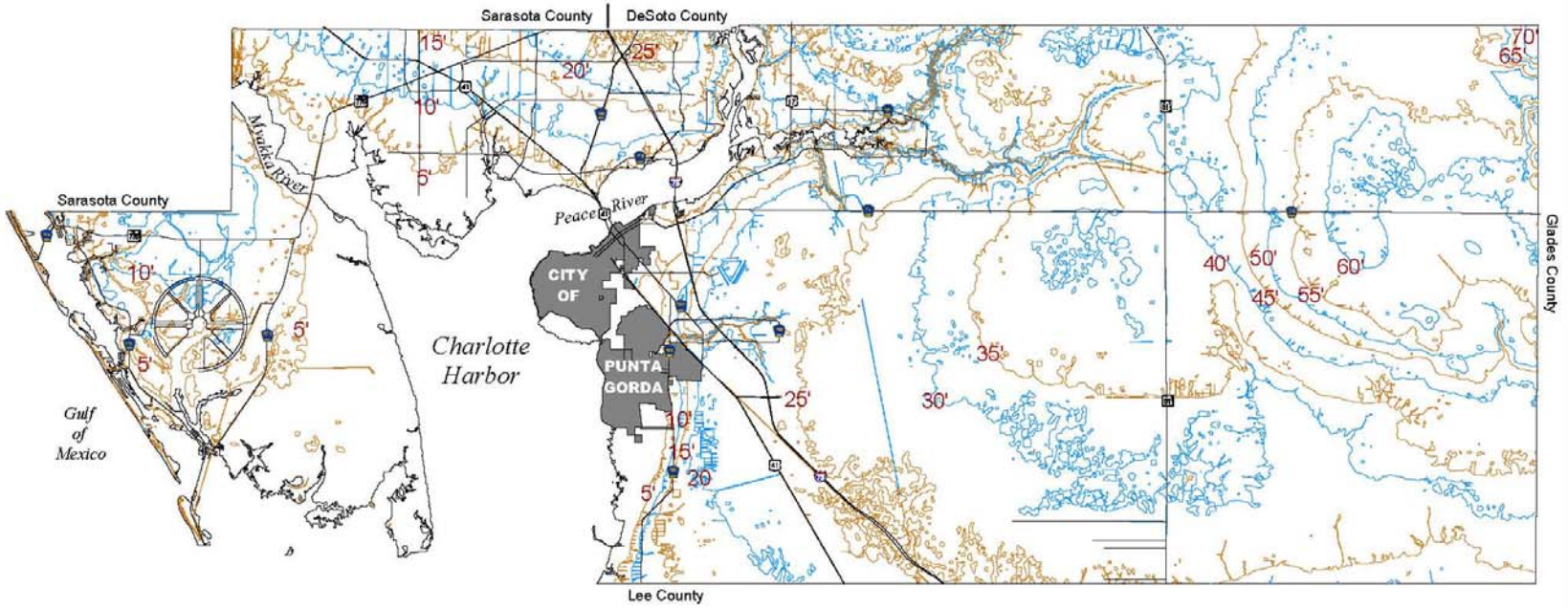
Historically, surface water drained according to Charlotte County's topography, i.e., generally to the west and south. This is best illustrated by comparing Map 3.9, the topographic map of the County, with Map 3.10 and 3.11, which depicts the County's natural drainage patterns and historic drainage basins. Prior to large scale alteration of the natural drainage patterns by man, water that fell upon the land during the wet summer months would drain either by defined channels, such as sloughs, creeks and rivers, or by the slow movement of shallow water covering large areas of flat land, known as sheet flow. During the dry winter months, stream flow was derived from discharge by the shallow aquifer and drainage occurred almost entirely by defined channels.

Under natural conditions, the sheet flowing portions of the County flooded seasonally as the water table rose above the land surface, and the water drained off slowly. In earlier times, people settled on the well drained lands to avoid the problems created by seasonal flooding. Growing population and corporate land development - in conjunction with federally subsidized flood insurance - have brought such floodable lands into residential use. Instead of designing roads and structures to tolerate these seasonal conditions, large land areas have been drained through the construction of drainage canals and ditches. Disruption of natural drainage patterns is not limited to urban uses; some types of agricultural activities require greater drainage than that provided by the natural systems. Ditches to draw down the high water table in the rainy season and re-flood the water table during the dry season through pumping are found in most citrus groves. Shallower ditches, the legacy of water control from several seasons of vegetable crops, mark the land surface of most improved pastures. Many marshes are ditched, drawing down water levels so that cattle can wade in and graze. Wet prairies and sloughs on native range are often ditched to run the water off the land more quickly.

Surface waters in Charlotte County drain according to natural topography, and according to man-made alterations of natural drainage features such as dams, dikes, roads, canals, ditches and stormwater control structures. As illustrated by Map 3.10, which also appears in the Drainage Section of the Infrastructure Element, there are 73 drainage basins located entirely or partially within Charlotte County.

Natural drainage basins in western Charlotte County, and in particular on the Cape Haze Peninsula, have been dramatically altered by growth and development. The most significant alterations of natural drainage features include man-made canals; the use of surface waters as sources of potable water; development activities which have resulted in the reduction of the Lemon Bay and Gasparilla Sound drainage basins; the destruction of sloughs that serve as natural flowways; loss of wetlands that serve as water storage areas, and the alteration or elimination of sheet flow from parts of the county due to development activities. The Drainage Section of the Infrastructure Element provides a thorough description of drainage patterns, problems, and possible solutions.

Map 3.9
Topographic Map



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ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: University of Florida Geoplan Center

Five Foot Intervals
Ten Foot Intervals

Scale: 1:320,000

1 inch equals 5.1 miles

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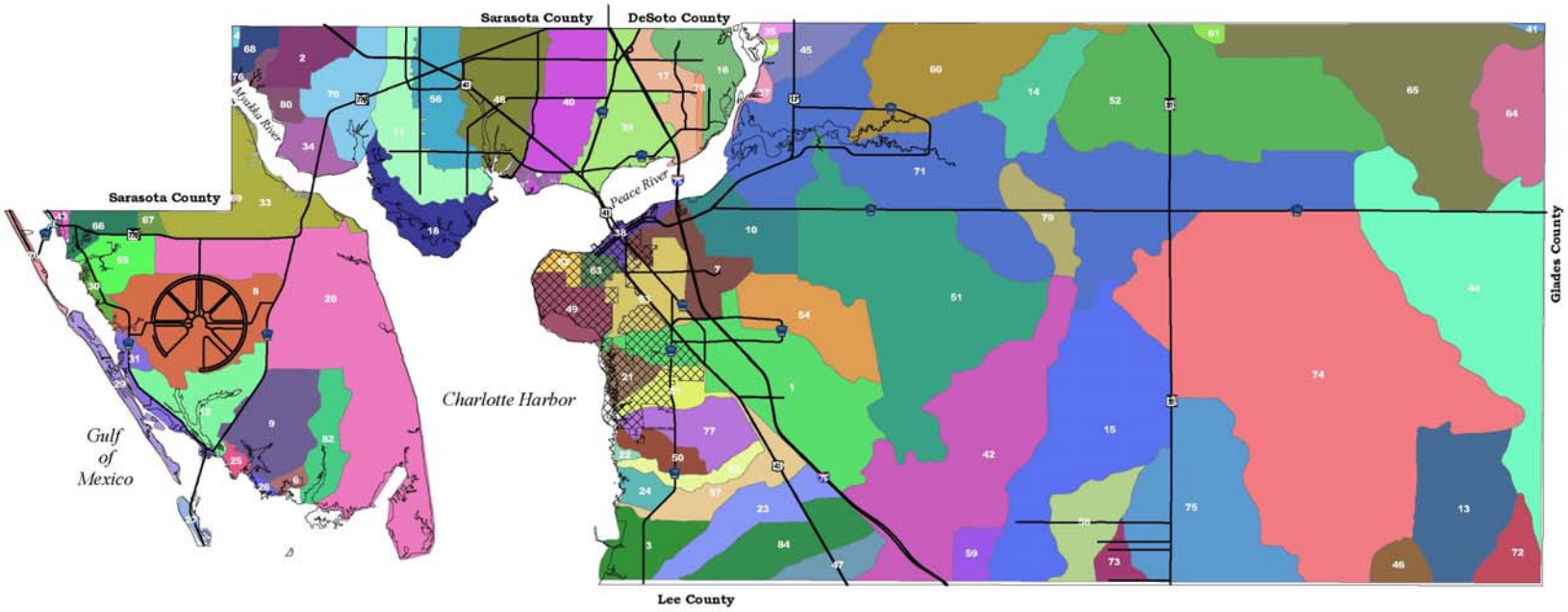
Map 3.10
Drainage Basins



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ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units: meters

Source: Charlotte County Stormwater Management

Drainage Basins

1, Alligator\Creek
2, Apollo\Jupiter Wtr
3, Bear\Branch
4, BigSlough\Canal
5, BigSlough\Canal
6, Boggess\Hole\Outflow
7, Broad\Creek
8, Buck\Creek
9, Catfish\Creek\Bayou
10, Cleveland\Cem Ditch
11, Corn\Waterway
12, Coral\Creek
13, Cypress\Creek
14, Cypress\Slough
15, Daugherty\Creek
16, Deep\Creek
17, Deep\Creek\Subdiv
18, Direct\Runoff\To Bay
19, DR To\Bay
20, DR to\Bay
21, DR To\Bay
22, DR To\Bay
23, DR To\Bay
24, DR To\Bay
25, DR To\Gasparilla\Sound
26, DR To\Gasparilla\Sound
27, DR To\Gasparilla\Sound
28, DR To\Lemon Bay\Gulf
29, DR To\Lemon Bay\Gulf
30, DR To\Lemon\Bay
31, DR To\Lemon\Bay
32, DR to\Myakka River
33, DR to\Myakka River
34, DR To\Myakka\River
35, DR to\Peace\River
36, DR To\Peace\River
37, DR To\Peace\River
38, DR To\Peace\River
39, DR To\Peace\River
40, Fordham\Wagra
41, Gannet\Slough
42, Gator\Slough\Canal
43, Gotthied\Creek
44, Jacks\Branch
45, Lee\Branch
46, Lee\City\Creek 2
47, Lee\County\Creek 1
48, Little\Alligator C
49, Mangrove\Point\Canal
50, Mound\Creek
51, Myrtle\Slough 1
52, Myrtle\Slough 2
53, N. Fork\Alligator\Creek
54, N Prong\Alligator
55, Oyster\Creek
56, Pellam\Auburn\Mdw
57, Pirate\Canal
58, Popash\Creek
59, Powell\Creek
60, Prairie\Creek
61, Prairie\Creek
62, Punta\Gorda\Isles
63, Punta\Gorda\Isles
64, Rainey\Slough
65, Rattlesnake\Gully
66, Rock\Creek
67, Rock\Creek
68, Rock\Creek 2
69, Rock\Creek\Ditch
70, Sam\Knight\Creek
71, Shell\Creek
72, Spanish\Creek
73, Stroud\Creek
74, Telegraph\Creek
75, Trout\Creek
76, Unnamed
77, Unnamed\Canal 1
78, Unnamed\Canal 2
79, Unnamed\Ditch
80, Venus\Waterway
81, Whidden\Branch
82, Whidden\Creek
83, Winegourd\Creek
84, Yucca\Pen\Creek

City of Punta Gorda

Scale 1:205,920
1 inch = 3.25 miles

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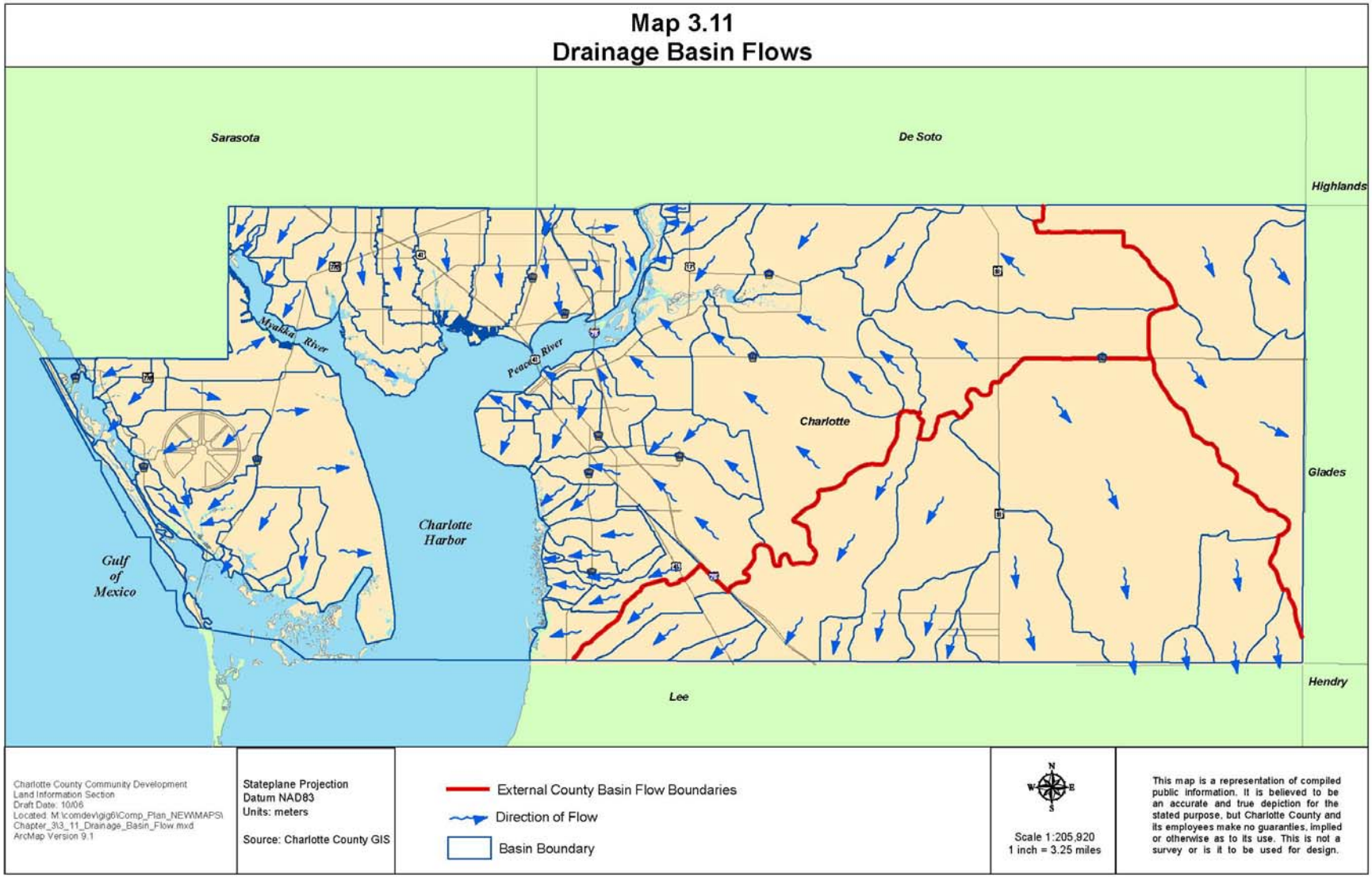
Map 3.11
Drainage Basin Flows
Sarasota
De Soto
Highlands
Myakka River
Peace River
Charlotte
Glades
Charlotte Harbor
Gulf of Mexico
Lee
Hendry
Charlotte County Community Development
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ArcMap Version 9.1
Stateplane Projection
Datum NAD83
Units: meters
Source: Charlotte County GIS
External County Basin Flow Boundaries
Direction of Flow
Basin Boundary
N
W
E
S
Scale 1:205,920
1 inch = 3.25 miles
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Floodplains

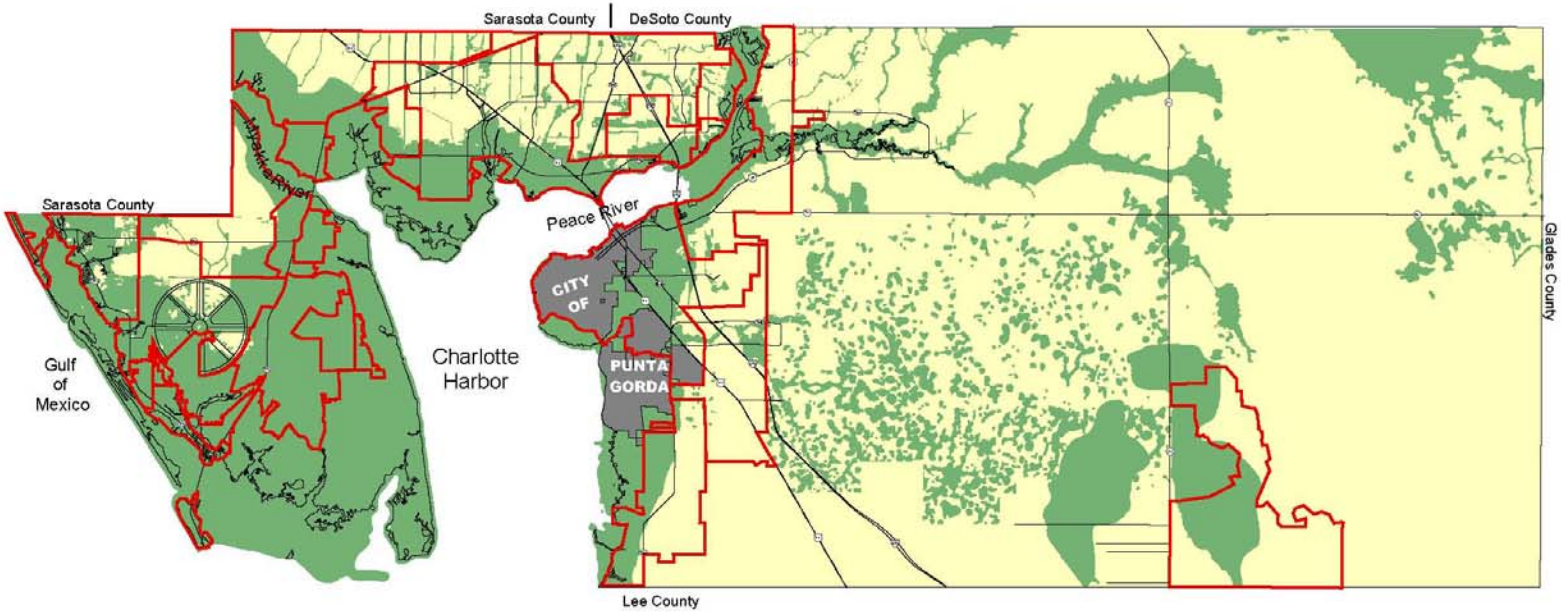
During periods of heavy rainfall, flood plains and wetlands associated with flowways serve to: (1) accumulate runoff and provide temporary storage of stormwater; (2) provide an avenue for conveying floodwater downstream; (3) biologically filter (absorb) nitrogen, phosphorous, heavy metals, pesticides and other pollutants from stormwater, thus improving surface water quality; and (4) in some instances recharge the surficial aquifer (Comer, et. al., 1982). As such, flood plains and wetlands are a valuable natural resource. When structures and fill are placed in flood plains and wetlands, or when artificial drainage structures bypass these areas, storage capacity is reduced, with the following consequences: (1) flood waters are discharged at a greater peak velocity in a shorter period of time causing more severe downstream flooding; (2) conveyance of floodwater is restricted causing more severe flooding upstream; (3) contact time required for pollutant removal is reduced or eliminated; and (4) the potential for groundwater recharge is reduced or eliminated. Charlotte County's designated floodplains are illustrated in Map 3.12.

The floodplains associated with the Myakka and Peace Rivers encompass much of the County's developed area as development has, historically, occurred in proximity to the coast and rivers. Although development provides for stormwater run-off, Charlotte County's natural low elevation makes it probably the most vulnerable county in the state to the impacts from hurricanes and tropical storms. Looking at Map 3.13, Landfalling Storm Surge Zones, the Cape Haze Peninsula (also known as the West County Planning District) lies entirely within the Tropical Storm, and Category I, II, and III Storm Surge Zones and is known to have flooding problems. Yet the West County Planning District 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 manmade drainage systems. Most of Charlotte County's densely populated areas (which tend to occur near the coast or along natural or man-made waterways) are located within the Category III Hurricane Vulnerability Zone.

In areas which have not been developed, stormwater management is provided by natural conveyance systems. Runoff from urbanized areas within the County can be a significant issue since higher volumes of stormwater from increased impervious surfaces not only worsens flooding, it also contributes to increased pollutant levels (in the form of non-point source pollution) to the County's surface waters.

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

Map 3.12 Charlotte County Floodplains



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ArcMap Version 9

Stateplane Projection
Datum NAD83
Units meters

Source: Charlotte County Stormwater and Planning Staff

Within Floodplain
Outside Floodplain
Urban Service Area Overlay

N W E S

Scale: 1:320,000

1 inch = 4.9 miles

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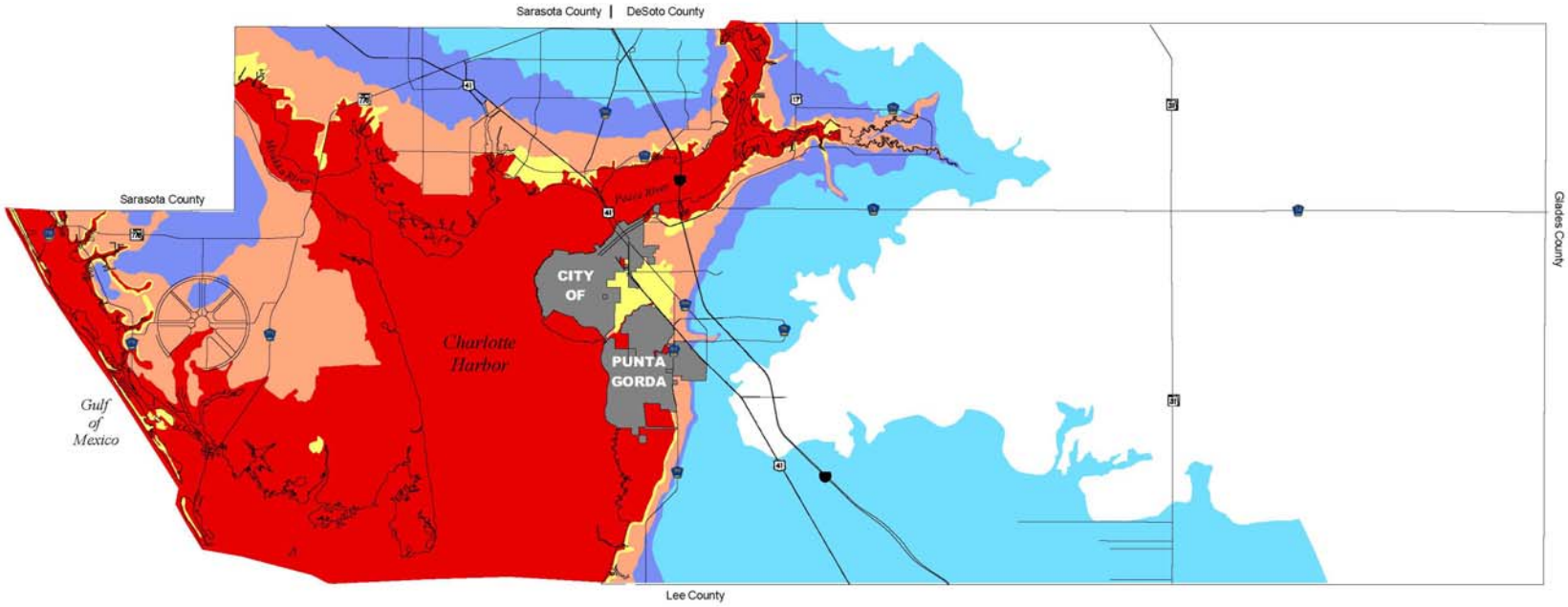
Map 3.13 Charlotte County Landfalling Storm Surge Zones



Charlotte County Community Development Land Information Services Draft Date: 10/06 Located: gig6\comp_plan_NEW\Chapter_3\3_13_Land_falling_surge.mxd ArcMap Version 9.1	Stateplane Projection Datum NAD83 Units meters Source: Charlotte County Gis & Planning Staff	**Storm Surge** Tropical Storm - 3.1 to 5.7 Feet Above Mean Sea Level (MSL) Category 1 - 4.5 to 6.6 Feet Above MSL Category 2 - 8.3 to 12.3 Above MSL Category 3 - 11.3 to 20 Feet Above MSL Category 4-5 - 17.2 to 31.7 Feet above MSL	N W E S Scale 1:205,920 1 inch = 3.25 miles	This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

3. Groundwater

Aquifers

The groundwater underlying Charlotte County is contained within four distinct but stratigraphically complex aquifers (Sutcliffe, 1975, Wolansky, 1983). The four aquifers include the surficial aquifer, two intermediate aquifers, and the deep Floridan aquifer. The intermediate and Floridan aquifers are artesian aquifers that each contains several water-bearing strata. In general, the water in each aquifer is separated from other aquifers by confining beds (relatively, impervious mineral or rock layers); however, discontinuities or breaks in the confining beds allow some hydraulic exchange between overlying and underlying aquifers.

The surficial aquifer (also referred to as the water table aquifer or unconfined aquifer) contains potable water across most of eastern Charlotte County. It is composed of sand, marl, shell and limestone and has an average thickness of 35 feet. A clay confining layer averaging about 40 feet thick separates the surficial aquifer from the underlying intermediate aquifer (SWFWMD, 1988). Wolansky (l978) estimated that l50 million cubic feet of relatively good quality water is stored in Charlotte County's surficial aquifer. However, the majority of this water is located in the eastern third of the County, at least l5 miles from the nearest population centers of Port Charlotte and Punta Gorda.

Hundreds of wells tap the surficial aquifer in Charlotte County, and may withdraw as much as 4 million gallons of water per day (Wolansky, 1978). Many of these wells are used to irrigate vegetable crops and water livestock. Others are located in the Englewood well fields and are used for public water supply. Water yields from wells tapping the surficial aquifer average 30 gallons per minute (Wolansky, 1983), but can range as high as 600-700 gallons per minute for wells tapping Caloosahatchee Marl in the eastern part of Charlotte County.

The intermediate aquifers include the Tamiami-Upper Hawthorn aquifer, and the Lower Hawthorn - Upper Tampa aquifer (Wolansky, 1983). These aquifers consist of permeable sand, gravel, shell and limestone and dolomite beds in the Tamiami Limestone.

The thickness of the intermediate aquifers and confining beds is approximately 550 feet in Charlotte County. The Tamiami-Upper Hawthorn aquifer is the most highly developed aquifer in western Charlotte County, supplying most of the water for domestic irrigation. Wells that draw over the entire thickness of this aquifer are capable of producing 200 gallons per minute. The Lower Hawthorn-Upper Tampa aquifer is also used for irrigation, with wells yielding as much as 500 gallons per minute (Wolansky, 1983) and for potable water supply, with respect to CCU's Burnt Store well field with reverse osmosis treatment. Both of the intermediate aquifers contribute water to the Englewood well fields, but because the water is highly mineralized, it requires desalinization by reverse osmosis before it can be used for public supply.

In Charlotte County, the Floridan aquifer consists of permeable layers in the Tampa Limestone, Suwannee Limestone, Ocala Limestone, and Avon Park Limestone formations. The Floridan aquifer is confined by impermeable limestone and clays of the Tampa Limestone on top and by impermeable limestone of the Lake City Limestone which forms the bottom confining bed. The average thickness of the Floridan aquifer in Charlotte County is about l,700 feet. The Floridan is

the most productive of Charlotte County's aquifers, with wells capable of producing thousands of gallons of water per minute. However, the water contained in the Floridan aquifer underlying Charlotte County is highly mineralized and would require desalinization before it could be used for irrigation or potable water.

A better understanding of these aquifers in Charlotte County will be gained upon the completion of CCU's countywide groundwater with RO feasibility study. The intent of this study and subsequent work is to determine the feasibility of using one or more of these aquifers as an additional water supply source for the County.

Aquifer Recharge (The following is excerpted from the *Groundwater Resource Availability Inventory: Charlotte County* issued by the Southwest Florida Water Management District in 1988. A complete discussion of the nature of aquifer recharge in Charlotte County is presented in the Aquifer Recharge section of the Infrastructure Element.)

Recharge is defined as the depth of water that enters an aquifer per unit area of aquifer. County-wide variations in recharge are dependent on a number of variables, including rates of surface water runoff, permeability of soils and the underlying confining beds, relative differences between potentiometric and water table levels, precipitation and evapotranspiration rates, and pumpage. Flowing artesian wells are also an artificial recharge variable.

The surficial aquifer is recharged by rainfall that has not been intercepted by evaportranspiration, runoff, foliage, or depression storage; upward leakage from the intermediate and Floridan aquifers; and ground water flow from outside the county. The majority of recharge is by infiltration of rainfall. Upward leakage and ground water flow from outside the county contribute minor amounts and flowing artesian wells contribute appreciable amounts. Wolansky (l978) estimates that recharge to the surficial aquifer in Charlotte County ranges from less than l inch per year to 16 inches per year depending on permeability and thickness of aquifer material and the topography.

In the majority of Charlotte County, the potentiometric surfaces of the confined aquifers are higher than the water levels in the surficial aquifer and water generally leaks upward to the surficial aquifer. However, there is one area of the County, the approximately 50 square mile region in the northeastern corner of the County (illustrated by Map3.14) where the water level of the surficial aquifer is about 10 feet above the potentiometric surface of the intermediate aquifer; therefore, surficial aquifer water is recharging the intermediate aquifer.

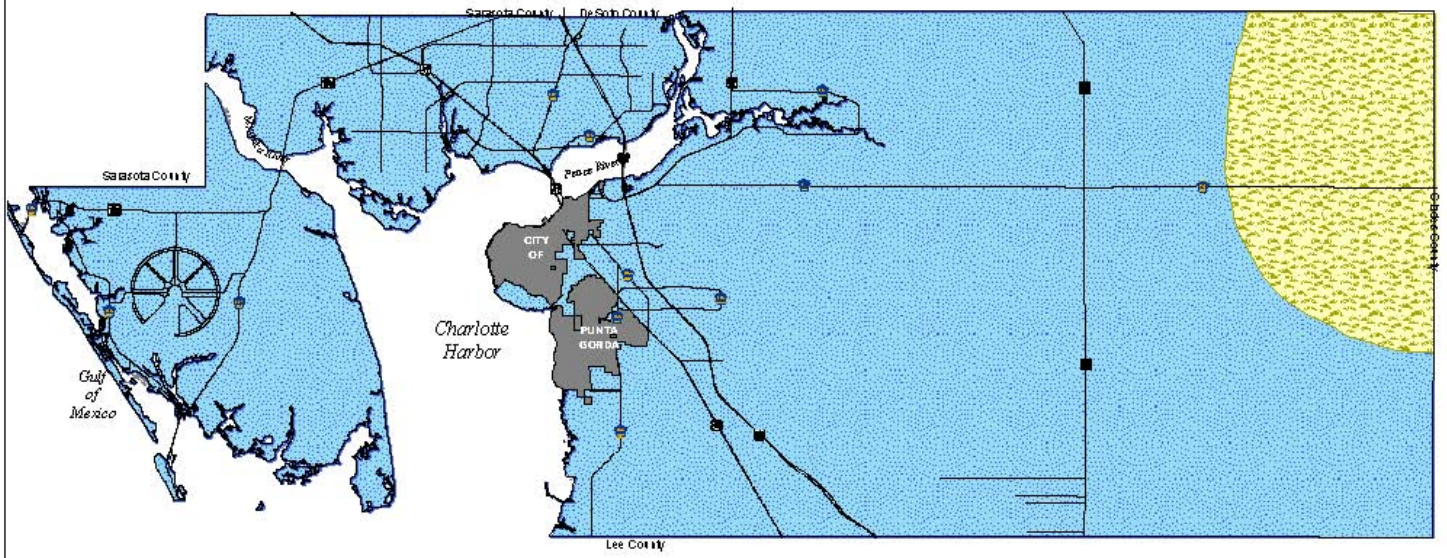
Regulations Protecting Recharge Areas

The only discrete areas of groundwater recharge which are readily regulated in terms of permitted land uses and development are wetland systems. Agencies currently involved in regulating uses in wetland areas are the US Army Corps of Engineers, Florida Department of Environmental Protection (FDEP), and the water management districts. Through the Environmental Resource Permitting (ERP) program, the permitting criteria of the FDEP and water management districts have become standardized, and the lead authority typically falls to the districts. Destruction or alteration of wetland systems is contingent upon demonstrating compliance with minimum standards, and providing satisfactory compensation for wetland loss.

Compensation typically consists of the creation of new wetlands or restoration of previously impacted wetlands. The USACoE derives its authority to regulate wetland impacts through Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

Though the permitting processes described above can be effective in protecting wetland systems and floodplains, their effectiveness at protecting recharge areas is compromised by a number of weaknesses, including exemptions for wetlands below one half acre in size, generally inadequate upland buffer requirements, exemptions for mining proposals, and the fact that aquifer recharge, though acknowledged as one of the functions of wetlands, is not addressed through specific permitting criteria. Because of these weaknesses Charlotte County is considering amending its Code to provide additional protection for recharge areas.

Map 3.14 Aquifer Discharge/Recharge Areas



Charlotte County Community Development Land Information Services Draft Date: 10.06 Located: gig6\comp_plan_NEW\Chapter_3\3_14_Aquifer_recharge.mxd ArcMap Version 9.1	Stateplane Projection Datum NAD83 Units meters Source: Charlotte County Community Development Water Management Websites (2005)	No discharge to very low discharge (0.0 to 1.0 inches per year) to the Upper Floridan Aquifer No Recharge to very low recharge (0.0 to 1.0 inches per year) to the Upper Floridan Aquifer	Scale 1:333,000 1 inch = 5 .25 miles	This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Ground Water Quality - Mineral Content

One of the most basic measures of ground water quality is mineral content which largely determines its suitability for domestic, agricultural, or industrial use. The mineral content of ground water is determined primarily by the composition and solubility of soil and rock that come into contact with the water and the length of time the water is in contact with these materials. "Thus", Wolansky states, "the chemical quality of water from an aquifer usually depends upon lithology of the aquifer. Quartz sand, the major constituent of the surficial aquifer, is relatively insoluble. The sandy and clayey limestone and dolomite of the intermediate aquifers are more soluble than the quartz sand of the surficial aquifer, but less soluble than the limestone and dolomite of the Floridan aquifer" (Wolansky, 1983).

Because mineral content can be defined as the sum of all of the dissolved inorganic ions and compounds, a measure of the mineral content of a ground water can be obtained by measuring the concentration of major inorganic constituents - such as total dissolved solids (TDS), chloride, sulfate and hardness (calcium and magnesium) - in the water. Chapter 62-520 of the Florida Administrative Code establishes standards for the quality of drinking water distributed by public water systems (standards for private wells have not been developed on a statewide basis, at this time). Florida's secondary drinking water regulations include standards for total dissolved solids (TDS), chloride and sulfate in public water supplies is 500, 250 and 250 milligrams per liter (mg/l), respectively. These are identical to the USEPA recommended levels for TDS, chloride and sulfate in drinking water. A standard is not given for hardness, but water having a hardness concentration greater than 180mg/l is considered very hard and can cause excessive soap consumption and scale build up in water heaters.

TDS, chloride and hardness all exceed the maximum allowable levels for public drinking water for the entire County. Sulfate exceeds State standards in the western half of the County. The Floridan aquifer has the most highly mineralized ground water of Charlotte County's aquifers All parameters are greater than would be allowed under public drinking water regulations, except for sulfate in the eastern half of the county.

Except for the surficial aquifer in the eastern half of the county, water chemistry data indicates that, in general, the ground water quality in Charlotte County is poor. The intermediate and Floridan aquifers have high mineral contents, especially in the western half of the County. The SWFWMD's *Groundwater Resource Availability Inventory* suggests that the County's low topography (near sea level) and the relatively thick confining layers that separate the aquifers may retard the flushing of the salty aquifers by fresh rain water.

Ground Water Contamination

While the surficial aquifer contains the highest quality groundwater in the county, it is also the most susceptible to contamination. Potential point sources of groundwater contamination in Charlotte County include landfills, percolation ponds for sewage effluent disposal, and areas for land application of sewage sludge, and industrial sites, these are illustrated in Map 3.15. Free flowing artesian wells also constitute a potential point source of contamination of groundwater as lower quality water from deeper aquifers may mix with the generally better quality water of the shallower systems. Septic systems, agricultural and residential use of fertilizers and pesticides,

and salt water intrusion along the coastal shoreline are also considered non-point sources of contamination.

In central and western Charlotte County, wells drilled into the intermediate and Floridan aquifers are artesian aquifers, since the hydrostatic pressure of these confined aquifers is great enough to push water to the ground surface. As discussed in the previous section, the Floridan aquifer has a higher mineral content than the intermediate aquifers, which, in turn, are more mineralized than the surficial aquifer. When a well is drilled into any artesian aquifer and the well is not cased, it is improperly constructed, or deteriorates, or free flows at the land surface, the poorer quality water of the deeper aquifers can leak or be injected into the less mineralized water of overlying aquifers. Thus, water quality in the overlying aquifers becomes degraded because it is hydrologically connected to a deeper aquifer of lower water quality. Hydrologic connections between aquifers do occur naturally as evident from artesian springs, such as Warm Mineral Springs in Sarasota County. However, most of the major free flowing artesian wells in Charlotte County are the result of drilling. Wells are illustrated on Map 3.16.

Artesian wells that free flow at land surface accelerate aquifer contamination in two ways:
(1) Uncontrolled discharge reduces the hydrostatic pressure of the artesian aquifer, accelerating the intrusion of even more highly mineralized water from the sea or deeper aquifers; and
(2) Highly mineralized water discharged at the land surface results in artificial recharge of the surficial aquifer with poor quality water.

Re-establishing the separation between aquifers by plugging sections of wells that allow hydrologic connection is crucial in eliminating inter-aquifer contamination (SWFWMD, 1988).

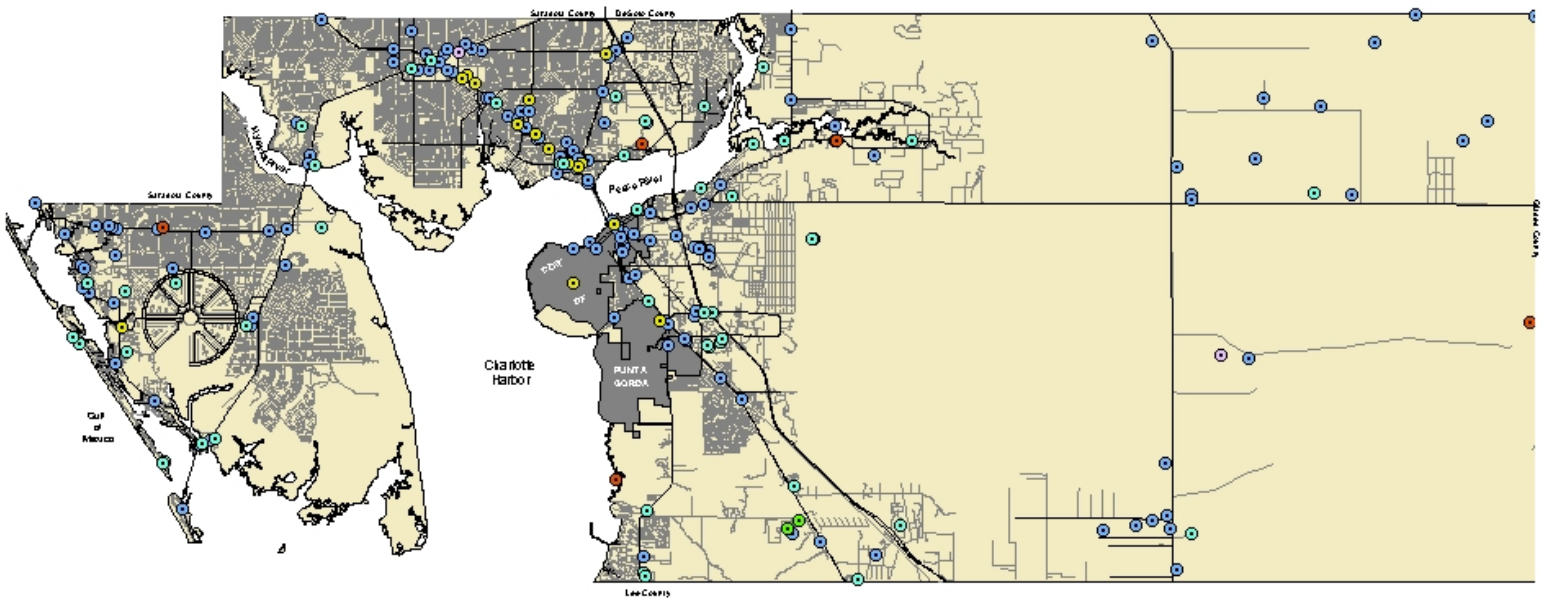
In 1974, the SWFWMD began the Quality of Water Improvement Program (QWIP) to restore hydrologic conditions altered by well drilling activity. QWIP was initiated in Charlotte County where the problems with free flowing and abandoned artesian wells are most severe and complex. Since its inception, QWIP has resulted in the plugging of 265 wells - the total as of October 1, 2006(Kevin Stover, SWFWMD, 2006, personal communication) - in Charlotte County. In 2005/2006 fiscal year, 5 wells were plugged. Landowners are reimbursed $5,000 per well and can request funding for plugging up to 3 wells. An on-going program, QWIP continues to inventory and plug artesian wells in order to restore the aquifer system. The funding for the year 2006/2007 is $224,524 for reimbursement to landowners.

Septic systems are recognized as both polluters of groundwater and the major alternative to centralized sewage treatment plants. Under non-ideal conditions, septic systems can contaminate the surficial aquifer with nitrate, total dissolved solids, bacteria, and viruses. Since most of the naturally occurring soils in Charlotte County are classified by the U.S. Soil Conservation Service as severe for septic tank use (U.S. SCS, 1984), the use of septic tanks to treat domestic sewage in some of the more densely populated areas of Charlotte County must be questioned. The Charlotte County Environmental Health Unit of the Department of Health and Rehabilitative Services has issued over 36,500 permits for septic tanks in Charlotte County since 1972, and estimates that the County may have in excess of 46,000 septic tanks in use. Septic system permits more than doubled from 2004 to 2005; five hundred and fourteen permits were issued in

2004 and fifteen hundred and twenty-eight were issued in 2005. The number for 2006, up to October, was slightly less, thirteen hundred and fifty-one.

Charlotte County's extensive coastal and estuarine shoreline provides for an equally extensive interface between the brackish surface water of the bays, harbor and tidal creeks and the freshwater of the surficial aquifer. Under natural conditions, the surficial aquifer discharges fresh water into these estuaries. Under extreme drought conditions, salt water may intrude into the surficial aquifer along the coast. Pumping and draining the surficial aquifer in coastal areas can cause salt water intrusion. As the water table is lowered by pumping, salt water can move laterally within the permeable zones of the surficial aquifer. (Wolansky, l978). Many of the manmade canals in Port Charlotte are now equipped with physical barriers (salinity barriers) which limit the inland extent of brackish tidal waters.

Map 3.15
Potential Point Sources of Groundwater Contamination



Charlotte County Community Development
Land Information Section
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ArcMap Version 9

Stateplane Projection
Datum NAD83
Units meters

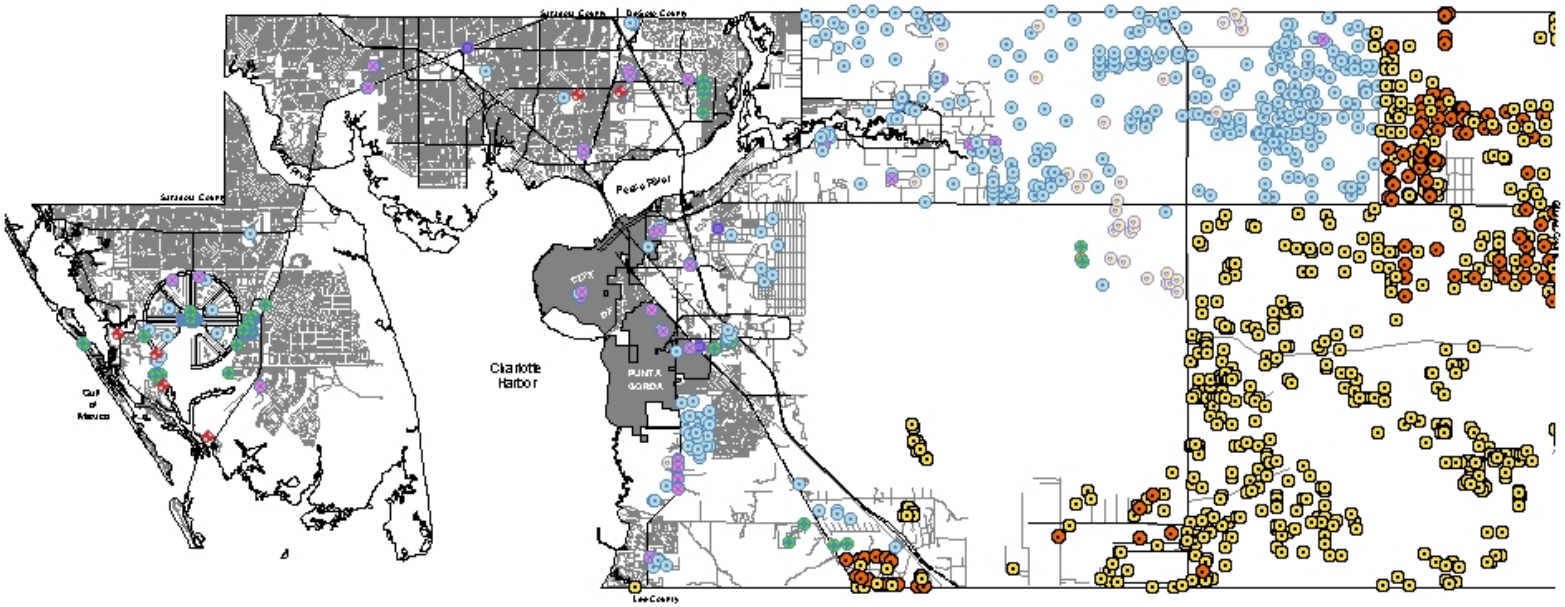
Source: Florida Department of Environmental Protection

Potential Contamination Sources
- Domestic and Industrial Waste Water
- Class 1 Underground Injection Control Wells
- Dry Cleaners
- Landfills
- Hazardous Waste, Treatment, Storage and Disposal
- Petroleum Storage Tanks

Scale 1:333,000
1 inch = 5 .05 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guarantees, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Map 3.16
Wells in Charlotte County



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Stateplane Projection
Datum NAD83
Units meters

Source: Charlotte County
Community Development
Water Management Websites
(2005)

SWFWMD Well Data
- Essential Service
- Public Supply
- Irrigation
- Augmentation
- Effluent/Waste Water
- Industrial
- Livestock

SFWMD Well Data
- PUMP
- WELL

Scale 1:333,000
1 inch = 5 .25 miles

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D. Soil and Mineral Resources

The *Soil Survey of Charlotte County*, issued by the U.S. Soil Conservation Service (now known as the Natural Resource Conservation Service) in 1984, identifies 63 different soil types in Charlotte County. Map 3.17 is a general representation of the soils throughout Charlotte County, while Tables 3.1 through 3.16 provide the areal percent of each group of soils in the County. The soils are divided into 16 groups with soils in each group having similar characteristics.

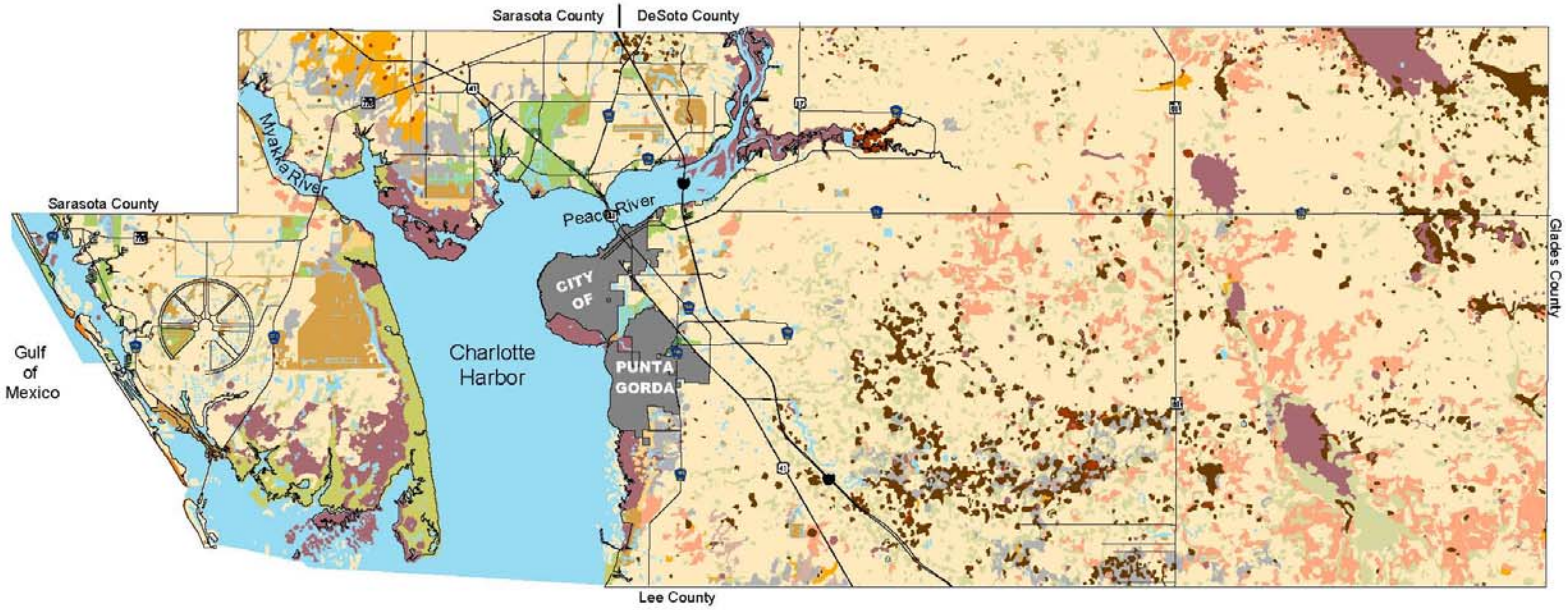
Table 3.1
Fine Sand Soils

Soil Name	Acres	Percent	Soil Name	Acres	Percent
Canaveral fine sand	779	0.2%	Punta fine sand	1,599	0.4%
Captiva fine sand	20	*	Malabar fine sand	14,261	3.2%
Hallandale fine sand	2,709	0.6%	Satellite fine sand	366	0.1%
Pompano fine sand	11,642	2.6%	Smyrna fine sand	22,514	5.0%
Myakka fine sand	22,282	4.9%	Cocoa fine sand	22	*
Felda fine sand	7,689	1.7%	Orsino fine sand	3,520	0.8%
Boca fine sand	10,769	2.4%	Caloosa fine sand	248	0.1%
Valkaria fine sand	3,224	0.7%	Heights fine sand	11,985	2.7%
Kesson fine sand	3,123	0.7%	Bradenton fine sand	665	0.1%
Pineda fine sand	40,140	8.9%	Electra fine sand	614	0.1%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.
*less than 0.1%

Fine sand soils are nearly level and somewhat poorly drained. Permeability is rapid in the uppermost layers and moderate to slow in lower ones. These soils are not highly suited for cultivating crops; however, crops can be produced with intensive management practices. The suitability for citrus ranges from poor to good - proper water control renders them suitable for citrus. These soils have severe limitations for urban uses and sanitary facilities due to wetness and a high water table.

Map 3.17 General Soil Types



Charlotte County Community Development
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ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: USDA Soil Conservation Service

- Water
- Fine Sand
- Fine Sand, Tidal
- Fine Sand Slough
- Fine Sand, High
- Fine Sand, Limestone Substractum
- Fine Sand, Depressional
- Mucky Fine Sand
- Sand, Linestone Substratum
- Sand, Depressional
- Sandy Loam, Depressional
- Gravelly Fine Sand
- Urban Land
- Urban Land Complex
- Beaches
- Muck

Scale: 1:320,000
1 inch = 4.9 miles

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Table 3.2 Muck Soils					
Soil Name	**Acres**	**Percent**	**Soil Name**	**Acres**	**Percent**
Estero muck	5,549	1.2%	Wulfert muck	6,731	1.5%
Gator muck	2,384	0.5%	Isles muck	4,745	1.1%
Terra Ceia muck	965	0.2%	Chobee muck	4,305	1.0%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

Muck soils are nearly level, very poorly drained, and located in marsh areas. Slopes range from 0 to 1 percent. These soils are generally not suitable for cultivated crops or citrus, but Gator muck is well suited for vegetable crops or sugar cane if drained. These soils are vulnerable to flooding and have severe limitations for urban development.

Table 3.3 Urban Land Complex Soils					
Soil Name	**Acres**	**Percent**	**Soil Name**	**Acres**	**Percent**
Canaveral - Urban land complex	21	*	Immokalee - Urban land complex	700	0.2%
Matlacha - Urban land complex	3,797	0.8%	Hallandale - Urban land complex	20	*
St. Augustine sand, organic substratum - urban land complex	21	*	Smyrna - Urban land complex	675	0.2%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.
*less than 0.1%

Urban land complex soils have generally been modified by grading and the construction of impervious surfaces. These soils accommodate buildings, roads, parking lots, and drainage facilities. Current land uses preclude the use of these soils for crop and citrus cultivation. These soils have severe limitations for septic tanks due to wetness.

Table 3.4 Sand Soils					
Soil Name	**Acres**	**Percent**	**Soil Name**	**Acres**	**Percent**
Eau Gallie sand	11,642	2.6%	Oldsmar sand	54,270	12.0%
Daytona sand	1,554	0.3%	Wabasso sand	48,430	10.7%
Immokalee sand	29,401	6.5%	St. Augustine sand	656	0.1%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

Sand soils are nearly level to gently sloping and are moderately well drained. Permeability is rapid in the surface layer and moderate in the subsoils. These soils have poor to moderate ratings for crop cultivation, and are suitable for citrus production with intensive land management; they

are fair to well suited for pastures. Sand soils have severe limitations for urban development because of a high water table.

Table 3.5
Fine Sand, Depressional Soils

Soil Name	Acres	Percent	Soil Name	Acres	Percent
Pompano fine sand, depressional	1,456	0.3%	Felda fine sand, depressional	10,841	2.4%
Isles fine sand, depressional	432	0.1%	Myakka fine sand, depressional	3,051	0.7%
Valkaria fine sand, depressional	767	0.2%	Pineda fine sand, depressional	11,896	2.6%
Malabar fine sand, depressional	3,041	0.7%			

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

These soils are nearly level and poorly drained. *Fine sand, depressional soils* are generally not well suited for crop or citrus cultivation, urban uses, or recreation because of ponding. These soils may be appropriate for pasture land. They have severe limitations for septic tanks.

Table 3.6
Fine Sand, Slough Soils

Soil Name	Acres	Percent
Isles fine sand, slough	2,878	0.6%
Boca fine sand, slough	680	0.2%
Hallandale fine sand, slough	28	*

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.
*less than 0.1%

Fine sand, slough soils are nearly level, drain poorly, and are located in sloughs. Slopes are smooth to slightly concave and range from 0 to 1 percent. During periods of heavy rainfall, the soil is covered by slowly moving shallow water. Permeability is rapid. These soils are not suitable for crop or citrus farming, and have severe limitations for urban uses; they are well suited for pastures if using water control structures.

Table 3.7
Fine Sand, Tidal Soils

Soil Name	Acres	Percent
Hallandale fine sand, tidal	497	0.1%
Boca fine sand, tidal	1,783	0.4%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

Fine sand, tidal soils are nearly level, poorly drained, and are subject to tidal flooding. These soils are not suitable for crop or citrus production because of high salt content. They have severe limitations for urban development and require mounding when septic tanks are used.

Table 3.8
Sand, Depressional Soils

Soil Name	Acres	Percent
Anclote sand, depressional	690	0.2%
Floridana sand, depressional	5,117	1.1%
Winder sand, depressional	13,753	3.1%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

Sand, depressional soils are nearly level, very poorly drained, and located in depressions. The water table is above the surface for 3 to 6 months of the year. These soils have moderate ratings for range plant production, but are poorly suited for crop and citrus production and have severe limitations for urban development.

Table 3.9
Fine Sand, Limestone Substratum Soils

Soil Name	Acres	Percent
Matlacha gravelly fine sand, limestone substratum	28	*
Oldsmar fine sand, limestone substratum	568	0.1%
Pineda fine sand, limestone substratum	904	0.2%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.
*less than 0.1%

Fine Sand, Limestone Substratum Soils are nearly level and poorly drained. Permeability is rapid in the surface and subsurface layers and moderately slow in subsoils. These soils are suitable for crop and citrus cultivation when water control structures are employed. Though they have high potential for range uses, fine sand, limestone substratum soils have severe limitations for urban development because of a high water table.

Table 3.10
Beaches Soils

Soil Name	Acres	Percent
Beaches	137	*

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.
*less than 0.1%

Beaches are narrow strips of nearly level, mixed sand and shell fragments along the Gulf of Mexico. These areas are covered with daily saltwater tides and are subject to movement by wind and tides. Salt-tolerant plants are the only vegetation. Beaches are suitable for recreation.

Table 3.11
Urban Land Soils

Soil Name	Acres	Percent
Urban Land	1,892	0.4%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

Urban land soils consist of areas that are covered by buildings, parking lots, roads, and other man-made structures. Unoccupied areas are mostly lawns, vacant lots, and playgrounds. This soil is unsuitable for crop and citrus cultivation because of current land uses.

Table 3.12
Fine Sand, High Soils

Soil Name	Acres	Percent
Malabar fine sand, high	27,323	6.1%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

This soil, *malabar fine sand, high*, is nearly level, poorly drained, and located in flatwoods. Slopes are smooth to slightly convex and range from 0 to 2 percent. Permeability is rapid in the surface and subsurface layers and the sandy part of the subsoil; permeability is moderately slow in the lower, loamy part of the subsoil. With good water control practices, this soil is well suited for some vegetable crops and citrus. It is well-suited for pasture land, but has severe limitations for urban development because of a high water table.

Table 3.13
Mucky Fine Sand Soils

Soil Name	Acres	Percent
Peckish mucky fine sand	9,096	2.0%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

Peckish mucky fine sand is nearly level, very poorly drained, and located in broad tidal swamp areas. The water table fluctuates with the tide and the soil is subject to flooding. The soil is not suited for crop or citrus cultivation, pasture grasses, or woodlands. It has severe limitations for urban and recreational uses because of flooding, the high water table, and sandy texture.

Table 3.14
Gravelly Fine Sand Soils

Soil Name	Acres	Percent
Matlacha gravelly fine sand	12,808	2.8%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

This soil, *matlacha gravelly fine sand*, is nearly level, somewhat poorly drained, and was formed by fill and earthmoving operations. Permeability is estimated to be rapid in the fill and underlying surfaces. It is poorly suited for plants unless topsoil is spread over the area to provide a suitable root zone. The soil has severe limitations for septic tanks and recreational uses and moderate limitations for building sites.

Table 3.15
Sand, Limestone Substratum Soils

Soil Name	Acres	Percent
Wabasso sand, limestone substratum	12,353	2.7%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

This soil, *wabasso sand, limestone substratum*, is nearly level, poorly drained, and located in broad flatwoods areas. Permeability is rapid in the upper layers, but slow in the lower parts of the subsoil. The soil is suitable for many vegetables flower crops, oranges, and grapefruit if water control systems are used. The soil is well suited for pastures and hay crops. It has severe limitations for urban development because of a high water table.

Table 3.16
Sandy Loam, Depressional Soils

Soil Name	Acres	Percent
Copeland sandy loam, depressional	2,110	0.5%

Source: Derived from Soil Survey of Charlotte County, Florida, Soil Conservation Service, 1984.

The *copeland sandy loam, depressional soil* is low, nearly level, very poorly drained, and located in depressions. Slopes are concave and less than 1 percent. Permeability is rapid in the surface layer and moderate in the subsoil. In its natural state, the soil is not suitable for crops, trees, or improved pasture because of the lack of drainage outlets. It has moderate potential for range plant production. This soil has severe limitations for urban development because of the high water table.

Soil Erosion

Erosion is a natural process by which rocks are weathered to soil by water and wind. Rainfall and wind abrade the rocks and carry soil particles away. Rivers transport the sedimented soils, undercutting their banks as they make their way to the oceans. Both natural disasters and human activities can hasten this process. Clearing large areas of land for agriculture or urban development exposes the soil to wind and water and thus accelerates erosion. Soil erosion not only represents the loss of an irreplaceable natural resource, but also threatens the quality of surface waters.

Due to Charlotte's County's generally level topography and soil types, the NRCS does not classify any areas in Charlotte County as being subject to severe erosion (Howard Yamataki, NRCS, personal communication). While there do not appear to be any serious problems

associated with agricultural land uses in Charlotte County with respect to physical erosion, the loss of peat or muck soils by chemical oxidation, a problem experienced in the Everglades Agricultural Areas, may pose a potential problem. Fortunately, the only portions of Charlotte County which may be subject to such a threat are the peat and muck soils of Long Island Marsh in the northeastern corner of the County.

Severe, localized erosion can and does occur as a result of poor land development practices such as clearing an area during pre-development site preparation, then leaving the site exposed to wind and water erosion over a period of months. Fill slopes of development sites and side slopes of excavations and ditches, if not stabilized, can cause sedimentation in swales and drainage works. This problem is especially critical when fill material is placed next to waterways or wetlands in which sedimentation can result in destruction of aquatic habitats, displacement of dependent fauna, obstruction of navigation channels, and possible release of pollutants (nutrients, metals, or pesticides).

To counter these problems, the County Code prohibits the non-agricultural clearing of property until such time as building permits have been issued for development projects, and encourages the use of best management practices for agricultural activities. Throughout all construction activities, staked hay bales or filter cloth must be placed between the development site and any adjacent swales, surface waters, or wetlands. The Code also requires that all slopes, including those associated with single family residential development, be sodded immediately after final grading. Finally, the Code requires that areas in which fill or other soil materials are to be stored must be sprinklered or provided with some other mechanism to minimize erosion.

Commercially Valuable Mineral Deposits

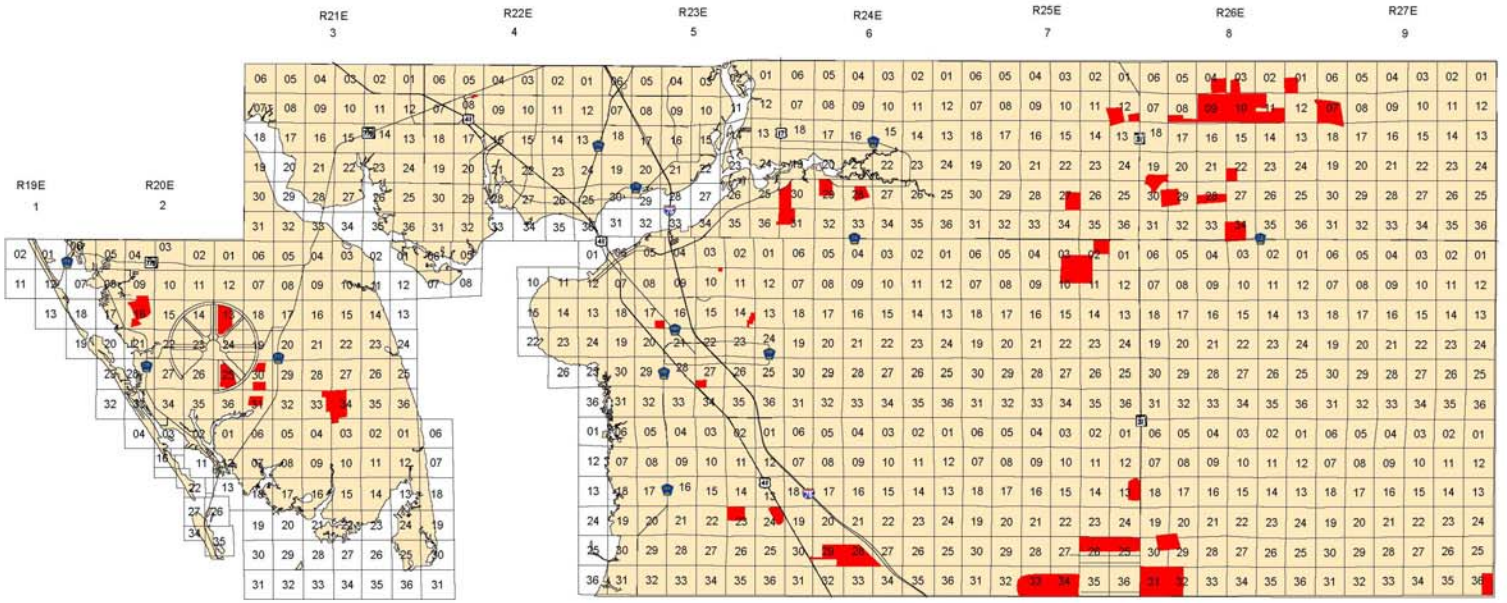
As illustrated by Map 3.18, Charlotte County has several mining operations in operation even though there are few known commercially valuable mineral deposits. Sand, shell, and marl deposits occur in the northeastern portion of the County and throughout the central part of the Cape Haze peninsula. Several commercial lime rock quarries are located on Cook Brown Road, just south of the Babcock/Webb Wildlife Management Area. Likewise, sand and shell quarries, located on the Cape Haze Peninsula and in the East County Planning District, are used to supply sand and shell for the production of asphalt. Much of the material mined from excavation pits is used for building pads, roads, parking lots and golf courses. Excavation pits are scattered throughout the County.

Impacts associated with excavations include alteration of natural drainage patterns and, due to dewatering activities, drawdown of the local water table. When mining operations are conducted in sloughs that constitute natural flowways, or in areas of heavy sheetflow, berms are often constructed around the excavation to prevent flow through that portion of the flowway. This often results in the flooding of adjacent properties as well as disruption of the natural hydrologic function of the subject flowway as hydrologically connected wetlands.

When excavation activities in flowways are unavoidable, the hydrologic function of the flowway and connected wetlands should be maintained through the construction of channel and water control structures (weirs, dikes, etc.) to route surface flow around the excavation and maintain

appropriate hydroperiods. When pumping and offsite disposal of groundwater is proposed to facilitate the mining operation, the impact of water table drawdown on nearby wells, water bodies and wetlands should be evaluated and monitored, if impacts resulting from the operation of excavations are anticipated. Through the Environmental Resource Permitting program, the setbacks established by the water management districts from surface waters are calculated to minimize drawdown. The Charlotte County Excavation Ordinance helps minimize the detrimental effects of mining and excavation activities by establishing standards for the location and operation of excavations and requiring reclamation plans.

Map 3.18 Commercially Permitted Excavation Sites



Charlotte County Community Development
Land Information Section
Draft Date: 10/06
Located: gig6\comp_plan_NEW\
Chapter_3\excavation_sites.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: Charlotte County
Land Developement

Excavation Sites

Scale 1:205,920
1 inch = 3.25 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Apparently, no significant phosphate deposits have been found in Charlotte County. That phosphate which is present is disseminated within the minable formations and cannot be profitably recovered at the present time (Calver, 1957). Florida's main phosphate mining operations are centered around the extensive deposits in and around Polk County - many of which are concentrated along the Peace River, which flows directly into Charlotte Harbor. State mining regulations have been developed and strengthened over the years and have resulted in decreased overall impacts, although dangers to the environment remain, as exemplified by the proposed Consolidated Minerals, Incorporated's (CMI) proposed phosphate mine for which CMI sought approval in the early 1990's.

Between 1990 and 1993, the citizens of Charlotte County and the Board of County Commissioners fought the issuance of FDER and SWFWMD permits for a 17,709 acre industrial complex located next to Horse Creek upstream of the Peace River Water plant which supplies potable water to a significant portion of urbanized Charlotte County. The major components of the complex would have included a power plant, phosphate mine, phosphate processing plant, a sulfur recovery plant, and a Portland cement manufacturing facility. Among the many areas of concern associated with the proposed facility, Charlotte County was (and remains) particularly sensitive to the following:

- the potential contamination of the County's primary water supply;
- loss of watershed area;
- the threat to Charlotte Harbor in the event the slime ponds fail;
- the amount of water necessary for processing and power production; and
- the disposal of waste water resulting from the facility's multiple components.

Due to errors in the permit applications, changing market conditions (most especially the lack of interest for 'excess' electricity generated by the power plant) and mounting opposition, CMI was allowed to withdraw its permit applications.

Although not exactly the same project, the threat of impacts from development, whether an industrial park or mining operations, remain a major concern to Charlotte County and the Peace River. As a key component of a the drinking water supply for 150,000 people, a support system for dozens of species of wildlife and plants and a key link in the health of one of the state's most valuable and scenic harbors, the Peace River and the National Charlotte Harbor Estuary need to be monitored. The Charlotte County Board of Commissioners set out to create a plan to assure Charlotte County and Peace River watershed are protected from the risks of phosphate mining. The plan set out to study the affects of phosphate mining on the Peace River watershed. The plan aims to create a management method for mining that does not affect the environment. Stated goals include protecting Horse Creek from adverse effects of phosphate mining. Peace River Water Authority needs to set minimum flow levels established by the Southwest Florida Water Management District. This would prevent water levels from dropping further. Lastly, the plan set out to receive the assurance that phosphate mining companies will pay for restoration after unavoidable accidents occur. After years of litigation Plans such as the Charlotte County plan are important in creating public trust that phosphate mining, though a risk, can be controlled in a manner which minimizes its negative affect on the environment and people.

E. Agricultural Lands

The Natural Resource Conservation Service (NRCS) classifies prime farmlands as:

> [L]and that has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops, and is also available for these uses (that is, it is not wetland or built up urban land). It has the soil quality, growing season, and moisture supply needed to produce sustained high crop yields under treatment and management. (IFAS, 1982)

According to the NRCS (Howard Yamataki, personal communication, 1996), there are no prime farmlands in Charlotte County. However, there are areas which constitute farmlands of local importance which occur in the eastern portions of Charlotte County, most notably those areas used for citrus and truck farming.

Charlotte County's agricultural base rests primarily upon three activities - cattle, citriculture, and row crops. Compared to north Florida and the timber industry of the Southeastern United States, the commercial harvest of forest lands is almost non-existent in Charlotte County. According to the 2005 Florida Statistical Abstract, the total acreage in farms in Charlotte County was 191,529 acres. That number includes 41,928 acres in cropland, 96,158 acres in woodland, 35,374 acres in pastureland, and 18,069 acres listed as "other".

Intensive Agriculture

Citrus groves and vegetable crops represent the most intensive agricultural practices in the county. The most common row crops grown include tomatoes, cucumbers, peppers, squash, cabbage, watermelons, strawberries, and cantaloupe. For some crops, after one or more years of cultivation in the same field, nematode infestation becomes so severe that the field must be abandoned and new native range or woodland cleared for crops. Some abandoned cropland is converted into improved pasture for cattle.

Intensive agricultural practices generally do not lend themselves to maintaining native habitat functions. Additionally, croplands require extensive draining of the land and, in some cases, lowering of the water table. Intensive agriculture also requires the use of substantial quantities of water for irrigation, and often uses large amounts of fertilizers and pesticides which, if used improperly, may threaten water quality.

Since l988, market forces have resulted in the conversion of large tracts of land (such as the 10,000-acre Evans Properties parcel, 2,000 acres of which have been dedicated to citrus production) from less intensive uses to citriculture. Since 1988, the year after the most devastating freeze in Florida history, technology has reduced the time needed to bring planted citrus groves into production to three to five years.

The freezes of the l980s (the last occurring in 1989) have driven production southward. Nearby Hendry County has replaced Polk as the top citrus producing county in Florida (and the nation).

The importance of this geographical shift is further reflected in the creation of the Gulf Citrus designation, giving fruit grown in Southwest Florida equal marketing status with the better know Indian River and Ridge products. In spite of these trends, there is some indication that the southern migration of citriculture may be slowing down.

The 1995 Florida Statistical Abstract indicated that as of January, 1994, a total of 19,995 acres was devoted to citriculture. . In 2000, the acreage had increased to 21,478 acres and by 2004 the acreage had slightly decreased to 20,183 acres. Table 3.17 below, compares the acreage devoted to farming of specific fruits such as oranges and grapefruits between 1995 and 2004.

Table 3.17
Charlotte County Citrus Acreage by Fruit 1995-2004

Fruit	1995	2000	2004
Orange	14,781	16,936	16,291
Grapefruit	3,655	3,090	2,846
Specialty Fruit	1,559	1,452	1,046
Total	**19,995**	**21,478**	**20,183**

Source: Florida Statistical Abstract, 1995, 2000 and 2005.

Forest Lands

In 1982, the SCS, now known as the Natural Resource Conservation Service (NRCS), estimated a total of 13,700 acres of commercial forest land in Charlotte County (SCS, 1985). However, because of the statistical nature of the SCS inventory and the difficulty of distinguishing between managed and unmanaged native woodlands on aerial photographs, the SCS estimate was believed to be low. Forestry practices in the County are not intensive. Usually, woodland management relies on natural regeneration following a harvest, with relatively long rotations between harvests (i.e. 40-80 years). The major tree crop is South Florida Slash Pine, although some cypress has been harvested in the past.

In 1993, a total of 1,190 cords of softwood (pulpwood) was harvested in Charlotte County. There is little incentive for any but the largest landowners to harvest trees, since the property tax structure is such that woodlands are assessed at the same rate as improved pasture. It is not economically feasible to harvest small acreage of woodlands on relatively long rotations while being assessed at a higher tax rate than that for native range. Offering incentives, such as property tax assessments more in line with low intensity forestry practices, or special assessments in exchange for conservation or recreational easements, would encourage landowners to maintain their property as forested lands, rather than converting it to a more profitable but intense land use. Some of the overall benefits of maintaining large areas of forested land in the County include:

- maintaining a low impact land use that does not create a high demand on public services;
- maintaining the quality of air, water and wildlife habitat; and
- providing for future outdoor recreational opportunities

Rangeland

By definition, rangeland is land on which the natural vegetation is grasses, forbs or shrubs suitable for gazing or browsing (SCS, 1984). Rangeland includes pine flatwoods, dry prairie, wet prairie and sloughs. Because pine flatwoods are the dominant upland native habitat, sparse flatwoods with a grassy understory are probably the most common type of native range used to graze cattle. The l995 Florida Statistical Abstract indicates that 160,603 acres were devoted to range or pasture land in Charlotte County. The Natural Resources Conservation Service has estimated that only 15% of Charlotte County's natural vegetative communities are in excellent condition for use as rangeland, and about 60% are rated fair or poor. Improved pasture (drained, cleared and planted with grasses) has a greater productivity per acre than most native rangeland, but pastureland is also assessed at a higher property tax rate than rangeland. Thus, there is a financial incentive to keep lands in native range. While heavy grazing in native range can significantly alter the vegetation of a particular habitat, native rangeland maintains more habitat functions and values than do more intensive forms of agriculture.

F. Alternative Methods of Land Preservation

Concern over the preservation of native habitats on privately-owned lands for the purpose of supporting viable populations of wildlife continues as the fiscal and political limitations of government land acquisition programs become more apparent, and as more and more naturally vegetated areas are cleared for uses more intensive than native range. In its 1994 report entitled *Closing the Gaps in Florida's Wildlife Habitat Conservation System,* the Florida Game and Fresh Water Fish Commission identifies 4.82 million privately owned acres as Strategic Habitat Conservation Areas essential to meet the long-term conservation needs for a number of plant and animal species. As pointed out in the report:

> It seems unlikely that all lands within the identified Strategic Habitat Conservation Areas will ever come under State ownership, even if all the landowners were willing to sell. Since 1974, the State has spent an average of $1,182 per acre to purchase land for recreation, conservation, and historical preservation. At this rate, $5.7 billion would be needed to purchase all 4.82 million acres within the Strategic Habitat Conservation Areas, much more than the $3.2 billion authorized under Preservation 2000. Fortunately, many of the lands within the Strategic Habitat Conservation Areas are in low intensity uses, such as silviculture and rangeland, that are compatible with the habitat conservation needs of many species. In fact, the management of wildlife habitat on many private lands has been excellent, and conservation measures should focus on maintaining existing land uses on private lands through incentives such as tax breaks, conservation easements, or cooperative agreements with landowners. These techniques have the potential to provide adequate protection without the need for fee simple acquisition by the State.

Protecting wildlife habitat through measures other than fee simple purchase is examined in numerous publications. Looking at this issue on a regional level Charlotte County shares the Regional Planning Council's view on protecting natural resources. Other publications focus on measures intended to keep land in private ownership and on the tax rolls (a major concern, particularly for poorer or undeveloped counties with substantial areas in public ownership). The

other than fee simple methods (which does also reference acquisition) may be divided into three general categories: those dealing with development rights, payment and credit programs, and land management techniques.

Development Rights
These mechanisms involve the sale, transfer, donation or lease of the development rights associated with a piece of property. A key component of all these approaches is that the landowners retain title to the land, may restrict public access, and have the ability to sell, give, or transfer their land as they choose. Charlotte County adopted a Transfer of Development Rights Ordinance in 1994. It was revised in 2001 and again in 2004; it is now known as the Transfer of Development Units Ordinance.

Payment and Credit Programs
Under these programs, property owners receive financial compensation for maintaining or restoring native habitats on their lands, or for allowing potentially damaging species (typically large predators) to utilize their property. Such compensation may be in form of:

- cost-sharing for management activities;
- one-time, lump sum payments for habitat set-asides which are typically placed under some form of easement to a qualified entity;
- multiple payments, spaced over time (typically annually), paid to the property owner to maintain areas in a native condition (again, such areas are typically placed under some form of easement);
- compensation for damage done by wildlife species (e.g., payment for livestock lost to predators); or
- market-based incentive programs in which new, environmentally sensitive products or services are promoted by government entities or business associations (for example Chambers of Commerce) to give the innovative property owner a marketing advantage.

Interestingly, the Wilderness Adventure operated by the Babcock Florida Company at the Crescent B Ranch in eastern Charlotte County is used in the *Field Manual* as an example of an innovative business which turns a profit for the property owner while protecting native habitats.

Land Management Techniques
The common denominator of these techniques is that natural resource management becomes an integral part of the management strategy for the overall property. Compensation, in a variety of forms, may be available depending upon the nature of the program and the social environment (i.e., governmental, political, etc.) in which it occurs. Whole farm plans, habitat conservation plans (an approach authorized under the Endangered Species Act), habitat conservation agreements, voluntary management plans, and stewardship recognition programs all fall under this heading.

Land Use Designations

Resource Conservation areas

The Resource Conservation future land use category discussed in the Future Land Use Element lays the foundation for a land management approach to habitat conservation in Charlotte County similar to those discussed in the AFT/FFWCC publications. Areas receiving this designation are currently subject to restrictive zoning and land use classifications intended to prohibit activities which would negatively impact natural resources. This regulatory approach is commonly used throughout Florida and most of the nation. While it is relatively simple, the inflexible nature of this approach, coupled with the resentment it tends to engender among affected property owners, limits its effectiveness.

Habitat Conservation Plans

In an effort to resolve conflicts between development/property rights and the interests of preserving listed wildlife species, the Endangered Species Act (ESA) authorizes the development of Habitat Conservation Plans (HCPs) which establish guidelines for the long-term maintenance of viable populations of targeted species. Through an HCP, areas determined to be biologically essential to the survival of a species are targeted for preservation and management, either through fee simple acquisition or any of the other mechanisms discussed above, while other areas, which may contain the target species but are too small or too isolated to remain viable over time (or which contain only declining, marginal habitat which cannot be restored and managed for the targeted species) are released for development through the ESA's incidental take permitting process as impacts would be mitigated in the preserved areas. Thus, an HCP brings an element of predictability to the County's development review and permitting processes, which is an important consideration for investors and developers.

The USFWS assists local governments with preparation of HCPs and approves final draft documents. In addition to meeting the requirements of the ESA for establishing conservation measures for targeted species, developing HCPs for target species will:

- reduce the amount of time associated with conventional permitting procedures;
- reduce mitigation costs for individual developers by designating sanctuaries for preservation (this pre-identifies mitigation areas) and areas for incidental take;
- provide habitat for additional plant and animal species (listed as well as non-listed) within the preserve areas;
- ensure that Charlotte County's residents and visitors continue to have an opportunity to enjoy native Florida; and
- address concerns expressed by the citizen input including such as those with the Charlotte Assembly.

The first species for which an HCP has been developed is the Florida scrub-jay (*Aphelocoma coerulescens*) which is listed by both the FFWCC and USFWS as a threatened species. As discussed in greater detail in the Listed Species section, below, the dry, sandy habitats necessary for this species' survival are well suited to a number of intensive uses, including urban development and citriculture. If sufficient scrub habitats are not protected, this species may face

local extirpation. The same may be said of other species, such as the red-cockaded woodpecker, Florida black bear, woodstorks, and others which should also be considered candidates for HCPs.

County staff initiated a county wide HCP for impacts related to the Florida Scrub Jay in 2004. The Board of County Commission voted not to pursue a county wide plan, and voted to pursue the HCP on individual County CIP projects. Staff submitted a HCP in December 2004 to FFWCC and USFWS for four County capital improvement projects (Edgewater Corridor expansion, Murdock Village, Winchester Boulevard expansion, and Solomon Drive). USFWS approved the HCP at the District level, and has forwarded it to the USFWS regional office in August 2006 for further review. It is anticipated that final approval will be received by January 2007.

G. Wildlife and Native Communities

Charlotte County is endowed with a great diversity of native habitats ranging from coastal dunelands, a major estuary and river system, to swamps, pine flatwoods and oak scrub. These habitats are an important resource 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.

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 (as well as all of Florida) 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.

Wildlife Linkages and Natural Preserve Design

When natural lands are set aside as reserves or conservation areas, their effectiveness in that role is dependent upon a number of interrelated factors. These include the diversity of habitats found on the subject property; the diversity of plant and animal species occurring there; and the nature and impact of surrounding land uses. A low diversity of habitats will necessarily limit species diversity to those species which naturally occur in the represented habitats. For some species (for example frogs, sea turtles, etc.), habitat requirements vary for different stages in the species' life cycle. If the habitat needs of these stages are not met on a site, the species probably will not persist there, or may need access to other areas where the necessary habitat components may be found. Thus, habitat diversity and size are important factors when considering the establishment of natural areas intended as wildlife preserves. The preserve's proximity to intensive land uses

may also affect the number and composition of species found on site as wildlife species have differing levels of tolerance for human activities.

As reserve size increases, habitat and species diversity generally increase, and development impacts are reduced to the edge areas, which buffer the interior. Natural reserve areas, whether in public or private ownership, should therefore be as large as possible. Some of Charlotte County's existing preserves fit this criterion. Unfortunately, most of these areas, particularly in western Charlotte County, are surrounded by land uses which are not generally conducive to the long-term maintenance of wildlife species. The establishment of preserves under these circumstances results in a patchwork of small, fragmented natural areas which are isolated from one another by a matrix of disturbed and developed land. The small populations of wildlife typically found within such small, isolated sites are particularly susceptible to local extinction as a result of natural catastrophes such as fire, drought, flooding, and infectious disease. Furthermore, fire suppression, a common occurrence in areas surrounded by urbanization, results in a change in habitat characteristic that does not favor desirable, native species. Isolation in small groups also increases rates of inbreeding, which reduces overall genetic fitness and often produces infertile offspring.

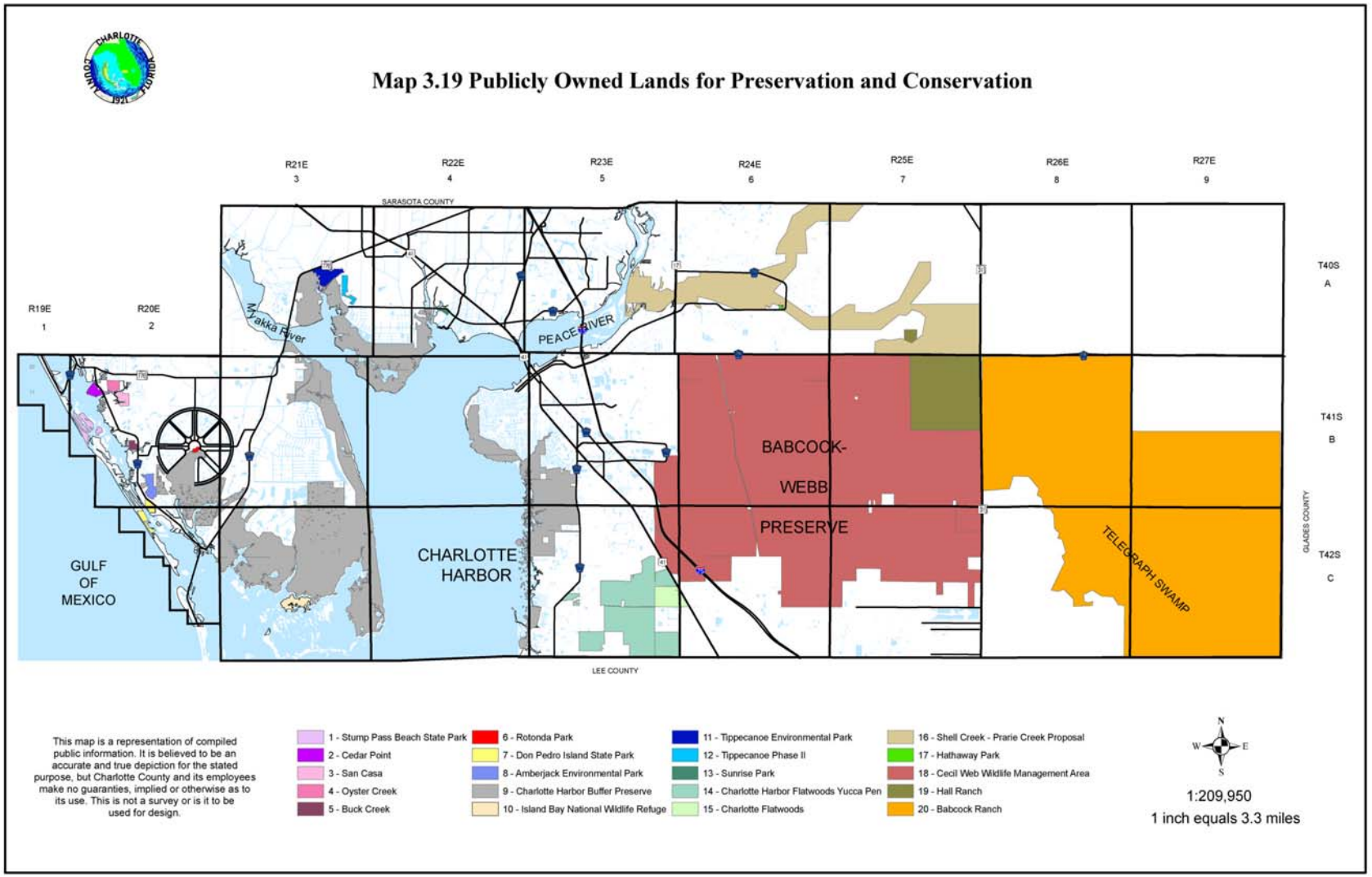
A possible solution to this problem is to establish linkages between natural or semi-natural lands in order to provide greater rates of genetic exchange between populations. With proper management, these linkages are likely to increase fitness and potential for long-term survivability; provide avenues for escape from fire or other catastrophic events; and facilitates recolonization following local extinctions; and provides access to a greater variety of habitats. This ultimately increases native species diversity.

Linkage zones, areas between existing preservation areas, should be identified and retained when setting aside natural areas as reserves, or during the design of large projects such as developments of regional impact. These zones may be centered on linkages of convenience, such as abandoned railroad rights-of-way, public easements, or natural connections, such as forested riparian corridors. The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission (FFWCC) has identified a system of wildlife corridors which would link Southwest Florida's existing preserves. The Charlotte County portion of the system was incorporated as part of the proposed Conservation Overlay District. Though never implemented, the Overlay has been a useful land acquisition planning tool, and has helped the County's Metropolitan Planning Organization's highway planning efforts.

The FFWCC developed a series of recommended Strategic Habitat Conservation Areas which are discussed in great detail in *Closing the Gaps in Florida's Wildlife Habitat Conservation System* (FWC, 1994). These areas are also referred to in the publication *Habitat Conservation Needs of Rare and Imperiled Wildlife in Florida* (FFWCC 2000). It was hoped that, through the acquisition of carefully considered parcels of land coupled with the development of Resource Conservation Areas, Habitat Conservation Plans, and other less than fee simple measures, Charlotte County would be able to fully participate in this State-wide effort to preserve the most important segments of Florida's natural heritage. Map 3.19 identifies those areas that are now owned and managed by the State, County or other agencies. The County remains committed to

continue to participate 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.

The following is a brief discussion of Charlotte County's significant natural habitat areas which function as reserves. Charlotte County's good fortune in having such resources is a reflection of the wisdom of the State's land acquisition efforts as well as the concerted efforts of many of the County's large landowners.


Map 3.19 Publicly Owned Lands for Preservation and Conservation
R21E
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R22E
4
R23E
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R24E
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R25E
7
R26E
8
R27E
9
SARASOTA COUNTY
R19E
1
R20E
2
T40S
A
T41S
B
T42S
C
Myakka River
PEACE RIVER
BABCOCK-
WEBB
PRESERVE
TELEGRAPH SWAMP
GLADES COUNTY
GULF
OF
MEXICO
CHARLOTTE
HARBOR
LEE COUNTY
This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.
1 - Stump Pass Beach State Park
2 - Cedar Point
3 - San Casa
4 - Oyster Creek
5 - Buck Creek
6 - Rotonda Park
7 - Don Pedro Island State Park
8 - Amberjack Environmental Park
9 - Charlotte Harbor Buffer Preserve
10 - Island Bay National Wildlife Refuge
11 - Tippecanoe Environmental Park
12 - Tippecanoe Phase II
13 - Sunrise Park
14 - Charlotte Harbor Flatwoods Yucca Pen
15 - Charlotte Flatwoods
16 - Shell Creek - Prarie Creek Proposal
17 - Hathaway Park
18 - Cecil Web Wildlife Management Area
19 - Hall Ranch
20 - Babcock Ranch
N
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1:209,950
1 inch equals 3.3 miles

Publicly Owned Natural Reserves

Charlotte County has several significant tracts of publicly owned land that serve as natural reserves. As shown by Map 3.19, these include state and county parks, wildlife management areas, and national wildlife refuges. Table 3.18, below, serves as the legend for Map 3.19 and provides the names and acquisition programs for the various acquisition projects.

Table 3.18
Publicly Owned Lands for Preservation and Conservation

Project Number on Map 3.19	Name	Acres	Land Acquisition Program	Status
1	Stump Pass State Park	295±	N.A.	Complete
2	Cedar Point Environmental Park	115±	Purchase originally completed by Charlotte County; outparcels submitted to Florida Communities Trust for Shared Acquisition	Complete
3	San Casa	136±	Florida Communities Trust	Complete
4	Oyster Creek	141±	Florida Communities Trust	Complete
5	Buck Creek	68±	Request for funding will be submitted to Florida Communities Trust	Complete
6	Rotonda Park	12± of scrub habitat	none	Complete
7	Don Pedro Island State Park	203±	Acquired by the Florida Department of Natural Resources through the Save Our Coast Program	Complete
8	Amberjack Environmental Park	223±	Florida Communities Trust for Shared Acquisition; Trust for Public Land Owns Interest in Title	Complete
9	Charlotte Harbor Buffer Preserve	28,600±	Acquisition began under Environmentally Endangered Lands program and continues under Conservation and Recreation Lands and Save Our Rivers	Substantially complete and ongoing

Table 3.18 Publicly Owned Lands for Preservation and Conservation				
Project Number on Map 3.19	**Name**	**Acres**	**Land Acquisition Program**	**Status**
10	Island Bay National Wildlife Refuge	20	N.A.	Established in 1908 by Federal Government
11	Tippecanoe Environmental Park	448±	Florida Communities Trust	Complete in November 1995
12	Tippecanoe Scrub Environmental Park (Phase II)	150±	Florida Communities Trust	Should be completed by late 2006
13	Sunrise Park	40	Florida Communities Trust	Complete
14	Charlotte Harbor Flatwoods (Yucca Pen)	5,350±	Conservation and Recreation Lands	Complete
15	Charlotte Flatwoods	600±	Florida Communities Trust and Conservation and Recreation Lands	Complete
16	Shell Creek/Prairie Creek Proposal	13,600±	Save Our Rivers (Southwest Florida Water Management District)	Approved for Acquisition, 610 acres acquired in Charlotte County
17	Hathaway Park	10± of scrub habitat	none	Complete
18	Fred C. Babcock - Cecil M. Webb Wildlife Management Area	67,000±	Acquired using Pittman-Robertson (Federal) Funds in 1940's	Complete, though additional acreage is added through inholdings and additions
19	Hall Ranch Project	5,800±	Submitted to Conservation and Recreation Lands in 1996 cycle	no land yet acquired
20	Babcock Ranch	72,000± (total is	Florida Communities Trust, Fish and Wildlife Conservation	Acquisition completed,

Table 3.18 Publicly Owned Lands for Preservation and Conservation				
Project Number on Map 3.19	**Name**	**Acres**	**Land Acquisition Program**	**Status**
		74,000±)	Commission, Florida Department of Agriculture and Consumer Services, Lee County	payment will be complete in July 2009

Sources: Environmental & Extension Services, Natural Resources Division

Island Bay National Wildlife Refuge

This refuge was established in 1908 and is located at the southern tip of the Cape Haze Peninsula. It is composed of six separate tracts located on mangrove islands and totaling twenty acres. The John Quiet and Cash Mounds, middens left behind by the area's original native inhabitants, are included in the refuge. In 1973, Island Bay Refuge was declared a Wilderness Area. The vegetation of the islands is predominately red and black mangroves, sea grape buttonwood, cabbage palms, rubber trees, gumbo limbo and saw palmetto. The islands serve as feeding and loafing sites for shorebirds, gulls and terns.

Fred C. Babcock - Cecil M. Webb Wildlife Management Area (the Webb)

The bulk of this 67,000 acre tract was purchased from the Babcock Florida Company in 1941 using Pittman-Robertson funds (Federal Aid Project) and later named in honor of Cecil M. Webb who served as Commissioner of the Florida Game and Fresh Water Fish Commission, the predecessor agency of the Florida Fish and Wildlife Conservation Commission, from 1948 to 1953. In 1995, Fred C. Babcock's name was added to the management area in recognition of Mr. Babcock's long-standing, cooperative relationship with the FFWCC. The Webb is located in central and south-central Charlotte County and managed by the FFWCC for hunting, fishing and general outdoor use by the public. Surrounded by residential development, citrus groves, and improved pasture, Babcock-Webb is among the last undeveloped expanses of hydric (wet) pine flatwoods in southwest Florida. The dominant mix of habitats is slash pine flatwood interspersed with wet prairies, marshes and sloughs. Improved pasture, dry prairie, mesic hammocks, and cabbage palm hammocks are also common habitats within the Webb area. A controlled burning program serves to maintain desirable habitat conditions and to support diverse plant and wildlife populations. The Webb provides critical habitat for several threatened and endangered species, including the red-cockaded woodpecker and the sandhill crane, and may one day be incorporated into the recovery plan for the Florida panther.

Charlotte Harbor Buffer Preserve

The Charlotte Harbor Buffer Preserve (formerly known as the Charlotte Harbor State Reserve) forms a protective ring of State-owned lands around Charlotte Harbor which extends from Matlacha Pass (in Lee County) along the eastern, western, and northern shore lines of the harbor, down to the southern tip of the Cape Haze Peninsula. The lands included within the preserve were purchased by the State of Florida through the Environmentally Endangered Lands (EEL) and Conservation and Recreation Lands (CARL) programs. As its name implies, one of the

Charlotte Harbor Buffer Preserve's main functions is to protect Charlotte Harbor against anthropogenic impacts, most particularly those associated with development activities.

The Charlotte Harbor Environmental Center (CHEC), Inc., a public/private, not-for-profit organization operates a 20 acre complex within the Buffer Preserve south of Punta Gorda and west of Burnt Store Road. Facilities at the CHEC site include an environmental museum, classrooms, activities shelter, meeting room, and offices. The park also has a lengthy trail system offering access to various habitat types. This excellent facility serves the residents of the County by promoting environmental awareness, providing education programs, bird watching and photography, as well as helping preserve a significant stand of native habitat. The Center provides over 20 different educational programs, has 7 major research projects, manages 8 sensitive lands and provides a total of 8+ miles of hiking trail and other recreational opportunities to the community

The Cape Haze project, it encompasses approximately 5,000 acres on the Cape Haze Peninsula and includes a large percentage of upland habitats which are considered developable under existing permitting programs. These habitats, including tropical hardwood hammock, scrub, and scrubby flatwoods significantly increase the diversity of the Buffer Preserve to which it is partially adjacent.

The dominant habitats in the preserve area and additions include mangrove swamp and mangrove islands, tidal creeks, tidal marsh, high salt marsh, salt flats and some transitional (fresh to brackish) wetlands. The preserve also contains some upland areas, of which pine flatwoods are the dominant community. In addition, there are scattered areas of hardwood and palm hammock, scrub habitat, tropical hardwood hammock, and Indian mounds within the preserve's boundaries, particularly within the portion located on the Cape Haze Peninsula. These habitats are utilized by a number of listed species including sandhill crane, bald eagle, southern mink, and Florida scrub jay, while the West Indian manatee is found throughout the shallow waters to which the Preserve is adjacent.

Stump Pass Beach State Park

Commonly referred to as "Stump Pass Beach", this 213 acre tract was acquired by the State in 1971 and encompasses the southern tip of Manasota Key, and includes Peterson and Whiddon Islands which lie immediately east of the recreation area within the Lemon Bay Aquatic Preserve. The State Recreation Area is bounded by Lemon Bay on the east, privately-owned, developed property on the north, the Gulf of Mexico to the west, and Stump Pass to the south. Though the dominant habitat found within the Recreation Area may be described as coastal strand, a serious infestation of exotic species (notably Australian Pine) has somewhat degraded the natural value of the area. Other habitats found within the Recreation Area include a mangrove fringe which occurs along the Lemon Bay side of the property, and dune and beach areas on the Gulf side.

Stump Pass State Park provides habitat for a number of listed species, including marine turtles which heavily utilize the area during nesting season. Because the property is in public ownership and not developed, the problem of beachfront lighting commonly associated with Gulf-front

development (known to cause disorientation in turtle hatchlings and to discourage female turtles from nesting), is significantly reduced for this segment of Charlotte County's barrier island chain. Other species which utilize the recreation area include migratory shorebirds, wading birds, raccoons, osprey, and a number of others. The waters of Lemon Bay, to which the Recreation Area is adjacent, are utilized by West Indian manatees. The subject property's public ownership helps reduce potential impacts to the manatee population by precluding development which results in loss of seagrass habitat (see discussion of seagrass habitats, below) as well as direct mortality due to boats and water craft.

Don Pedro State Park

Acquired by the State of Florida through the Save Our Coast (SOC) program, Don Pedro State Park encompasses approximately 140 acres of the Don Pedro Island Chain, just north of Little Gasparilla Island. Habitats within the state park include coastal strand, beach, tidal lagoon and fringing mangrove swamp habitats. Though Australian pines have become established within the park, the infestation is not as extensive as that which has occurred on the Stump Pass Beach State Recreation area. Charlotte County acquired approximately 30 additional acres which lie immediately adjacent to the Park on its north side. The same floral and faunal species which utilize Stump Pass Beach Recreation Area are also known to occur on Don Pedro Island, including nesting sea turtles. Again, because the property is not subject to residential development, the problems of beachfront lighting are substantially reduced.

Cedar Point Environmental Park

This 115 acre peninsula jutting into Lemon Bay was purchased by Charlotte County from the Trust for Public Land in three increments totaling $3.2 million using a special, limited duration *ad valorem* assessment. Habitats on site include pine flatwoods, scrubby pine flatwoods, mangrove forests, and disturbed lands (spoil areas dominated by exotic species). Using an ecological assessment developed by the FFWCC (which was funded by the Lemon Bay Conservancy) as a starting point, Cedar Point has been developed as a passive park with trails, educational displays, and a nature center. The County has entered into a contract with the Charlotte Harbor Environmental Center, Inc., which will develop and manage the park.

The habitats of Cedar Point and its surrounding waters are used by a number of listed animal species, including the bald eagle (there are four bald eagle nests on Cedar Point), little blue heron, reddish egret, snowy egret, Florida scrub jay, gopher tortoise, eastern indigo snake, manatees, and a variety of listed plant species.

Tippecanoe Environmental Park

With financial assistance from the Florida Communities Trust (a Preservation 2000 funded land acquisition program administered by the Department of Community Affairs), Charlotte County purchased 350 acres of ecologically valuable scrub habitats, pine flatwoods, tidal marshes, and freshwater wetlands abutting its namesake, Tippecanoe Bay, which is part of the Charlotte Harbor Aquatic Preserve. This acquisition was closed on November 2, 1995 at a cost of approximately $750,000, of which the County paid $350,000. The subject property, which was originally managed by Charlotte Harbor Environmental Center, Inc., (CHEC) is now managed by Natural Resources Division/Environmental & Extension Services. The Park provides habitat

for an estimated 5 clans of Florida scrub jays (a Threatened species) numerous gopher tortoises (Species of Special Concern), and a host of other wildlife species. A midden mound left by the area's prehistoric inhabitants also occurs within the lands purchased by the County.

An ecologically valuable purchase in its own right, the County's ownership and management of the Tippecanoe property complements the State's efforts to acquire and manage land to protect Charlotte Harbor. It also presents excellent outdoor recreational and educational opportunities.

Tippecanoe Environmental Park (Phase II)), which is located in an area west of Flamingo Blvd., was designed and is being implemented as a pre-mitigation area for Florida scrub-jay impacts that will be incurred during the widening of Edgewater Boulevard (Flamingo Corridor). The 214 acre project is partially funded (50%) by the Florida Communities Trust and will provide all of the required Florida scrub-jay mitigation for the Edgewater Boulevard expansion (between 776 and Edgewater). The site contains scrub, scrubby flatwoods, pine flatwoods, isolated wetlands, and a disturbed berm and is adjacent to Tippecanoe Scrub Environmental Park (Phase I) and the Port Charlotte Harbor Management Unit of the Charlotte Harbor Buffer Preserve. The site hosts Florida scrub-jays, gopher tortoise, listed wading birds, and may host Florida mice, gopher frogs and Eastern indigo snakes.

The Charlotte Harbor Flatwoods (Yucca Pen Slough)
Born of a joint initiative of the Charlotte County Planning Department, the Florida Game and Fresh Water Fish Commission, now known as the Florida Fish and Wildlife Conservation Commission (FFWCC), and the (now defunct) Lee County Division of Environmental Sciences, this CARL project first made it onto the priority list in 1991 where it debuted at number twenty. In early 1995, the Division of State Lands acquired the first 3,500 acres at a cost of approximately $8.25 million.

Due to its size and location (situated between Punta Gorda and Cape Coral), the Charlotte Harbor Flatwoods serves as an urban sprawl stopper. The Flatwoods is managed by the FFWCC as an addition to the Fred C. Babcock-Cecil M. Webb Wildlife Management Area to which it is adjacent. In fact, the Flatwoods' "official" name is the "Yucca Pen Cypress Unit of the Fred C. Babcock-Cecil M. Webb Wildlife Management Area".

The Yucca Pen Slough is an extensive slough system that lies between Charlotte Harbor and U.S. 41 south of Punta Gorda. It is composed of a network of freshwater swamps, marshes, and wet prairies interconnected by a network of sloughs which largely occur in hydric pine flatwoods. Though Yucca Pen Slough is bisected by Zemel Road, its northern and southern portions are hydrologically connected by a series of culverts. The slough ultimately drains into Charlotte Harbor, passing under Burnt Store Road through a series of culverts and ditches.

The Yucca Pen Slough is within the boundary of the Charlotte Harbor Flatwoods Florida Forever project (see above) which straddles the Lee/Charlotte line. Encompassing approximately 23,700 acres, the Flatwoods are a Priority B project of the Florida Forever land acquisition program (and its predecessor Preservation 2000/CARL) through which approximately 14,380 acres have been acquired to date. Allowed uses include passive recreation, hunting, and other activities

consistent with wildlife management practices. Camping is allowed on the adjacent Babcock-Webb Wildlife Management Area. The Charlotte Harbor Flatwoods form a critical link between the State's coast and its interior. While the Flatwoods are bounded on the east by the Babcock Webb Wildlife Management Area, they are bounded on the west by State-owned lands managed by the Department of Environmental Protection as part of the Charlotte Harbor Buffer Preserve which, as its name implies, is contiguous with the Charlotte Harbor Aquatic Preserve. Charlotte Harbor is in turn connected to the Gulf of Mexico through Boca Grande Pass. Thus, it is possible to move from the open waters of the Gulf and Harbor, through the mangrove forests of the buffer preserve, through the Flatwoods, and onto the pine prairies of the Babcock-Webb WMA. This corridor became more remarkable when the State completed its purchase of the Babcock Ranch which will extend the corridor to the Fisheating Creek Wildlife Management Area in Glades County, and thence to Lake Okeechobee.

Babcock Ranch

The Babcock Florida Company owned and managed the Telegraph Cypress Swamp which is located in southeastern Charlotte County. Telegraph Swamp represents over 7,000 acres of contiguous swamp and marsh habitats which drain generally southward, eventually into the Caloosahatchee River. Currently, Telegraph Swamp is maintained largely for conversation purposes, including water management, ecotourism (Babcock Wilderness Adventuresd), hunting, and fishing. The Telegraph Cypress Swamp provides excellent habitat for game species such as deer and turkey, as well as non-game species. It is an important area for wading birds and supports rookeries for wood storks, great egrets, white ibis, great blue herons and little blue herons (Barnett, et. al., 1980). Telegraph Swamp has been designated as an Outstanding National Resource Water.

Telegraph Swamp occurs within a water management district which bears its name "the Telegraph Cypress Water Management District (TCWMD)" which was created pursuant to Chapter 268, *FS.* The TCWMD encompasses the entire 90,000 Babcock Ranch, and was created primarily to give the Babcock Florida Company greater control of its water resources as well as latitude in its activation or de-activation of farm fields. Though somewhat autonomous, the TCWMD is within the South Florida Water Management District (SFWMD) which exercises oversight authority of its operations. The Florida Babcock Company, Sid Kitson & Partners, LLC and the State of Florida entered into unprecedented negotiations in 2005 to preserve 74,000 acres (Charlotte and Lee County) to the State of Florida in July 2006. The remaining 16,000 acres (13,686 acres in Charlotte County) is slated to be developed with a town center and surrounding villages.

The Shell Creek and Prairie Creek Corridor

The corridor bordering Shell and Prairie Creeks is characterized by a variety of habitat types, including willow and cypress strands, cabbage palm and oak hammocks, and, in the Washington Loop Road area (C.R. 764), by scrub communities including sand pine scrub, and oak/hickory scrub. In addition to this area's importance as wildlife habitat and potential function as a wildlife corridor, the Prairie Creek and Shell Creek drainage systems provides the primary source of potable water for the City of Punta Gorda as well as much of unincorporated Charlotte County south of the Peace River. In order to help protect this water supply, Charlotte County created a

Special Surface Water Protection Overlay District (SSWPOD, see Map 3.7) around these creeks, within which certain intensive land use activities are prohibited while all others are closely scrutinized.

Notwithstanding the SSWPOD, this important water supply would be better protected by maintaining the upland and wetland habitats which surround these creeks in a natural condition, something which the SSWPOD does not accomplish. The Southwest Florida Water Management District classifies the Shell/Prairie Creek Corridor as a "Group A" project of its Save Our Rivers program. This means that a resource evaluation report has been completed, and the project has been authorized for acquisition through the Save Our Rivers Program. Map 3.19 illustrates the areas under consideration for acquisition; to date 609 acres of the subject properties have been acquired.

Lewis M. Hall Ranch
Nine sections of land located at the southwest corner of Highway 74 and Highway 31, and four sections located north of Highway 74, comprise the Lewis M. Hall Ranch. This 8,000+ acre tract contains cypress swamp, mesic and hydric flatwood, and wet prairie habitats. The management practices of the Ranch complement those of the Webb Wildlife Management Area to which it is adjacent. As the Webb does not have any significant tracts of freshwater swamp habitat, the maintenance of the Hall Ranch in a natural condition provides for greater diversity for the area's floral and faunal species. As the cypress swamp on the Hall Ranch is part of the headwaters of Telegraph Swamp, maintenance of the Ranch affects not only the publicly owned Webb, but also the success of the Babcock Florida Company's Wilderness Adventure tours.

During the 1995/96 CARL cycle, the Hall Ranch was proposed for acquisition as an addition to the Webb. The project consists of one major owner and multiple smaller owners scattered throughout the property. Currently the project is at negotiated impasse because the owners are not willing to sell to the state. On April 6, 2001 the Council transferred this project to the "B" grouping and the Division of Land is not actively working on this project.

Gator Slough, Rainey Slough and Jack's Branch
These natural drainage features have been maintained in a relatively natural state and provide significant tracts of wildlife habitat. Gator Slough is located in south-central Charlotte County and drains much of the Cecil M. Webb Wildlife Management Area. The Slough extends south of the Webb area boundary into Lee County where it drains into the Gator Slough Canal. Gator Slough is a contiguous system of sloughs, marshes and wet prairies that drain wet pine flatwoods areas. Rainey Slough is located in north eastern Charlotte County and drains to the southeast into Fish Eating Creek. Rainey Slough is an expansive freshwater marsh that historically received surface water draining from Long Island Marsh. Jack's Branch is a hardwood swamp located in the southeastern corner of Charlotte County. Aside from their intrinsic value as wildlife habitats, these natural drainage features may also function as wildlife corridors.

The Peace River Wetlands
The wetland marshes and swamps that comprise fringing wetlands and islands in the upper portion of the Peace River function as wildlife habitat and flood plains. While many of these

wetlands are privately owned, three of the islands (Bird Key, Coon Key and Long Island) are publicly owned but under State jurisdiction. Two wading bird colonies have been established in the Peace River wetlands.

Natural Habitat Acquisition and Preservation Program

Essentially all of the publicly owned natural lands in Charlotte County have been acquired by State or Federally funded programs such as CARL, SOR, or FCT. The Florida Forever Program (previously Preservation 2000), the State of Florida's ten-year, $3 billion land acquisition funding legislation, provides the majority of the funds for these programs. Beginning in the late 1980's and continuing through this writing, Charlotte County has actively pursued funding from these and other sources for the purchase of vital natural habitats ranging from barrier island beaches to pine flatwoods. With the Babcock Ranch purchase by the State of Florida, 38% of Charlotte County is conservation land. Charlotte County owns approximately 1% of the total conservation land, while the state owns the remaining.

To aid staff in identifying properties suitable for acquisition and to help gain access to funding sources, the Board of County Commissioners established the *Environmental Lands Acquisition Advisory Council* (ELAAC) in 1991. This 17 member council consisted of representatives from civic and environmental organizations, the agricultural industry, and both Chambers of Commerce (Charlotte County and Englewood). ELAAC met it original goal of identifying potential properties for acquisition and identified potential alternative funding sources for land acquisition. ELAAC was disbanded in September 2006.

Beginning in fiscal year 1991, the Board of County Commissioners established the Land Acquisition Trust Fund to provide money for the acquisition of environmentally sensitive properties. This is based on an assessment of .05 mils and annually generates approximately $600,000. County staff recommendations to the Board of County Commissioners regarding land acquisition proposals have been funded from this source. Of the parcels designated for acquisition on Map 3.19, the ELAAC is responsible for the Tippecanoe Scrub, Amberjack Environmental Park, Amberjack Scrub, Don Pedro Island, and Fairway Woodlands proposals. Of these, Tippecanoe Scrub received Land Acquisition Trust Fund monies, while Amberjack Slough, Don Pedro Island, and others may yet receive funds from this source. Through the ELAAC, Charlotte County has been very successful in garnering Preservation 2000 funds, particularly those allocated through the Florida Communities Trust program which receives 10% (approximately $30,000,000) of each year's Preservation 2000 funds

In addition to supporting land acquisition purchases intended primarily as nature preserves, County staff has worked with the local Metropolitan Planning Organization and FDOT to develop a Rails-to-Trails project in southwestern Charlotte County. Known as the Cape Haze Pioneer Trail, the project originates at State Road 776 near Gardens of Gulf Cove and, following the abandoned Seaboard Coast Line Rail Road Right-of-Way, terminates approximately 13 miles to the south near Placida. When complete, the rail-trail will provide an excellent opportunity for both active outdoor recreation and wildlife observation. This project received funds from the Federal Intermodal Surface Transportation Efficiency Act in Fiscal Year 1999/2000.

The County should not limit its options for land acquisition to State and Federal programs. As previously discussed, it should also continue to pursue the use of techniques such as conservation easements, requiring the preservation of open space in native habitat for large scale development, transfer/purchase of development rights, or tax incentives to encourage private conservation efforts. Without such efforts, populations of wildlife in Charlotte County, which greatly contribute to the quality of life enjoined by residents and visitors, will inevitably decline, and listed species, such as the bald eagle, Florida scrub-jay, and others, may disappear entirely. For this reason, voters will be asked on November 7th, 2006 to approve the Charlotte County Conservation Program. If approved, a .20 millage increase will allow the County to bond up to 77 million dollars to purchase environmentally sensitive lands throughout the County. To continue the efforts of ELAAC, an environmental lands oversight committee will be formed to make land purchase recommendations to the BCC through funding that would be provided by the Conservation Charlotte Program, if approved.

Listed Species

Charlotte County is fortunate to host a great diversity of wildlife species, both in its preserve areas (public and private), and in areas which still retain habitat despite encroaching development. In addition to wildlife species commonly found throughout Southwest Florida, Charlotte County is home to a number of species which have been designated as endangered, threatened, or of special concern by State and Federal agencies. Charlotte County is interested in formulating a habitat conservation ordinance to further assure long range specie survival and protection of natural areas in which each species resides. Though the Federal Endangered Species Act (ESA) and Florida Wildlife Code (FFWCC) utilize different definitions, these designations may be summarized as follows:

Endangered Species: any species which is in danger of extinction throughout all or a significant portion of its range (summary from ESA);

Threatened Species: any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (summary from ESA); and

Species of Special Concern: means that the species could easily become threatened unless "appropriate protective or management techniques are initiated or maintained" (summary from FFWCC; "special concern" is a designation applied by the State of Florida and not used by the USFWS).

The discussions, below, briefly describe several listed wildlife species of particular concern to Charlotte County. A complete inventory of listed plant and animal species which are known to occur, or which are likely to occur, in Charlotte County is maintained by the Natural Resources Division of the Environmental and Extension Department.

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle is classified as threatened by both the State of Florida and the Federal government. 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. If future nesting habitat is not reserved, the eagle population of Charlotte County, though it may remain stable, stands little chance of increasing.

West Indian Manatee (*Trichecus manatus*)
Listed as endangered by both the USFWS and FFWCC, these large marine mammals are found throughout Charlotte County's surface waters. The manatee's range extends from Florida's Big Bend on the west coast, south to the Keys, and north again to the greater Jacksonville area. 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 10% of the believed statewide 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

Seasonal relative abundance appears to be highest in spring followed by summer, fall and winter in descending order (SWFRPC, 1994). Few manatees are present in the Charlotte Harbor area during December, January, and February as falling water and air temperatures presumably trigger manatee movements to winter warm water refuges at Tampa Bay or Fort Myers. The high counts occurring in the spring likely represent the dispersal of manatees from these refuges. It is believed that manatees use the waters in Charlotte Harbor as a stopover during migration, taking advantage of the abundant seagrass beds found in the area. The relatively stable number of manatees observed in the summer and fall likely represent the non-winter population level of manatees in the Harbor area. Counts begin to increase in the late fall as manatees pass through Charlotte County as they return to their warm water refuges.

Historically, manatee mortality in the Charlotte County portion of Charlotte Harbor has been fairly low. The mortality rate for 2005 was 22 deaths, 2 deaths were caused by watercraft collisions (there were 5 undetermined causes). A five-year average, from 2001 to 2006, shows

that that 24% 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.

The majority of deaths occur as a result of natural causes, such as disease or red tide poisoning. Research conducted by the FDEP, Mote Marine Laboratory, the University of Miami, and others finally determined that the manatees died of a 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, four specific conditions—early manatee aggregation, mid winter dispersal, high salinities in the affected areas' waters, and high concentrations of *G. breve*—combine to produce circumstances which lead to high die-off rates(Steidinger, 1996).

In the year 2000 two lawsuits were filed by 13 environmental groups and three individuals against the Army Corp of Engineers and the United States Florida Wildlife Service and the other against the Florida Wildlife Conservation Commission. The lawsuits claim that the agencies were not protecting the species as outlined in the existing laws. As a result of the lawsuits, FWS proposed rules for manatee refuges and sanctuaries. In addition, FFWCC proposed speed zones statewide. Although Charlotte County adopted the MAC protection plan, the FFWCC has indicated that it is not sufficient to protect the species. Therefore, the County will be held to the FFWCC 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.

The FDEP determined that a Manatee Protection Plan is warranted for Charlotte County; this position concurred with that of the County's Marine Advisory Committee (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 (not to mention manatees) by providing adequate depths as an alternative to the current, uncontrolled pattern of seeking deep water through any means possible deep channels may 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; and
- continuing boater education programs targeted at both adults (current water users) and school-age children (future users).

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proposed rules for manatee refuges and sanctuaries. In addition, FFWCC proposed speed zones statewide. Although Charlotte County had adopted the protection plan put forth by MAC, the FFWCC indicated that it was not sufficient to protect the species. Therefore, the County is held to the FFWCC rules. Manatee protection speed zones were approved by the Fish and Wildlife Conservation Commission 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 Florida Fish and Wildlife Conservation Commission website.
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. These gentle giants are part of our area's culture, and to lose them would be a tremendous loss.

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 Kemps 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 fisherman on offshore waters are now required to have turtle excluder devices, a highly controversial subject, on their nets.

Florida scrub-jay (Aphelocoma coerulescens)
An endemic inhabitant of Florida's scrub habitats, the scrub-jay is listed as a threatened species by both the FFWCC and USFWS. Scrub-jays are social birds, living in well organized family units known as clans. A clan typically consists of a breeding pair and their offspring, including both newly hatched and young from previous breeding seasons.

According to the *Statewide Scrub Jay Inventory* compiled by the Archbold Biological Station, Charlotte County trails only Sarasota County in the number of jay clans in the Southwest Florida region. In fact, Charlotte County's 128 clans is the seventh highest in the state. In Charlotte County, scrub-jays occur in sand pine/oak scrub, xeric oak scrub, scrubby flatwoods and scrubby coastal strands. The scrub habitats upon which this species depend must not only contain the proper species of oak for acorn foraging, they must be maintained in an early successional state with a relatively open canopy. In nature, this successional state is maintained by natural fires. If scrubs become overgrown (a condition often caused by the suppression of natural, cyclic fires) the habitat becomes unusable to the jays which must either find new, habitable territory or perish.

The suppression of natural, cyclic fires is not the only threat facing scrub jays. Because they are typically high, dry, and well-drained, scrub habitats are well suited for a variety of urban and agricultural land uses; as more and more scrubs are cleared for such purposes, the scrub-jay's existence becomes increasingly threatened. Even if scrub habitats are preserved during development activities (the FFWCC recommends 25 acres per clan), jay populations may still be imperiled due to improper habitat management and secondary impacts such as the introduction of predators (domestic cats and dogs) and other anthropogenic problems. Finally, the preservation of isolated fragments of scrub habitat within developed areas may not be adequate to prevent the local extirpation of the species. In order to ensure long term viability, a system of ecologically significant stands of scrub, linked by flyways which include smaller stands, must be developed as part of an overall Habitat Conservation Plan for the species. Without such a plan, which is authorized by the Endangered Species Act, Charlotte County's scrub-jay population may face slow but certain extinction.

Gopher Tortoise (*Gopherus polyphemus*)
Once abundant throughout the southeastern United States, the gopher tortoise is now principally found in southern Alabama, Georgia, and all of Florida. It is listed as a species of special concern by the FFWCC. Habitat loss due to a variety of land use activities is the principal threat to this species. Gopher tortoises prefer dry, well drained soils for their burrows, such as are found in xeric habitats including beach scrub, sand pine, longleaf pine-turkey oak, live oak hammock, scrubby flatwoods, mesic flatwoods, and old field successional stages leading to any of these. Unfortunately, these same areas are preferred for most forms of development.

The gopher tortoise is considered a keystone species on which the survival of many other animals depend. In fact, beyond sheltering the tortoise, a gopher tortoise burrow may provide shelter for any of more than 360 different animal species, including the listed indigo snake, gopher frog, and burrowing owl. Although relocation of tortoises is permitted, this should be undertaken as the *final alternative* on a development site. Establishment of protection zones or conservation areas must be encouraged.

Gopher Frog (*Rana capito*)
The gopher frog is listed as a species of special concern by the FFWCC. The gopher frog utilizes gopher tortoise burrows, mouse burrows, stump holes, and post holes in the habitats where the gopher tortoise is found. The gopher frog inhabits dry, sandy uplands- such as scrub- that include

isolated wetlands or large ponds with 1 mile. The gopher frog breeds chiefly in seasonally flooded and temporary ponds. The gopher frog migrates to ponds for breeding from October through April, though breeding may occur in the summer in southern Florida, such as Charlotte County. The gopher frog is highly vulnerable because isolated ponds and marshes void of fish are not afforded the same protections as contiguous wetlands. High, dry upland communities inhabited by gopher frogs are highly desirable sites for development and conversion to citrus. Gopher frog conservation will be increased by the preservation of large tracts of native vegetation in sandy, upland habitats that also include wetlands. Managing upland habitats for gopher tortoises will also assist in preserving the gopher frog.

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 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.

American crocodile (*Crocodylus acutus*)
The American crocodile is listed as endangered by both the FFWCC and USFWS. The American crocodile is a primarily coastal crocodilian occurring in parts of Mexico, Central and South America, the Caribbean, and at the northern end of its range in southern Florida. Crocodiles are limites mostly to the souterhn part of the peninsula, but they have been spotted as far north as Charlotte County.

Human population growth and development in South Florida is diminishing the restricted distribution of the American crocodile at the northernmost limit of its range. The American crocodile inhabits brackish water and is typically found in ponds, coves, and creeks in mangrove swamps. These areas are characterized by deeper water, low wave action, and intermediate salinities. The creation of man-made habitat, especially nesting sites near natural areas, have been essential for the long-term recovery of crocodiles.

Eastern indigo snake (Drymarchon corais couperi)
The eastern indigo snake is listed as threatened by both the FFWCC and USFWS. The eastern indigo snake is a very large, stout-bodied, shiny black snake reaching lengths as great as 8 ft. The eastern indigo uses many habitats occurring in Charlotte County, including: mangroves, wet prairies, dry prairies, pine flatwoods, hammocks, scrubby flatwoods and scrub. Major threats to the indigo are habitat loss, degradation and fragmentation, with associated highway mortality. The indigo snake is wide-ranging; home range estimates of the indigo are as high as 250 acres (Moler, 1992). Habitat protection intended to protect the indigo should focus on preserving large tracts of land.

Florida pine snake (Pituophis melanoleucus mugitus)
The Florida pine snake is listed as a species of special concern by the FFWCC. It inhabits areas with relatively open canopies and dry sandy soils, in which it burrows. The Florida pine snake often co-exists with gopher tortoises. Threats include highway mortality, habitat loss and

fragmentation from development, intensive agriculture and mining. Conservation actions include protecting unfragmented blocks of land, managed with fire to prevent closed canopy forests.

Red-Cockaded Woodpecker (*Picoides borealis*)
Another once abundant species, the red-cockaded woodpecker (which formerly occurred from Texas to Florida) is now endangered due mainly to loss of habitat. Red-cockaded woodpeckers (or RCWs) require fairly large, mature stands (100 acres or more) of pines to be a viable colony. RCWs are found in larger stands of pines in Charlotte County such as the C.M. Webb Wildlife Management Area and the Charlotte Harbor Flatwoods. Though acquisition and management of suitable habitat is one sure method for maintaining viable populations of RCWs in Charlotte County, land management practices on privately owned property such as long-term timber rotation and native range grazing offer this species an opportunity for survival.

Florida panther (Puma concolor coryi)
The Florida panther is listed as endangered by both the state and federal governments. Panthers only inhabit southern Florida, including Charlotte County. Pine flatwoods, in combination with other forested upland and seasonal wetland habitats, provide critical foraging, breeding, and wildlife corridor habitat for the Florida panther. The panther utilizes hydric, mesic, and xeric pine flatwoods, and savanna, hardwood hammocks, and mixed swamp forest. Ecotones are particularly important to the panther because they support an increased variety and density of species. Recently burned pine flatwoods provide more prey for panther, and panthers are documented to move toward fires and stay in areas of recent burns. The panther has large home range requirements and a low reproductive rate, making them vulnerable to habitat fragmentation and loss.

Florida black bear (Ursus americanus floridanus)
The Florida black bear, listed as threatened by FFWCC, is restricted to large, contiguous blocks of suitable habitat in Florida. Its habitat includes: pine flatwoods, cypress swamps, cabbage palm forest and hammocks, such as found in Charlotte County. Forested wetlands are particularly important for diurnal cover. Large home range requirements and a low reproductive rate render black bears susceptible to habitat fragmentation and loss, and highway mortality. Conservation actions include the maintenance of a diversity of habits over extensive acreages.

Sherman's fox squirrel (*Sciurus niger shermani*)
The Sherman's fox squirrel is listed as a species of special concern by the FFWCC. The Sherman's fox squirrel inhabits mature, fire-maintained pine flatwoods in Charlotte County; such as found on the Fred C. Babcock - Cecil M. Webb Wildlife Management Area. They are highly vulnerable due to habitat loss and alteration (conversion to pasture, fire suppression).

Florida mouse (Podomys floridanus)
The Florida mouse inhabits xeric upland communities found in Charlotte County, including scrub and scrubby flatwoods. The Florida mouse frequently inhabits gopher tortoise's burrows. Because it is so specialized and exclusively occurs in drier natural plant communities, the Florida mouse is highly vulnerable to habits losses or alterations. Its preferred habitat is highly suitable for development or for conversion to citrus culture. Recommended conservation actions for the Florida mouse include preserving upland areas, such as scrub and scrubby flatwoods, and

managing for gopher tortoises. The Florida mouse is listed as a species of special concern by the FFWCC.

Sherman's short-tailed shrew (*Blarina carolonensis shermani*)
The Sherman's short-tailed shrew was found in 1955 in southwest Florida, including Charlotte County. Range estimates extend from Charlotte County over to Lake Okeechobee (north) and down to the Everglades. The areas where the shrews have been trapped has been intensively managed or developed. The Sherman's short-tailed shrew is listed as a species of special concern by the FFWCC, and may be extinct.

Other Listed Species of Interest in Charlotte County (*not inclusive*)

	FFWCC	**USFWS**
Brown pelican (*Pelecnus occidentalis*)	SSC	
Black skimmer (*Rynchops niger*)	SSC	
Least tern (*Sterna antillarum*)	T	
Roseate tern (*Sterna dougallii)*	T	
Limpkin (*Aramus guarauna)*	SSC	
Reddish egret (*Egretta rufescens*)	SSC	
Snowy Egret (*Egretta thula*)	SSC	
Little blue heron (*Egretta caerulea*)	SSC	
Tricolored heron (*Egretta tricolo*r)	SSC	
White ibis (*Eudocimus albus*)	SSC	
Florida sandhill crane (*Grus canadensis pratensis*)	T	
Wood Stork (*Mycteria americana*)	E	E
Roseate spoonbill (*Platalea ajaja*)	SSC	
The burrowing owl (*Athene cunicularia*)	SSC	
Southeastern America kestrel (*Falco sparverius paulus*)	T	
Audubon's crested caracara (*Polyborus plancus*)	T	T

Protective Measures
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 serves the interests of the community at large. Protection of habitats used by our most imperiled species also benefits the public by inserting green space into congested developmental areas, providing access to larger tracts of land, increasing property values, (e.g., lots on preservation), and reducing the burden on county infrastructure by reducing developmental densities. 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.

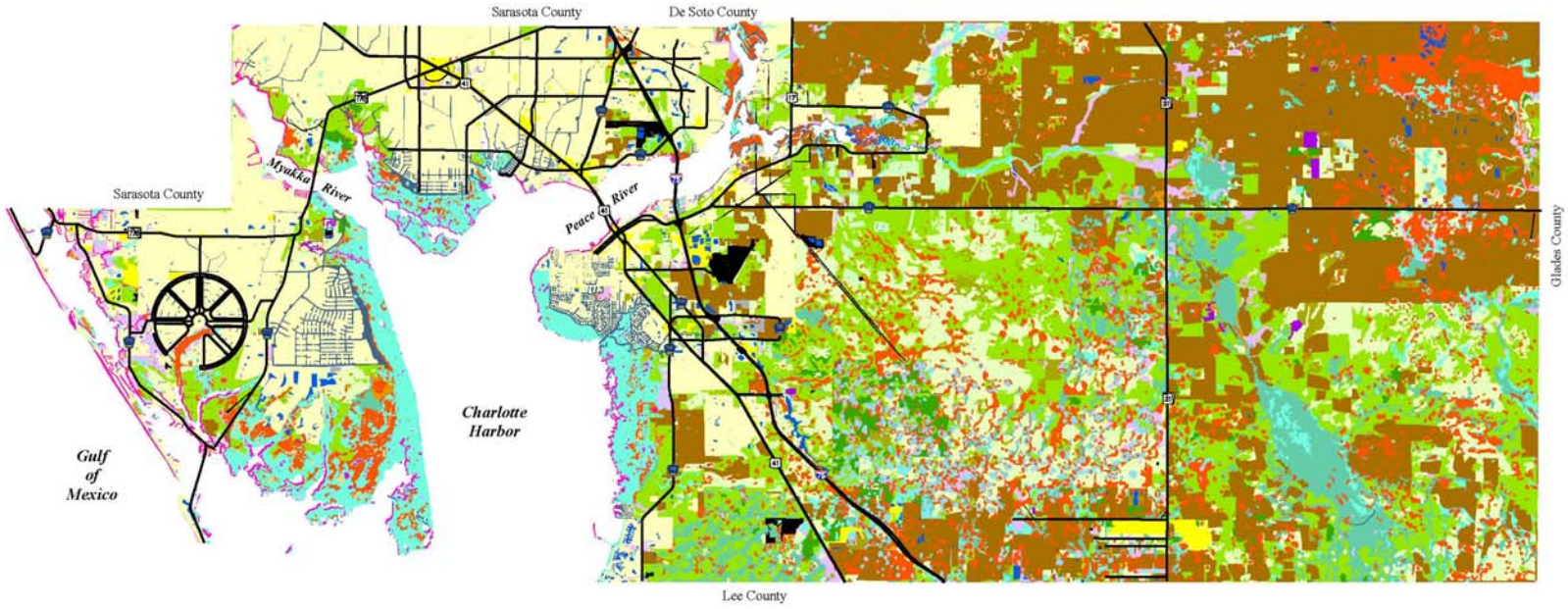
In 2004, a land acquisition referendum was being initiated to allow voters to set aside ad valorem taxes to purchase environmentally significant lands. The referendum was pulled from the ballot due to devastating impacts of Hurricane Charley. On November 7th, 2006, voters will have another opportunity to protect and manage environmentally significant lands through Conservation Charlotte land acquisition program. Voters will be asked to increase the County millage rate by .20, and this will allow the County bond up to 77 million dollars to purchase and manage environmentally significant lands for wildlife and passive recreational opportunities.

Habitat Inventory

Southwest Florida supports a wide variety of vegetative and wildlife communities. These communities are linked through the various water and flow systems throughout the region. Charlotte County references both the Florida Land Use Cover and Forms, Classification System (FLUCCS) and the Florida Natural Areas Inventory's Guide to Natural Communities of Florida" (FNAI) lists when reviewing potential developments. Individual communities and their rarity and threats are viewed through both systems. Based on the findings of these reviews, recommendations can then be provided for protection measures.

Map 3.20 is the FLUCCS map for Charlotte County. Comparing this map with the Future Land Use map identifies an inconsistency of land use and native community protection. As pointed out in the Strategic Regional Policy Plan the main problem in dealing with the protection of the natural resources, in this case specifically vegetative communities, is the competition of the resources among the many users of them. Urban development competes for water use with agriculture and industrial users while the natural systems are also competing with these other users. For example, in Charlotte County, the Florida panther requires large tracts of acreage to exist. Development within the urban service area precludes preservation of large tracts of land due to the existence of platted lands. Areas outside of the USA provide the County's best chance of panther habitat preservation but these areas are managed for citrus, vegetable, cattle production of other agricultural or extractive industry uses. These tracts of land are being converted to other uses which are not compatible for panther use. Although plans may exist for preservation of particular species, lack of funding for the purchase of these lands or the development rights to them continues to be the problem. Private landowners cannot be expected to dedicate their lands and investments to sit idle or unused without some form of compensation. The FNAI data is utilized in a similar manner.

Map 3.20 Florida Land Use Cover and Forms, Classification System (FLUCCS) Map



Charlotte County Community Development
Land Information Section
Draft Date: 10/06
Located: M:\comdev\gig6\Comp_Plan_NEW\MAPS\Chapter_3\3_20_FLUCCS_Map.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units: meters

Source: Southwest Florida & South Florida Water Management Districts

Florida Land Use and Cover Classification System

Urban - Residential	Upland Hardwood Forest	Wetland Hardwood Forest
Urban - Commercial	Tree Plantations	Wetland Coniferous Forest
Agricultural	Streams and Waterways	Wetland Forested Mixed
Herbaceous (Dry Prairie)	Lakes	Vegetated Non-Forested Wetlands
Upland Shrub and Brushland	Reservoirs	Non-Vegetated Wetlands
Mixed Rangeland	Bays and Estuaries	Barren Land
Upland Coniferous Forest	Ocean & Gulf	Transportation, Communication & Utilities

N W E S

Scale 1:205,920
1 inch = 3.3 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Table 3.19 Florida Land Use Cover and Forms, Classification System	
Land Use Classification	**Acreage**
Urban-Residential	79,291
Urban-Commercial	6,265
Agricultural	100,107
Herbaceous(Dry Prairie)	4,096
Upland Shrub and Brushland	41,589
Mixed Rangeland	5,972
Upland Coniferous Forest	76,739
Upland Hardwood Forest	9,064
Tree Plantation	615
Streams and Waterways	4,476
Lakes	6,315
Reservoirs	4,475
Bays and Estuaries	2,786
Ocean & Gulf	32
Wetland Hardwood Forest	28,660
Wetland Coniferous Forest	22,693
Wetland Forested Mixed	984
Vegetated Non-Forested Wetlands	44,290
Non-Vegetated Wetlands	737
Barren Land	713
Transportation, Communication & Utilities	3,993
Other Open Lands-Rural	3,867
TOTAL ACREAGE	447,758

The FNAI provides a ranking system of S1 (Critically imperiled because of extreme rarity, 5 or fewer occurrences or very little remaining area, or especially vulnerable) and S2 Imperiled (because of rarity, 6-20 occurrences or little remaining area, very vulnerable). The Table below identifies the communities that are found in Charlotte County that are listed as S2.

Table 3.20 FNAI Communities			
FNAI Community	**Ranking**	**FNAI Community**	**Ranking**
Scrub	S2	Dry Prairie	S2
Beach Dune	S2	Floodplain Marsh	S2
Coastal Berm	S2	Seagrass Bed	S2
Coastal Strand	S2	Shell Mound	S2

Source: Strategic Regional Policy Plan 2002

Solid information regarding the natural systems needs to be maintained. With development occurring at record paces, conditions are continually changing. The following is a brief description of twenty-nine readily identifiable native communities occurring in Charlotte County. Each description includes characteristic plants, and is accompanied by a discussion of the community's environmental values and functions, threats it may face, and management

considerations. Listed plant and animal species which depend upon or use each particular habitat are also noted.

Flatwoods and Prairies

1. Pine Flatwoods

Description

This community occurs on generally level ground with relatively poorly drained soils. These areas possess sandy soils with a moderate amount of organic matter in the top three inches, and an acidic, organic hardpan from one to several feet below the surface. Flatwoods are the most abundant natural cover type in the County, and once occupied over half of the State. They occur over extensive areas, and often contain smaller inclusions of habitats such as ponds, marshes, prairies, bayheads, or cypress domes and strands. The three major types of flatwoods in the County are hydric, mesic and xeric flatwoods which are dominated by slash pine and longleaf pine, of which the slash is much more extensive and occupies wetter sites; longleaf pine, on the other hand, occupies areas with better drainage, and may be found in some abundance on the Cape Haze Peninsula. Beneath the fairly open overstory, the vegetation varies tremendously and ranges from a low growing ground cover of wiregrass, running oak, broomsedge, elephant's foot, and rabbit tobacco to a dense understory community of gallberry, fetterbush, saw palmetto, wax myrtle, and sprouts of live oak, laurel oak, and occasionally water oak. In xeric or scrubby pine flatwoods, understory species may include scrub oak, myrtle oak, sand live oak, Chapman oak, rosemary and other species adapted to living in dry conditions.

Cyclic fire and water regimens are driving forces of flatwoods ecology. Fire occurs often enough to clear accumulated ground litter and reduce competition from hardwoods, but not frequently enough to eliminate fire sensitive young slash pines and prevent stand regeneration. If fire is suppressed, succession is toward a xeric oak community in scrubby flatwoods, mesic hardwood in mesic stands, or to a bay forest community in wetter sites.

Environmental Functions and Values

Pine flatwoods support an impressive variety of wildlife species, though much of the fauna occurs primarily along ecotones of the flatwoods and adjacent communities. Typical species include white-tailed deer, bobcat, raccoon, opossum, nine-branded armadillo, gray fox, gray squirrel, Sherman's fox squirrel, cotton rat, least shrew, great horned owl, red-tailed hawk, pine warbler, eastern towhee, brown-headed nuthatch, pine woods treefrog, oak toad, eastern diamondback rattlesnake, black racer, Florida pine snake, and box turtle. Mature pine flatwoods along rivers, estuaries, or occasionally even lakes or large ponds, provide nesting habitat for the bald eagle, while over-mature stands provide habitat for the red-cockaded woodpecker. Florida panther are also known to utilize pine flatwoods, as are Florida black bear.

Most cattle-raising operations in the Country appear to rely heavily upon native range. Pine prairies can be costly to remove and replace with improved pasture. Maintaining a balance of native range and improved pasture can be beneficial because native range is well-adapted to drought and requires little maintenance.

Threats

Pine flatwoods are diverse, fairly resilient systems which can tolerate substantial use by man without significant endangerment. They are, however, sensitive to the exclusion of fire and water table fluctuations which can dramatically alter their vegetative composition and ecology. Tremendous acreage of flatwood habitats have been converted to cropland or improved pasture, grazed as native range, or supplanted by urban and suburban development. Intensive, short rotation, silviculture schedules (20-25 year rotation) reduce the natural diversity of flatwoods habitat and can render it relatively unusable for many wildlife species (Harris et. al., 1979; Repenning and Labisky, 1985). Similarly, overgrazing or trampling by livestock can destroy the value of pine flatwoods both as native range and as wildlife habitat. Development of flatwoods often reduces the value of adjacent wetlands or other habitat through reductions in vegetative diversity, increased erosion, and sedimentation or subsequent pollution of surface waters.

Evaluation

Pine flatwoods are one of the most abundant natural cover types found in Charlotte County. Research by the USFWS, FFWCC, SFWMD, and the University of Florida indicates that pine flatwoods are utilized by more wildlife species during their life cycles-and by more listed species in general-than any other upland forest habitat in the state. Because of their relative abundance and the fact that one variety (hydric pine flatwoods) is only now coming into wide recognition as a wetland or wetland/transitional habitat, pine flatwoods have not received the protection extended to other habitats during the regulatory agencies' review of land clearing operations. Much of the acreage cleared for urban development and agricultural operations in Charlotte County was originally pine flatwoods. Fortunately, the County's loss of pine flatwoods is somewhat offset by historic and ongoing purchases of environmentally sensitive lands by the State, including the Webb, Charlotte Harbor Buffer Preserve, and the Charlotte Harbor Flatwoods, and the Babcock Ranch. The County must continue to take advantage of Federal, State, and local land acquisition programs in an attempt to preserve these vital upland habitats.

2. Palmetto Prairies/Dry Prairies

Description

These treeless plains, generally resembling pine flatwood communities without the pine overstory, are usually dominated by wiregrass, broomsedge, and carpet grasses. Saw palmetto is the most abundant shrub, but fetterbush, staggerbush, sand live oak, and blueberry are also common. Hammocks, bayheads, and cypress domes are often scattered throughout this association.

Environmental Functions and Values

The Florida burrowing owl, and the Florida sandhill crane prefer to inhabit dry prairies, and the box turtle, black racer, turkey vulture, black vulture, common nighthawk, eastern meadowlark, least shrew, hispid cotton rat, eastern harvest mouse, and eastern spotted skunk also frequently occur in this community. The forested wetlands and other habitats often dispersed throughout dry prairies contribute significantly to the habitat diversity afforded by this association, and are partially responsible for their abundant wildlife populations.

Threats

Large areas of dry prairie have been converted to improved pasture or residential developments. Overgrazing generally leads to trampling of the forested inclusions, reduction of habitat diversity, and deterioration of the range as pasturage. Fire is important to prairie ecology, but either too frequent fires or their exclusion can seriously alter the vegetative composition of this association.

Evaluation

Another of the more extensive native communities occurring in Charlotte County, dry prairies often serve as transition areas between upland and wetland habitats, and are often used for native range grazing operations.

Scrub Communities

3. Sand Pine Scrub

Description

Sand pine scrub is a xeric (dry) habitat occurring on deep, acid, extremely well-drained soils. In Charlotte County, sand pine scrub can be found in the Washington Loop Road (CR 764) area. This community possesses an overstory of sand pine and a well-developed understory of sand live oak, myrtle oak, Chapman oak, staggerbush, silk bay, rosemary, saw palmetto, scrub palmetto, and gopher apple. Herbaceous ground cover is sparse, with large areas of white to grey sand and frequent patches of lichens or true mosses, particularly reindeer moss. Of the 40-50 plants known to occur in scrub habitats, approximately half are endemic (i.e. native to restricted area).

Sand pine scrub exhibits a fire-based ecology which determines the area's vegetative composition and density. Retention of lower limbs by sand pines and development of a dense understory usually provide ample fuel for a hot, fast burning fire every 20 to 40 years. These fires scarify the cones, clear most accumulated litter, and are generally conducive to even-aged forest development. If fire is excluded, succession is toward xeric, oak dominated hardwood forest, and ultimately to a mesic hammock association.

4. Scrubby Flatwoods

Description

This community is similar to sand pine scrub in its xeric character, evergreen shrubby understory, fire-dependent ecology, endemic flora and its occurrence on well-drained, deep sandy soils. It may, however, have slash or longleaf pine as the dominant overstory species. Herbaceous ground cover is more frequent than in true scrub. Like sand pine scrub, this association occurs as relatively small patches interspersed in areas of less well-drained vegetation, and it is susceptible to similar types of disturbance or development.

5. Xeric Oak Scrub

Description

This is a somewhat generic name for an association of xeric oaks and typical scrub understory without a pine overstory. This habitat generally possesses the environmental characteristics of sand pine scrub and scrubby flatwoods, including a dependency on period burning.

Environmental Functions and Values of Scrub

The deep, well-drained sands on which scrubs grow typically provide valuable aquifer recharge areas. Scrubs are of considerable scientific interest because of their endemic flora and fauna, unique ecology, and exemplification of ecosystem response to heat stress.

Animals residing in scrub habitats must be able to withstand heat and water stress through behavioral or physiological adaptation. Several typical scrub species are endemic to Charlotte County are the Florida scrub-jay, Florida mouse, gopher tortoise, gopher frog, southeastern pocket gopher, fence lizard, eastern indigo snake, Florida pine snake, ground dove, and eastern towhee. Sherman's fox squirrel occurs in areas with a mature pine canopy, and red-cockaded woodpecker colonies may be found in areas with over-mature pine stands.

Threats to Scrub

Scrub is among Charlotte County's most threatened natural communities. As they are typically dry and well drained, they are well suited to urban development as well as a number of agricultural activities, notably citriculture. The conversion of land for urban development or agriculture is the greatest threat to scrub habitat. Although the Endangered Species Act - which is geared toward preventing the taking (killing, harming, or harassing) individual animals - does afford some protection, scrub communities continue to be lost as this and other regulations are difficult to enforce and do not specifically address the loss of *habitat*.

Other threats to scrub habitat include vulnerability to erosion and root damage caused by foot or vehicular traffic, trampling by grazing animals, suppression of the natural fire regime, and invasion by exotic plant species.

Evaluation of Scrub

At this time, fee simple acquisition appears to be the most effective way to protect scrub habitats. In recognition of the vulnerability and ecological importance of these ecosystems, Charlotte County has actively pursued the acquisition of scrub tracts whenever possible. In l995, the County accepted title to 350 acres of scrub, scrubby flatwoods, tidal wetlands, and other habitats in the vicinity of Tippecanoe Bay. Known as the Tippecanoe Environmental Park, this acquisition was accomplished with the financial assistance of the Florida Communities Trust (FCT); the Tippecanoe property (which is illustrated on Map 3.19) will be managed as a passive park and outdoor educational facility. The County has also acquired 150 acres known as Tippecanoe II. Charlotte County has also acquired another significant scrub system known as the Amberjack Environmental Park on the Cape Haze Peninsula. Additional scrubs, notably those in the vicinity of Washington Loop Road, are also under consideration for acquisition.

Upland Hammocks

7. Live Oak Hammocks

Description

Hammocks dominated by live oak are relatively xeric, primarily occurring on well-drained sandy soils within pine flatwoods or pasture lands. Bluejack oak, laurel oak and cabbage palm may also occur as canopy species. Though herbaceous ground cover is sparse in these open woodlands, Chapman's oak, beautyberry, and winged sumac may be encountered. There is usually a well-developed layer of dry leaf litter in such hammocks. Typical wildlife species include the southern flying squirrel, cotton mouse, eastern mole, bluejay, screech owl, black racer, green anole, southern toad, and squirrel treefrog.

8. Cabbage Palm Hammocks

Description

Cabbage palm hammocks occur on moister, highly organic soils. Cabbage palm is the dominant tree species, but other species, particularly live and laurel oaks, may also occur. Shrubs and vines often form a dense understory in this community, which provides suitable habitat for the squirrel treefrog, rat snake, Carolina wren, fish crow, cotton mouse, and raccoon.

9. Mesic Hammock

Description

This association occurs on rich, organic soils of intermediate moisture content. Typical trees include laurel oak, pignut hickory, water oak, dogwoods, red bay, southern magnolia, palmetto, beautyberry, sparkleberry, greenbriar, Virginia creeper, and muscadine grape. Common vertebrates encountered include the southern toad, green anole, pileated woodpecker, great crested flycatcher, red-eyed vireo, gray squirrel, and cotton mouse.

Environmental functions and values of Hammocks

Hammocks often occur as inclusions in other major communities, thereby providing many wildlife benefits through greater diversity, protective cover, and food resources. The dense hammock canopy creates a cool, moist micro-climate that is not only appealing to people, but is essential for some plants. Butterfly orchids, string ferns and bromeliads all require the hammock micro-climate to survive.

Threats to Hammocks

Hammocks are vulnerable to the same development pressures threatening other upland communities throughout Florida. Residential, industrial, and agricultural interests often eliminate hammocks entirely, infringe upon their ecological integrity through development of adjacent uplands, or cause dramatic changes in the water table. Although their relatively rich soils permit more rapid recovery than most other upland habitats found in Florida, the mature forest canopy may take many years to recover from selective clearing or other disturbances.

Evaluation of Hammocks

Upland hammocks, including understory vegetation, should be maintained within urbanized or developing areas as "open space in native habitat". To encourage this, the County should develop a matrix of incentives (density bonuses, *administrative* relaxation of height and setback requirements, etc.) and regulations for inclusion within the County Code. In rural areas, the

County should work with property owners using the previously discussed methods to ensure that hammocks are maintained as part of the non-urban landscape.

Freshwater Aquatic Communities

10. Open freshwater systems

Description

This category includes lakes, ponds, rivers, creeks, drainage or navigation canals, and any other permanently open freshwater habitat. Salinity, currents, water quality, and cross section may vary considerably with seasonal rainfall, topography, watershed size and development, native communities surrounding the waterway, and proximity to estuarine or marine waters. The vegetation within these water bodies may include various pondweeds, milfoils, fragrant water lily, stonewort, widgeon grass, fanwort, bladderwort, hydrilla, Brazilian elodea, coontail, water sprite, spatterdock, water lettuce, water hyacinth, and many other species. Stream salinity, seasonality, water quality, depth, and currents all determine which species, if any, occur at a given site.

Major freshwater bodies in Charlotte County include Shell and Prairie Creeks, which are tributaries of the Peace River. Besides providing essential habitat for aquatic species and their natural drainage function, these two creeks serve as the water supply source for the City of Punta Gorda. Although the Peace and Myakka Rivers exhibit a more estuarine function in Charlotte County, they are the two major contributors of freshwater to the Charlotte Harbor system contributing an average of 1,300 million gallons per day (mgd) and 407 mgd., respectively.

Environmental Functions and Values

As might be expected, the fish and wildlife resources of these areas vary tremendously. Mosquito fish, bluegill, largemouth bass, Florida gar, golden shiner, Florida softshell turtle, Florida snapping turtle, peninsula cooter, stinkpot, and the American alligator usually occur in suitable waters, and estuarine or coastal species such as tarpon and mullet often venture far upstream in river and creek systems. The habitat diversity of adjacent flatwoods, marshes, prairies and swamps generally determines the wildlife and water characteristics of the actual water body. Many species inhabiting these adjacent lands depend on streams, lakes and ponds for drinking water, feeding areas, or seasonal habitat requirements. These include the wood duck, anhinga, osprey, bald eagle, belted kingfisher, numerous migratory waterfowl species, white-tailed deer, raccoon, river otter, pig frog, southern leopard frog, and American alligator, as well as numerous invertebrate species with terrestrial adult and aquatic juvenile forms.

Recreation and commercial values of aquatic habitats are related to navigability, hunting and fishing opportunities, bird-watching, and camping. Except for navigability, these values are directly dependent on preservation of native vegetation in and adjacent to the water body.

Threats

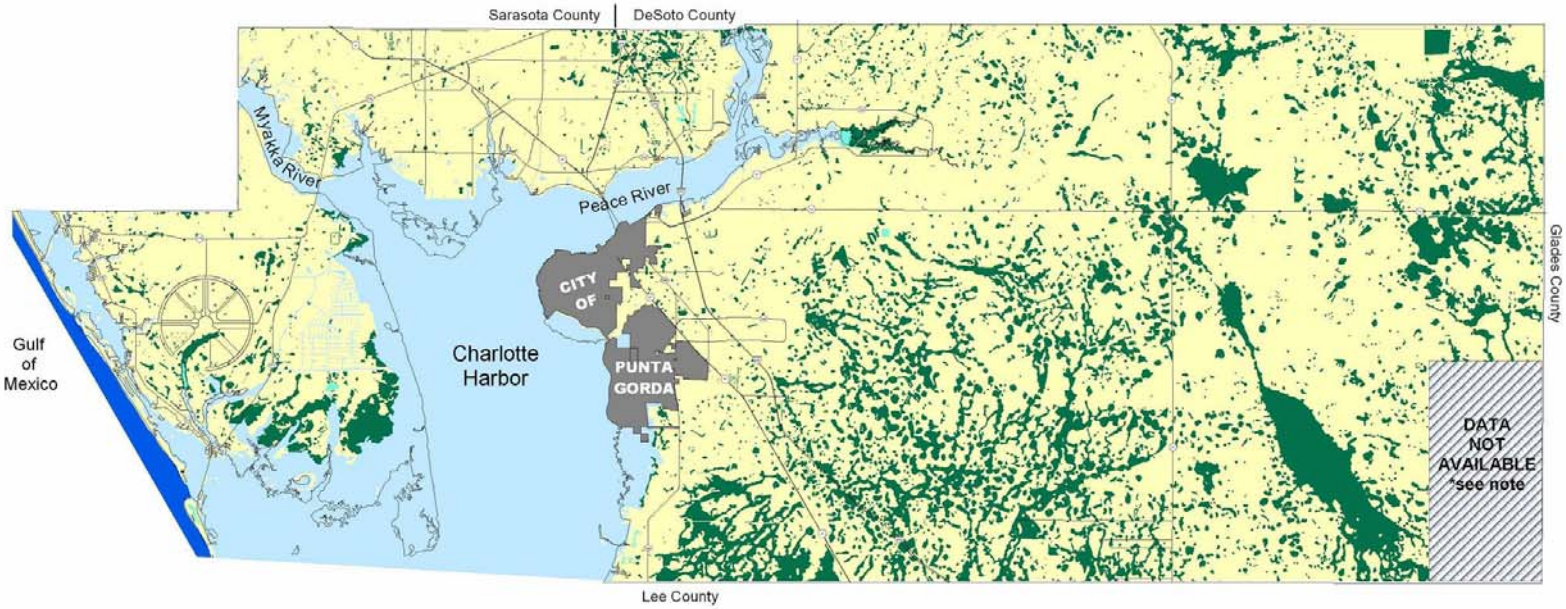
Freshwater aquatic systems are often adversely affected by channelization, water level stabilization, and other navigation or flood control measures. Pollution by municipal, industrial or agricultural runoff also poses a serious threat to aquatic habitat productivity. Noxious exotic

aquatic plants such as water hyacinth and hydrilla may adversely affect the accessibility and natural flow of these water bodies.

Evaluation

Freshwater aquatic systems are vulnerable to a number of potential impacts. To help ameliorate some of these impacts which result in a decrease of their value as habitat, naturally vegetated upland buffers should be used to protect natural rivers and creeks from the degrading effects and encroachment of adjacent upland development. In addition to providing wildlife habitat, the preservation of upland buffers helps protect water quality, particularly in regard to reduction of siltation and nutrient uptake. Dredging of natural rivers and creeks should be prohibited, except for periodic maintenance of existing channels or when there is clearly a public benefit in doing so and any environmental impacts are offset by quantifiable environmental benefits. Artificial stabilization structures along natural shorelines should be prohibited, except for maintenance of existing structures. Point source discharges of pollutants to natural rivers and creeks should be eliminated, and non-point sources of pollution identified and reduced.

Map 3.21 General Wetland Systems



Charlotte County Community Development
Land Information Services-MLH
Draft Date 11/05
Located: gig6\comp_plan_NEW\Maps\Chapter1\3_30_general_wetlands.mxd
ArcMap Version 9

Stateplane Projection
Datum NAD83
Units meters

Source: U.S. Fish & Wildlife Service - NWI
Note: Wetland type for Southeastern corner may be determined through examination of Maps 3-20.

Estuarine
Lacustrine
Marine
Palustrine
Riverine
Upland

Scale: 1:213,220
1 inch equals 3.37 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Freshwater Wetlands

The general descriptions of freshwater wetland habitats provided below is based on general vegetative characteristics and does not differentiate between contiguous and isolated systems. The hydrological functions of freshwater wetlands vary depending upon whether the wetlands constitute, or are contiguous with, a drainage feature, or whether the wetlands are isolated from a major flowway or drainage feature. Contiguous wetlands, including riverine marshes, major slough systems, cypress strands, riverine swamps, and hydric hammocks along creeks and rivers, constitute flowways and flood plains. Isolated wetlands, including wet prairies, cypress and bay heads and isolated hydric hammocks, usually have poorly defined or seasonal hydrologic connections with flowways or drainage features. Map 3.21 depicts the general location of wetland systems, both freshwater and estuarine, throughout Charlotte County.

11. Wet Prairies and Marshes

Description

Wet prairies occur on low flatlands subject to periodic flooding, and often grade imperceptibly into freshwater marsh or dry prairie communities. Usually dominated by shorter grasses and herbs such as maidencane, cordgrass, beakrushes, spikerushes, white-topped sedge, yellow-eyed grass, and red root, wet prairies often also support St. John's Wort and occasional patches of wax myrtle, coastal-plain willow, or buttonbush.

Freshwater marshes include a number of vegetative associations composed of grasses, rushes, sedges or broadleaved herbs, where the ground surface is inundated for a least a few months of the year. They are found bordering lakes or streams, in shallow natural depressions, and on lowlands with very little topographic relief. Ranging in size from small pockets within flatwoods or other communities to vast, uninterrupted wetlands, marshes often intergrade into wet prairies, or possess hammocks, cypress domes or strands, and deeper aquatic habitats. Sawgrass, lizard's tail, pickerelweed, cattail, arrowhead, spikerush, smartweed, bulrush, fire flag, cordgrass, and maidencane are common dominant species of particular marshes or patches within a marsh. The species listed under the wet prairie association are frequent, as are bacopa and water pennywort. Natural depressions, alligator holes, and sloughs often contain vegetation associated with deeper waters, including fragrant water lily, spatterdock, coontail, stonewort, milfoil, bladderwort, and pondweeds.

Wet prairies and isolated marshes usually have concentric bands of vegetation marking zones of differing hydroperiods (amount of time under water). The character of the plant community can vary widely from one isolated wetland to another. The outermost band is composed of species adapted to shorter periods of inundation (for example various grasses and St. John's Wort), while the innermost bands are dominated by taller grasses and flags, and bladderworts grow in a central pond. Generally the central portion of these wetlands has a longer hydroperiod and a greater organic content to its soil than do the outer portions.

12. Sloughs

Description

Sloughs appear as open expanse of grasses, sedges, and rushes in an area where the soil is saturated during the rainy season. Most sloughs are relatively long and narrow and slightly

lower in elevations than the surrounding habitats, which in Charlotte County are often flatwoods or hammocks. Grasses are the most common plants found in sloughs. Sedges and rushes also occur, with scattered shrubs in some locations. Beak rushes, maidencane, bottlebrush threawn, bluejoint panicum, soft rush, sand cordgrass, sundew, marsh pink, milkwort, yellow-eyed grass, meadow beauty, slough grass and low panicum are all frequently encountered within sloughs. Sloughs are natural flowways, interconnecting wet prairies and marshes, which when a number of sloughs come together, are referred to as a major flowway. Yucca Pen Slough within the Charlotte Harbor Flatwoods is an example of this type of major flowway.

13. Swamps

Description

This general category includes several major community types, the common denominators being seasonal or permanent inundation and predominance of woody vegetation. Their species composition, ecology, and wildlife benefits vary tremendously with soil composition, hydrology, topography, and watershed characteristics. Hardwood swamps and cypress swamps are the major communities possessing standing water for a substantial portion of the year. Bay forests represent a different type of wetland forest, ecologically, and are often included as a separate major community type.

A. Hardwood Swamps

This community is characterized by a canopy of large hardwoods including black gum, pop ash, red maple, sweetgum, and water oak. Bald cypress may occur as a minor canopy element, while buttonbush, wax myrtle, Carolina willow, dahoon holly, American hornbeam and elderberry are common in the scattered understory. During dry periods, exposed mud may occupy most of the forest floor, but lizard's tail, smartweed, water pennywort, and various grasses or sedges usually occur in patches. The degree of canopy closure and seasonal water levels generally determine the understory and ground cover species and density.

B. Cypress Swamps

Cypress swamps are usually found along rivers or lake margins, and interspersed through other communities such as pine flatwoods or wet (and occasionally dry) prairies, and in shallow sloughs or strands. They are normally inundated for much of the year. Bald cypress predominates in lake and stream margin swamps and in major sloughs, while pond cypress may dominate smaller domes or cypress heads. Though cypress is often the only canopy species encountered, black gum, red maple, coastal plain willow, pop ash, and slash pine may occur as well. Understory species vary with the degree of canopy closure and the inundation regime, but often includes wax myrtle, buttonbush, poison ivy, and greenbriar. Arrowhead, pickerelweed, sawgrass, bacopa, water pennywort and various ferns are often encountered as ground cover, and in open marshes within cypress swamps.

C. Swamp Thickets

These are dense strands of shrubs or low trees occupying standing water or periodically flooded sites. They occur in or around ponds, lake impoundments, and marshes or along rivers and streams. Thickets generally form a transition zone between more aquatic and

terrestrial habitats, or represent marshes and wet prairies undergoing secondary succession due to fire exclusion or a lowered water table. Wax myrtle, coastal plain willow, red maple, buttonbush, and dahoon holly are characteristic shrubby species; various grasses, sedges, and other forbs comprise the ground cover. Many passerine birds (perching and song birds) reside in such thickets permanently or seasonally, or utilize this habitat during migration. The marsh rice rat, cotton rat, and marsh rabbit are also common.

14. Bay Forests

Description

This association occurs on wet, acidic, highly organic soils which are often seasonally flooded. Though often classified as a swamp habitat, bay forests usually have shallower standing water, shorter inundation periods, and less dramatic water level fluctuations than the previously discussed forested wetlands. Bay forests usually occur along the margin of flatwoods ponds, or in shallow depressions in pine flatwoods, having succeeded from marshes, low pine flatwoods, and swamps through accumulation of organic matter. They are dominated by loblolly, red, and sweet bay which are all broadleaved, evergreen species with a similar growth from. These species usually form a dense canopy, with little sunlight penetration to promote understory or ground cover growth in the humid, dimly lit forest interior. Most understory vegetation, consisting primarily of wax myrtle, gallberry, fetterbush, and various lyonias, occurs at the forest fringes.

15. Hydric Hammock

Description

This community occurs on wet, poorly-drained soils along rivers and streams. Typical trees include swamp bay, water oak, sweetgum, laurel oak, and Florida elm. Lyonias, wax myrtle, and saw palmetto are common, and various ferns and lizard's tail provide a relatively sparse ground cover. Characteristic vertebrates found include the green tree frog, southern leopard frog, red-bellied woodpecker, and cotton mouse.

Environmental functions and values of Freshwater Wetlands

Periodic water level fluctuations are essential to the maintenance of wet prairies, marshes, sloughs and swamps. Alternating floods and dry periods provide seasonal nutrient pulses to these wetlands and prevent the invasion by more aquatic or terrestrial vegetative associations. This dynamic hydrologic regime produces a multitude of ecological benefits including natural retention of storm waters, damping of peak flood levels in rivers and lakes, subsequent slow-release of floodwater during the dry season, and vegetative filtration and assimilation of pollutants and nutrients contained in upland runoff.

Like their salt water counterparts, freshwater wetlands provide high quality habitat for fish and wildlife. The Florida sandhill crane (T), marsh rice rat, hispid cotton rat, marsh rabbit, ribbon snake, and pygmy rattlesnake are characteristic of wet prairies and sloughs. Other species including the round-tailed muskrat, common snipe, marsh hawk, woodstork, white ibis, and numerous other wading birds often utilize wet prairies when water levels are suitable for their feeding or habitat requirements.

Marshes are extremely productive areas for wildlife, with all of the species listed in the wet prairie discussion being encountered when water levels are suitable. The American alligator, Everglade kite, red-winged blackbird, sora rail, common snipe, river otter, largemouth bass, bluegill, pig frog, leopard frog, cottonmouth moccasin, Florida water snake, Florida softshell turtle, red-bellied turtle, apple snail, crayfish, and numerous other species are characteristic inhabitants of various types of marshes.

Freshwater swamps provide valuable habitats for fish and wildlife, with backwaters, oxbows, sloughs, and other features contributing significantly to habitat diversity. The wetlands and hammocks or other associated uplands provide nest and den sites, feeding areas, and suitable refuge from predators or flood waters. Animals likely to be encountered in swamps include the bobcat, opossum, raccoon, gray squirrel, river otter, pileated woodpecker, barred owl, red-shouldered hawk, wood duck, cottonmouth moccasin, Florida water snake, banded water snake, American alligator, green tree frog, squirrel tree frog, southern leopard frog, mosquito fish, and Everglades pygmy sunfish.

Cypress swamps provide habitat for many of the same species as hardwood swamps, but often possess more aquatic habitat for fishes, amphibians, and reptiles. They are particularly important as seasonal refuges for deer and other animals occurring in adjacent flatwoods communities, and as feeding areas for wading birds during the dry season when forage animals are concentrated into depressions within the slough or dome. Although seldom extensive and providing little food for wildlife when compared to other wetland habitats, bay forests may contribute significantly to the habitat diversity of a given tract. The southeastern shrew prefers bay forests as its primary habitat, and the yellow-billed cuckoo, Carolina wren, blue-grey gnatcatcher, short-tailed shrew, and cotton mouse are also common in this community.

In addition to their value as wildlife habitats, freshwater wetlands also function as recharge areas for groundwater, particularly the surficial aquifer, and may themselves be suitable for use as potable water supplies. Wetlands may also provide natural water treatment systems for certain types of urban and agricultural development activities.

Threats to Freshwater Wetlands

Freshwater wetlands are susceptible to trampling by livestock, overgrazing, disturbance by all-terrain vehicles, and conversion to agricultural and urban land uses. The degree of disturbance often depends on specific development plans. Wetlands can be seriously impacted by increased water depth due to stormwater retention systems, or by desiccation through drainage of adjacent lands and general lowering of the water table. Swamps have traditionally been labeled as worthless by agricultural, industrial, and residential interests, with the resultant destruction of large swamp tracts via-filling, drainage, or alteration of natural water regimes. State and Federal laws now protect these habitats to a certain degree, but development of previously impacted wetlands, flood control or navigation projects, trampling by livestock, and development of critically important adjacent uplands continue to adversely impact swamps.

Marine and Estuarine Wetlands

16. Tidal Marshes and Salt Flats

Description

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.

17. Mangrove Swamps

Description

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 waters 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, that 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% between 1945 and 1982 (Harris et. al, 1983).

Environmental Values and Functions of Marine and Estuarine Wetlands

The animals that rely on tidal marshes 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 which eat the seeds. 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 group 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, pileate 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.

Threats to Marine and Estuarine Wetlands

An estimated 51% 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 manmade 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 have been sea-walled or otherwise hardened. If undertaken, restoration of these areas to their natural condition will be 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 associate 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 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, *FS*, 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 and result in the loss of the very habitats that draw hundreds of thousands of residents to the state and regions. Since mangroves are, in the United States, a Florida phenomenon, it is bootless to expect the Federal government to protect them.

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.

18. Seagrass Meadows

Description

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 Map 3.22. 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 (l983) 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% 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.

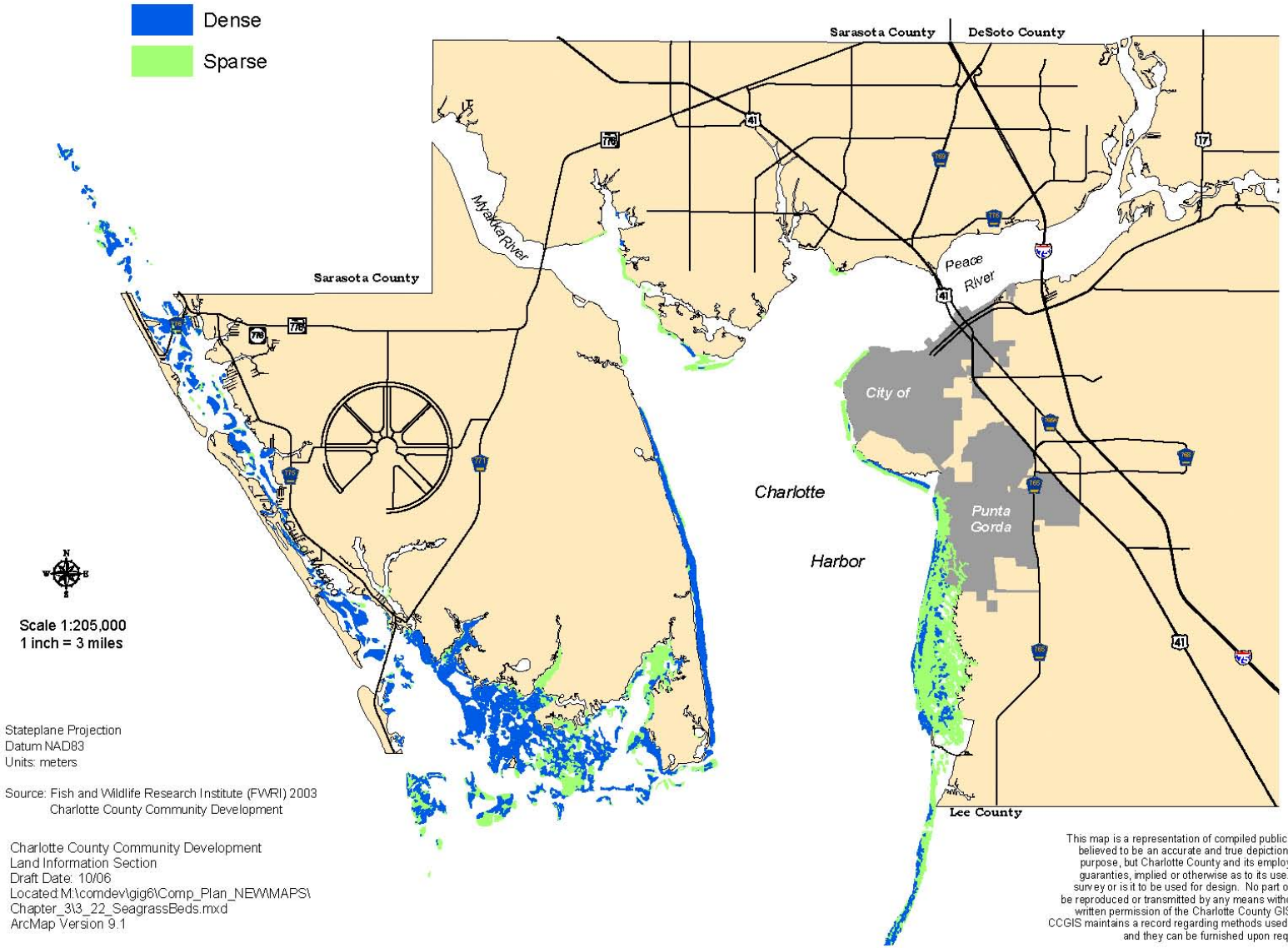
The FDEP Charlotte Harbor Aquatic Preserves have conducted annual seagrass transect monitoring since 1999. A draft summary prepared by the Charlotte Harbor Environmental Center for data from the period 1999-2004 indicates declines in seagrass density for all species and all areas sampled within Charlotte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

Threats

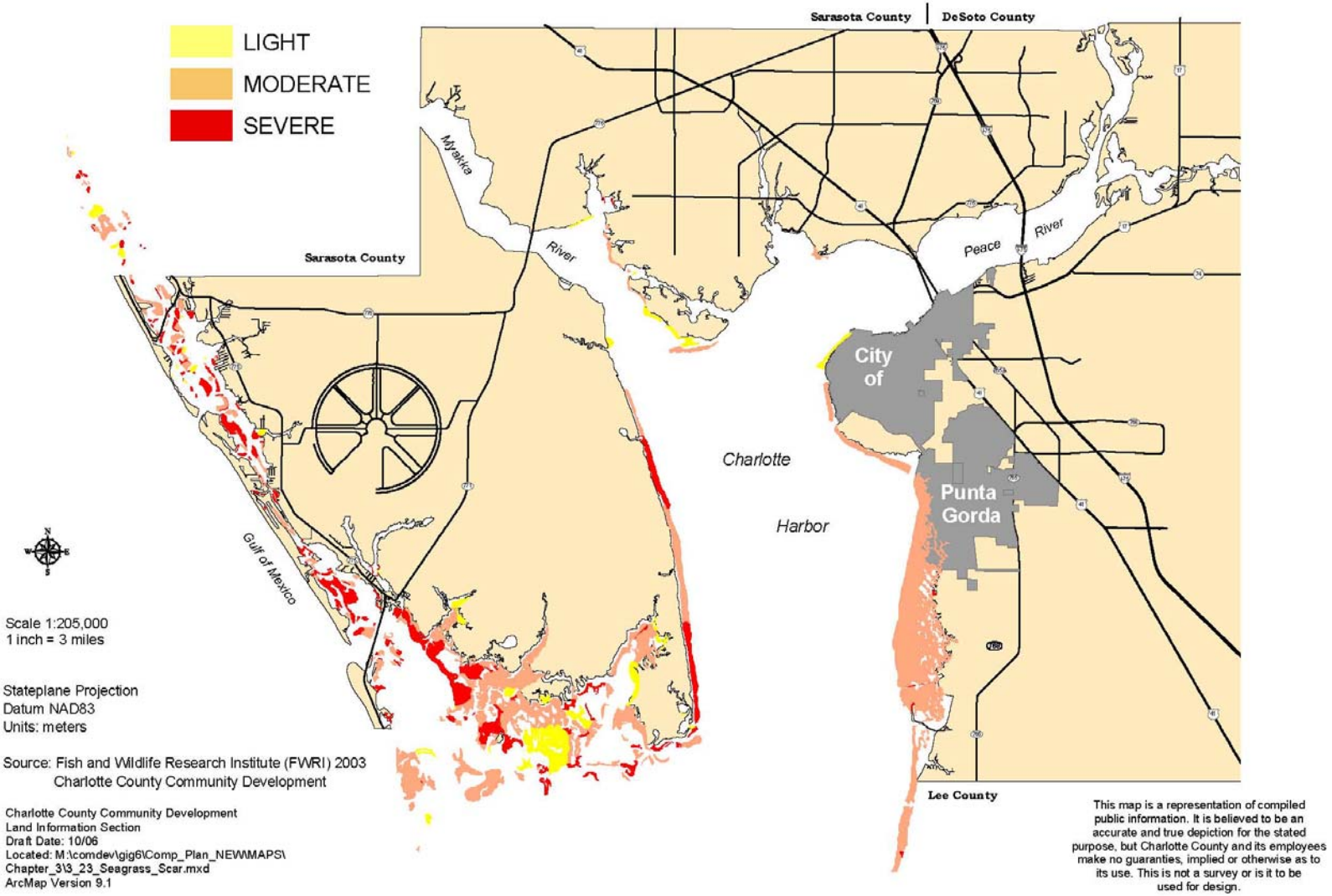
Threats to seagrasses as a result of propeller scarring is also on the rise. In 1995, the Florida Department of Environmental Protection's Florida Marine Research Institute (FMRI) now known as the Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute (FWRI) undertook 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 Map 3.23. 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 this same study, approximately 7,440 acres (or slightly more than half) of Charlotte County's seagrasses 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% of Charlotte County's seagrasses have some degree of scarring. Though the extent of moderately scarred areas were similar in the two studies, the degree of severe scarring increased over the 10 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.

Map 3.22 Seagrass Beds



Map 3.23 Seagrass Scarring Areas



19. Tidal Flats

Description

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.

20. Soft Bottoms

Description

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.

21. Oyster Bars

Description

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 l982 (Harris, et. al., l983). This represents a decrease of 60% in oyster reef habitat for these areas since l945. 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., l983). As oyster reefs are not identified as a specific habitat on either the Game Commission or Charlotte County inventories, the data gather 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.

22. Tidal Creeks

Description

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.

23. Open Water

Description

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 for the estuary, or that probably occur in the estuary. The presence of 1,122 species from several groups of plants and animals have 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.

Environmental Functions and Values of Estuaries

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.

The County's estuaries provide habitat for a number of listed bird species. 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 areas productive waters, while egrets, herons and roseate spoonbills wade the shallow waters in search of food.

Threats to Estuaries

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 seagrasses. 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. The Goals, Objectives, and Policies recommended by the Marine Advisory Committee seek further protection of these areas by providing reliable navigation channels as an alternative to many boaters' habit of seeking deeper water at 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. Seagrasses are also lost as a result of shading from docks constructed over seagrass meadows.

Indian Mounds

24. Indian Mounds

Description

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 which were not used for various tools, were discarded in large mounds.

Environmental Functions and Values

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.

Threats

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 rail-road beds. Though these resources are subject to nominal protection, their loss continues at the time of this writing.

Coastal Uplands

25. Coastal Strand

Description

The coastal strand is a thin strip of fragile, wind pruned, herbaceous vegetation which lies between beach and dune systems and 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.

26. Coastal Hammocks

Description

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 (E), Florida coontie (CE), sea grape, gumbo limbo, and strangler fig.

27. Dunes and Beaches

Description

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.

Dunelands 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, dunelands extend landward as far as the land is subject to active gain or loss if sand because of the sea or sea wind. The duneland area may be quite narrow or may extend many hundreds of feet.

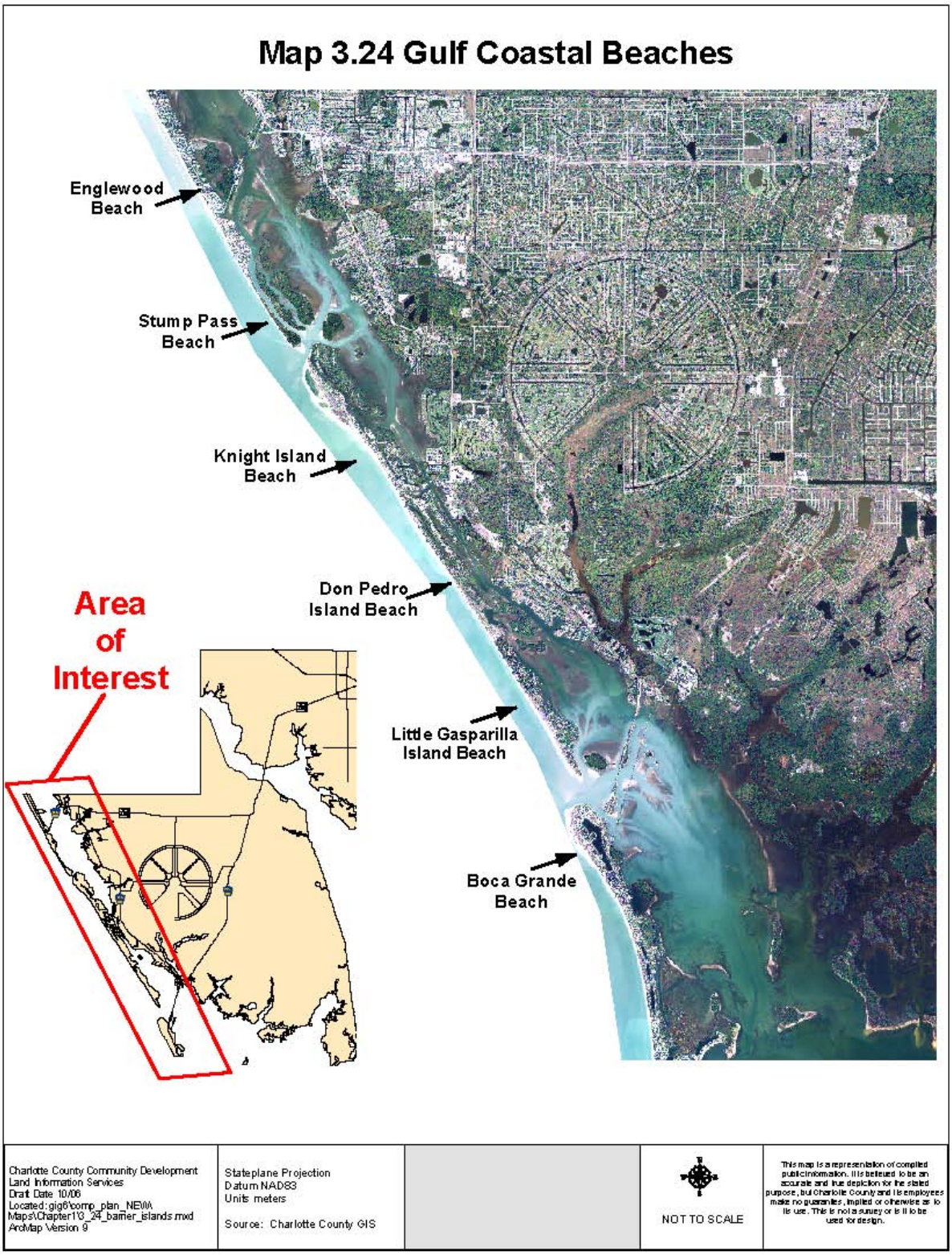
Dunelands in Charlotte County are generally low lying and are dominated by plants which are salt tolerant and able to grow in the dry, nutrient sparse habitat. The most dominant plant species of the dunelands is sea oats (*Uniola paniculata*), with beach elder (*Iva imbricata*), beach berry (*Scaevola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

Wildlife species utilizing dunelands 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.

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 waters 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.

As shown by Map 3.26, 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 l.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. These islands range from 80 to 2,000 feet in width and have elevations ranging from 5 to 9 feet (Doyle et. al., 1984).

Map 3.24 Gulf Coastal Beaches



Charlotte County Community Development Land Information Services Draft Date 10/06 Located: gis6\comp_plan_NEW\ Maps\Chapter13_24_barrier_islands.mxd ArcMap Version 9	Stateplane Projection Datum NAD83 Units meters Source: Charlotte County GIS		NOT TO SCALE	This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Environmental Functions and Values of Coastal Uplands

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 be 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 to 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 (collection, site preparation, etc.), 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.

Threats to Coastal Uplands

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 their shade they provide on the open beach, replace the native dune vegetation which can actually accelerate the erosion of dunes since their shallow roots 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 extent, 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 limits the beaches natural ability to adapt continuously to 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 Florida Department of Environmental Protection (DEP) 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 DEP 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 Knights 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 resulting in beach erosion along the northern interior shoreline of Knight Island. Consistent with the IMS, the secondary purposes of this project is to: restore and maintain safe navigation through Stump Pass, provide

erosion control measures by relocating the channel to its original 1980 location thus reducing the erosional stresses along Knight Island's northern interior shoreline; and 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, and 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 and 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 waterbody, 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.

III. Charlotte County Coastal Planning Area and Coastal High Hazard Area

A. Boundaries

Chapter 9J-5 of the Florida Administrative Code 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. As land development activities within the basins which drain into Charlotte County's estuaries can potentially impact the environmental quality of coastal and estuarine waters, the designated Coastal Planning Area should include all lands within such basins. As illustrated by Map 3.25 this Coastal Planning Area encompasses all but the most eastern portions of Charlotte County.

The Coastal High Hazard Area (CHHA), which is illustrated on Map 3.26, occurs within the Coastal Planning Area 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. 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 Coastal Construction Control Line established by the Florida Department of Environmental Protection.

With regard to land use in "High Hazard" areas, 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 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)

Characteristics of Hazard Areas

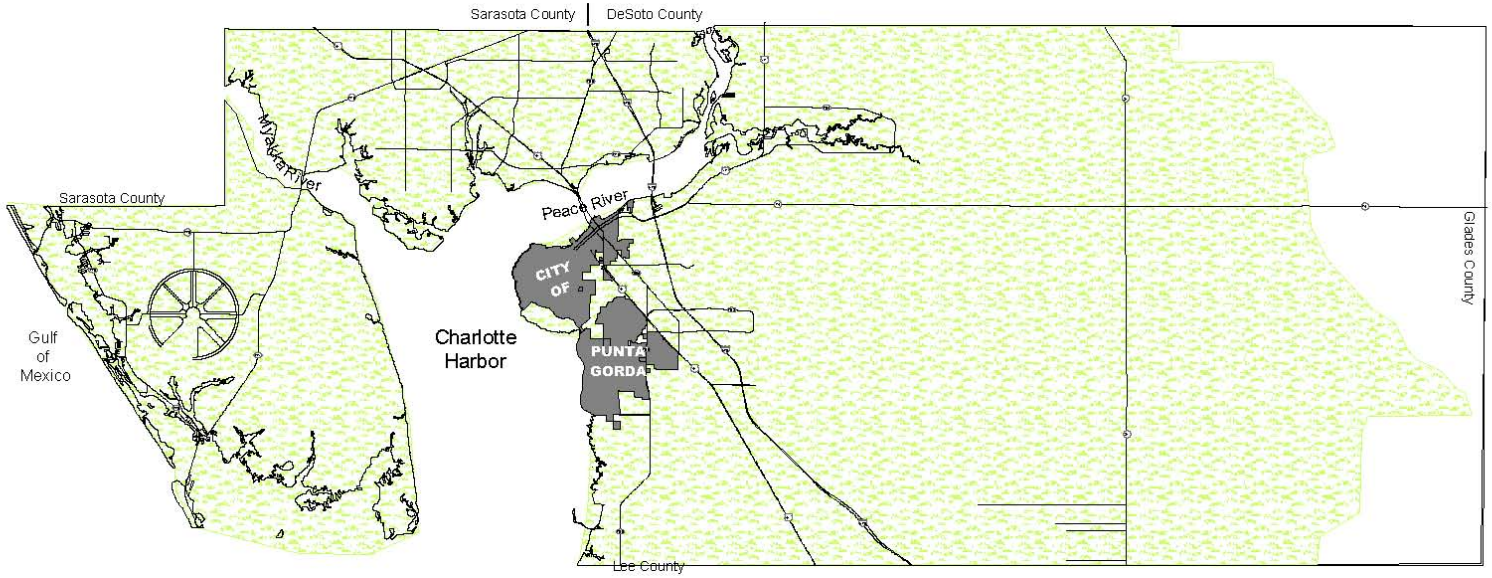
There are several characteristics which, individually or collectively, give land a high hazard designation (regarding hurricane). These are: proximity to large bodies of water; the location of the property in relation to shifting channels; and, the height of land in comparison to adjacent water bodies 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 l50 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.

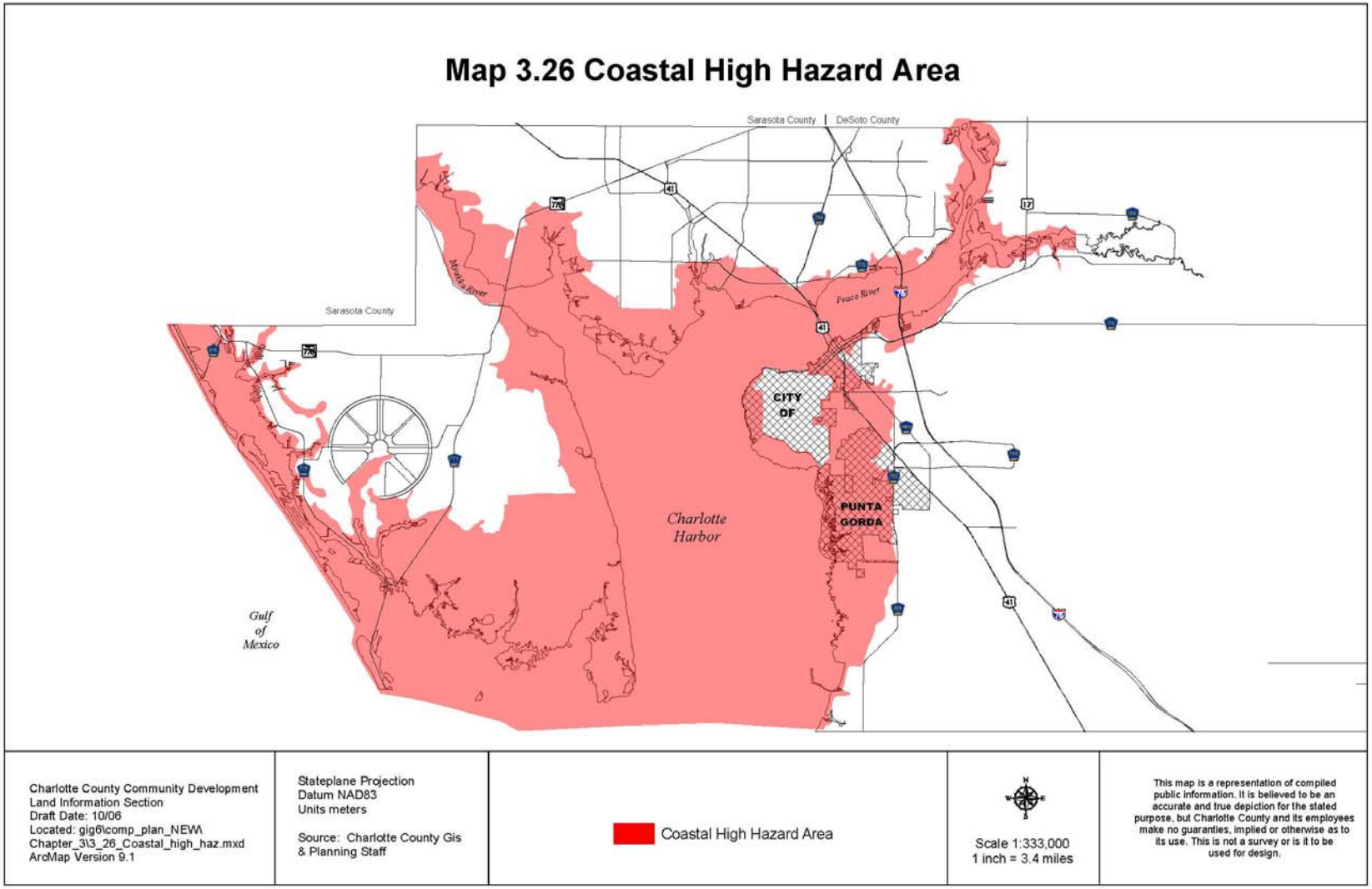
Low-lying lands (in relation to adjacent lands), is the last factor contributing to the "high hazard" designation. In the event of hurricane flooding, such low-lying lands will receive the first impacts of floods being deflected from other, higher, tracts. This may result in localized "surge" or seiche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

Map 3.25 Coastal Planning Area



Charlotte County Community Development Land Information Services Draft Date 10/06 Located: gig6\comp_plan_NEW\Maps\Chapter1\3_25_coastal_planning.mxd ArcMap Version 9.1	Stateplane Projection Datum NAD83 Units meters Source: Charlotte County Planning Staff	Coastal Planning Area	Scale: 1:320,000 1 inch = 4.9 miles	This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Map 3.26 Coastal High Hazard Area



B. Existing Land Use

Nearly all of Charlotte County's urban development lies within the Coastal Planning Area. With appropriate corrections for outlying rural areas, the existing land use inventories of residential, commercial, industrial, public and other non-industrial land uses provided in the Future Land Use Element can be used to describe land use patterns in the Coastal Planning Area. As its name implies, the Existing Land Use Map (ELUM) series (also presented in the Future Land Use Element) describes the uses to which properties in Charlotte County are currently subject. A complete description of the ELUM, including the technology on which it is based, is found in the Future Land Use Element. Unlike the Future Land Use Map, which has regulatory as well as descriptive uses, the ELUM series is included within the comprehensive plan solely as a descriptive tool as it may be subject to incorrect interpretations, particularly by casual observers.

C. Future Land Use

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 natural and financial resources 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.

D. 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 has developed a map (see Map 3.13) of all anticipated flooding which would occur in the event of a tropical storm or category 1, 2, 3, or 4/5 hurricane. Table 3.21 below, shows the estimated number of dwelling units which would be affected in each storm surge zone.

Table 3.21
Storm Surge Vulnerable Dwelling Units

Storm Surge Level	Number of Dwelling Units
Tropical	7823
Category 1	9,414
Category 2	32,692
Category 3	23,315
Category 4/5	13,913
TOTAL	**87,157**

E. Existing Infrastructure

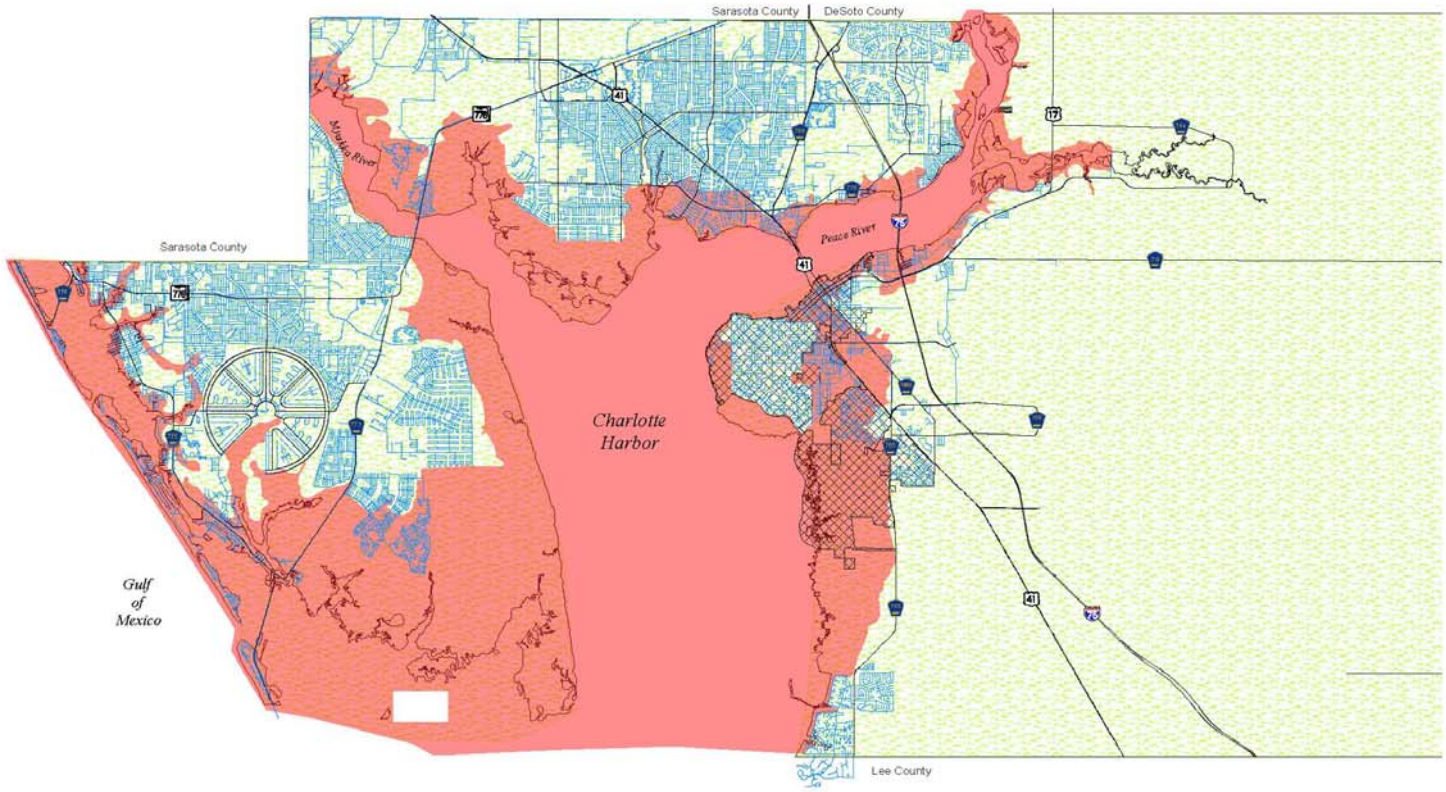
Infrastructure is a broad term which may be applied to any physical improvement to the land which generally serves growth or a public need. Infrastructure may include roads, bridges, parks, sanitary sewer facilities, potable water plants, public coastal shore protection structures, public buildings,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

Nearly all of Charlotte County's existing network of roads and bridges, water lines, and sewer lines occurs within the Coastal Planning Area. 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 Coastal Planning Area. Maps 3.27, 3.28, 3.29, and 3.30 illustrate the location of such infrastructure relative to the Coastal Planning Area and the Coastal High Hazard Area.

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 Facilities Needs 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.

Map 3.27 Potable Water Infrastructure in the Coastal Planning Area and Coastal High Hazard Area



Charlotte County Community Development
Land Information Section
Draft Date: 10/06
Located: gig6\comp_plan_NEW\Chapter_3\3_27_CHH_potable_water.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

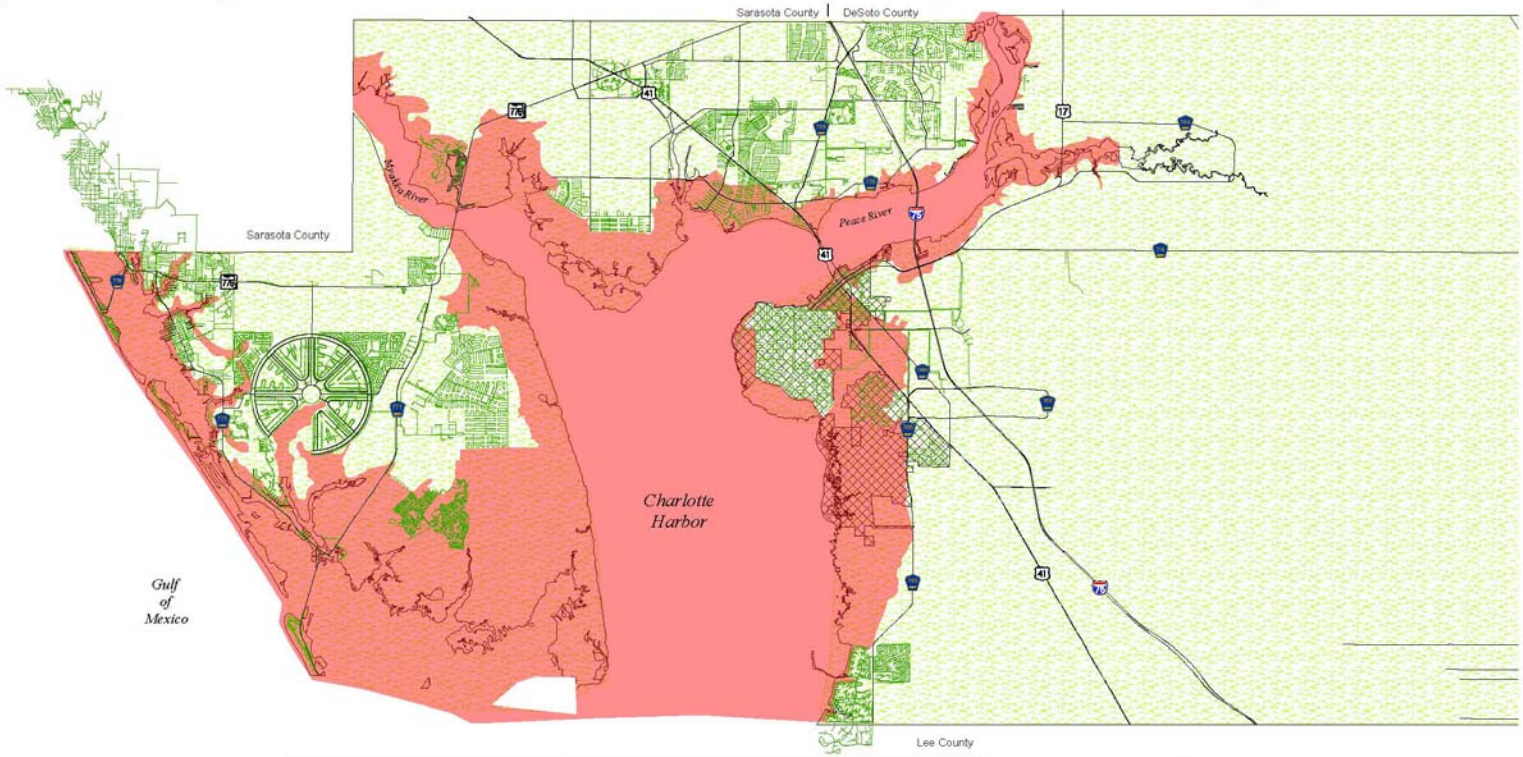
Source: Charlotte County Gis & Planning Staff

- Water Lines
- Major Roads
- Coastal Planning Area
- City of Punta Gorda
- Coastal High Hazard Area

Scale 1:205,920
1 inch = 2.5 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

Map 3.28 Sanitary Sewer Infrastructure in the Coastal Planning Area and Coast High Hazard Area



Charlotte County Community Development
Land Information Section
Draft Date: 10/06
Located: gig6\comp_plan_NEW\Chapter_3\3_28_sewer_coastal_planning.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: Charlotte County Gis & Planning Staff

- Sewer Lines
- Major Roads
- City of Punta Gorda
- Coastal Planning Area
- Coastal High Hazard Area

Scale 1:205,920
1 inch = 2.5 miles

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Map 3.29 Road Infrastructure in the Coastal Planning Area and Coastal High Hazard Area

Charlotte County Community Development
Land Information Section
Draft Date: 10/06
Located: gig6\comp_plan_NEW\Chapter_3\3_29_Roads_coastal_planning.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: Charlotte County Gis & Planning Staff

- Arterial Roads
- Collector Roads
- Coastal Planning Area
- City of Punta Gorda
- Coastal High Hazard Area

Scale 1:333,000
1 inch = 5 .25 miles

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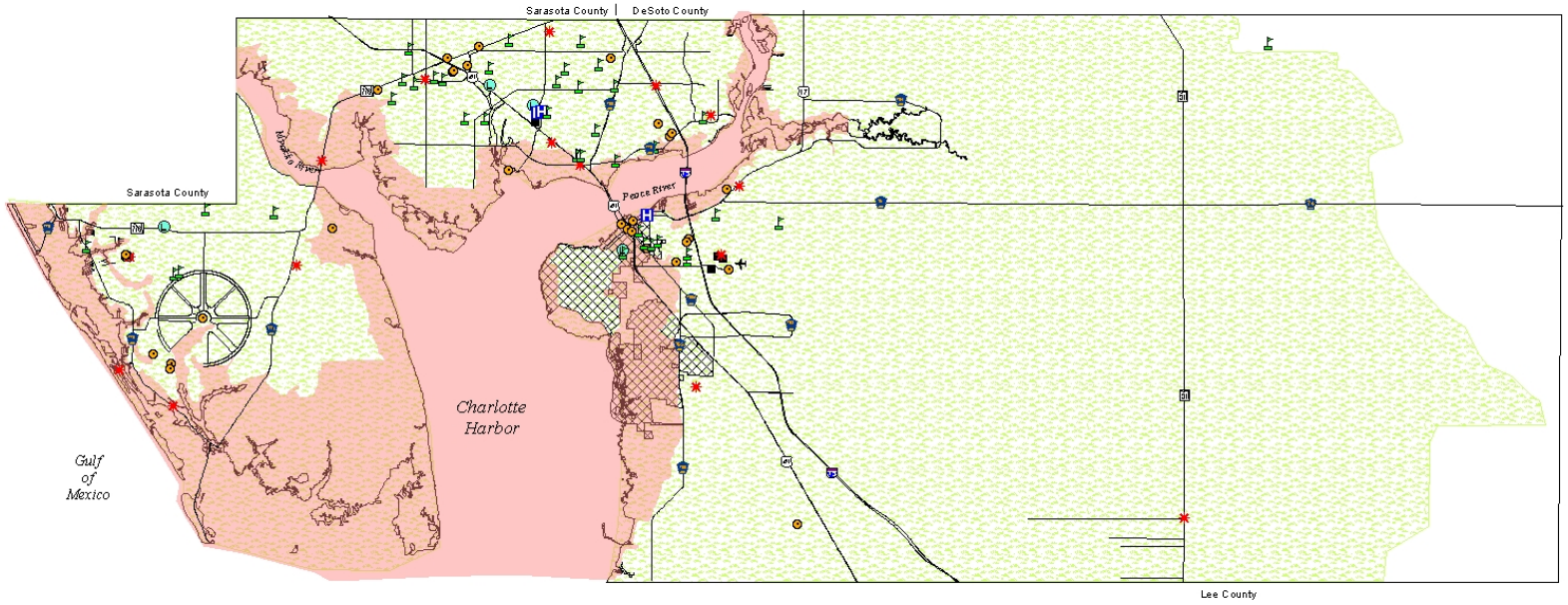
Map 3.30 Other Infrastructure in the Coastal Planning Area and Coastal High Hazard Area



Charlotte County Community Development
Land Information Section
Draft Date: 10/06
Located: gig6\comp_plan_NEW\Chapter_3\3_30_other_coastal_planning.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: Charlotte County Gis & Planning Staff

Infrastructure

- SCHOOLS
- HOSPITALS
- AIRPORT
- FIRE/EMS
- GOVERNMENT COMPLEX
- LIBRARY
- SHERIFF/JAILS
- Coastal Planning Area
- City of Punta Gorda
- Coastal High Hazard Area

Scale 1:333,000
1 inch = 3.2 miles

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F. Beach Access and Water Related Uses

Beach Access and Parking

Existing beach access and parking facilities are listed in Table 3.22~~8~~, below. At this time, the only public, Gulf-front beach with adequate parking is the Englewood Beach Facility (aka "Chadwick Park) maintained by Charlotte County. 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 to serve as an overflow parking and picnic area. The County received a grant from the Florida Communities Trust to aid this acquisition. The addition of the Winward property served to add additional parking for this beach.

Stump Pass Beach State Park, previously known as Port Charlotte State Recreation Area on Manasota Key, 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 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 Harbor Heights have already identified the acquisition of both nature preserves and active recreational facilities as top priorities.

Table 3.22
Public Beach Access Inventory for Charlotte County, Florida

Access Site	Ownership	Beach Frontage	Acres	Facilities/Comments
Englewood Public Beach (Manasota Key)	County	1,630'	15.6+	This is the primary Gulf access beach for in Charlotte County with 395 parking spaces, restrooms, outside showers, picnic shelters, barbeque grills, concessions, volleyball and playground areas.
Coquina Drive (Manasota Key)	County	30'	0.3+	None
Wilhelm Drive (Manasota Key)	County	30'	0.3+	None

Table 3.22
Public Beach Access Inventory for Charlotte County, Florida

Access Site	Ownership	Beach Frontage	Acres	Facilities/Comments
Friendship Drive (Manasota Key)	County	30’	0.3+	None
Sand Dollar Drive (Manasota Key)	County	30’	0.3+	None
Beachcomber Drive (Manasota Key)	County	20’	0.2+	1-2 “parking spaces” in sand at the end of the road right of way. No other facilities.
Stump Pass Beach State Park	State	6,400’	245	45 parking spaces along with restroom facilities, walkovers, and picnic facilities
Knight Island Beach (Palm Island/Knight Island complex)	County	3,000’ +	5.2+	Access begins at end of paved road (no parking spaces) on an bridgeless (boat access only) barrier island and encompasses a strip of beach which varies in width from 50’ to 100’ from Mean High Water. No facilities.
Pedro Island State Park (Don Pedro Island)	State	6,000+	165	Island is accessible by boat only. Facilities include docks, two cabanas, rest rooms, and trails. Future, proposed facilities may include canoe launch/trail system and snack area
Warren Street (Little Gasparilla Island)	County	20’	2.8+	Island accessible by boat only. These are unmarked access easements recorded across private properties. Private docks and homes built in close proximity may interfere with public use. No facilities. Water is shallow and there are mangroves present.
Gulf Estates (Little Gasparilla Island)	County	400’	0.5+	Island is accessible by boat only. The easements are unmarked and obscured by development of single family homes and private docks. Water is shallow and mangroves are present.
Coccoloba Subdivision (Little Gasparilla Island)	County	two 10’ wide and two 20’ wide	1.6+	Island is accessible by boat only and there are residences and private docks in the vicinity if the easements. Water is shallow and mangroves are present.
Rum Runner Road	County	20’	2.0+	Island is accessible by boat only. Access

Table 3.22
Public Beach Access Inventory for Charlotte County, Florida

Access Site	Ownership	Beach Frontage	Acres	Facilities/Comments
				is unmarked, and single family homes and associated docks are adjacent to the easements.
Privateer Road (Little Gasparilla Island)	County	10'	2.0+	Island accessible by boat only. Single family development, including docks have occurred in the vicinity of and adjacent to the easements.

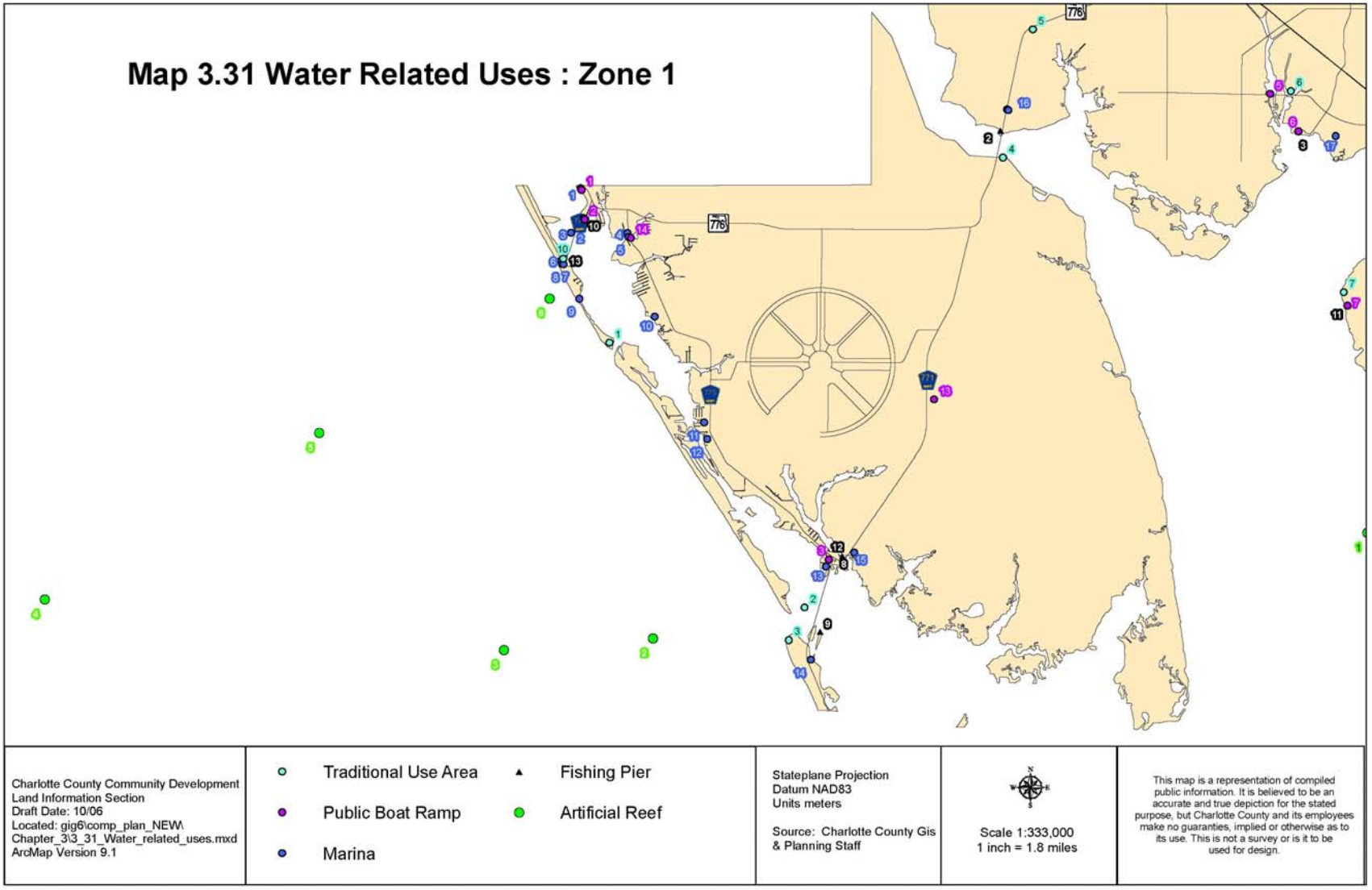
Source: Charlotte County Public Works Stormwater Division 2006

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.

Boating Facilities

Existing marinas, boat ramps, fishing piers, traditional use areas, and artificial fishing reefs are identified on Map Series 3.31 and listed in Table 3.23, 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 purchased additional land for development of new facilities and parking for boat ramps. Additional boat ramps and parking is available at Hathaway Park (1 lane), Ainger Creek Park (1 lane) and South Gulf Cove Park (1 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 (3 acres), Ainger Creek Park (1.5 acres) and the West County Boat Ramp (4.5 acres).


Map 3.31 Water Related Uses : Zone 1
776
776
721
Charlotte County Community Development
Land Information Section
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ArcMap Version 9.1
Traditional Use Area
Public Boat Ramp
Marina
Fishing Pier
Artificial Reef
Stateplane Projection
Datum NAD83
Units meters
Source: Charlotte County Gis
& Planning Staff
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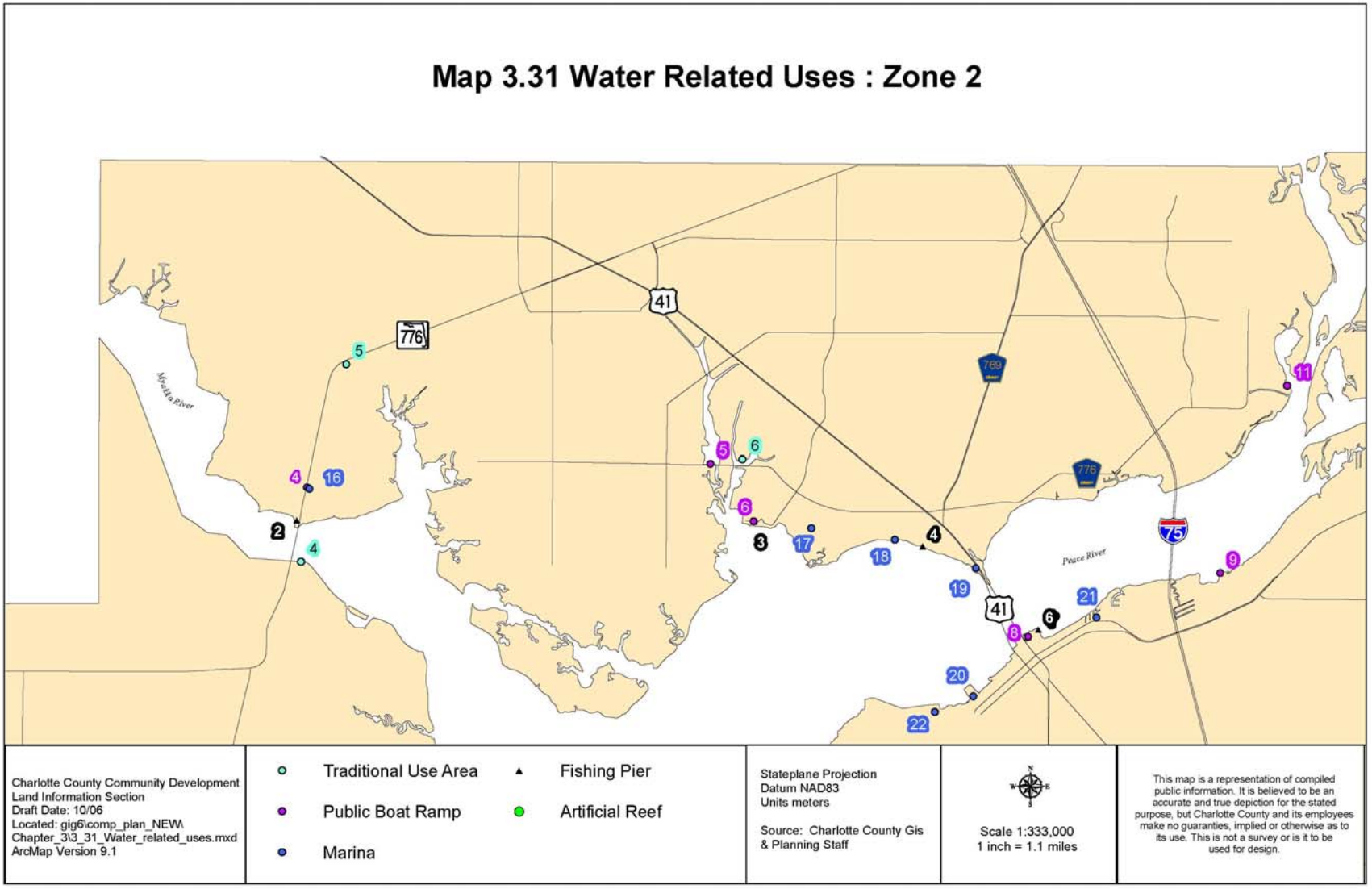
Map 3.31 Water Related Uses : Zone 2
Myakka River
Peace River
41
776
769
75
Traditional Use Area
Public Boat Ramp
Marina
Fishing Pier
Artificial Reef
Charlotte County Community Development
Land Information Section
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Stateplane Projection
Datum NAD83
Units meters
Source: Charlotte County Gis
& Planning Staff
Scale 1:333,000
1 inch = 1.1 miles
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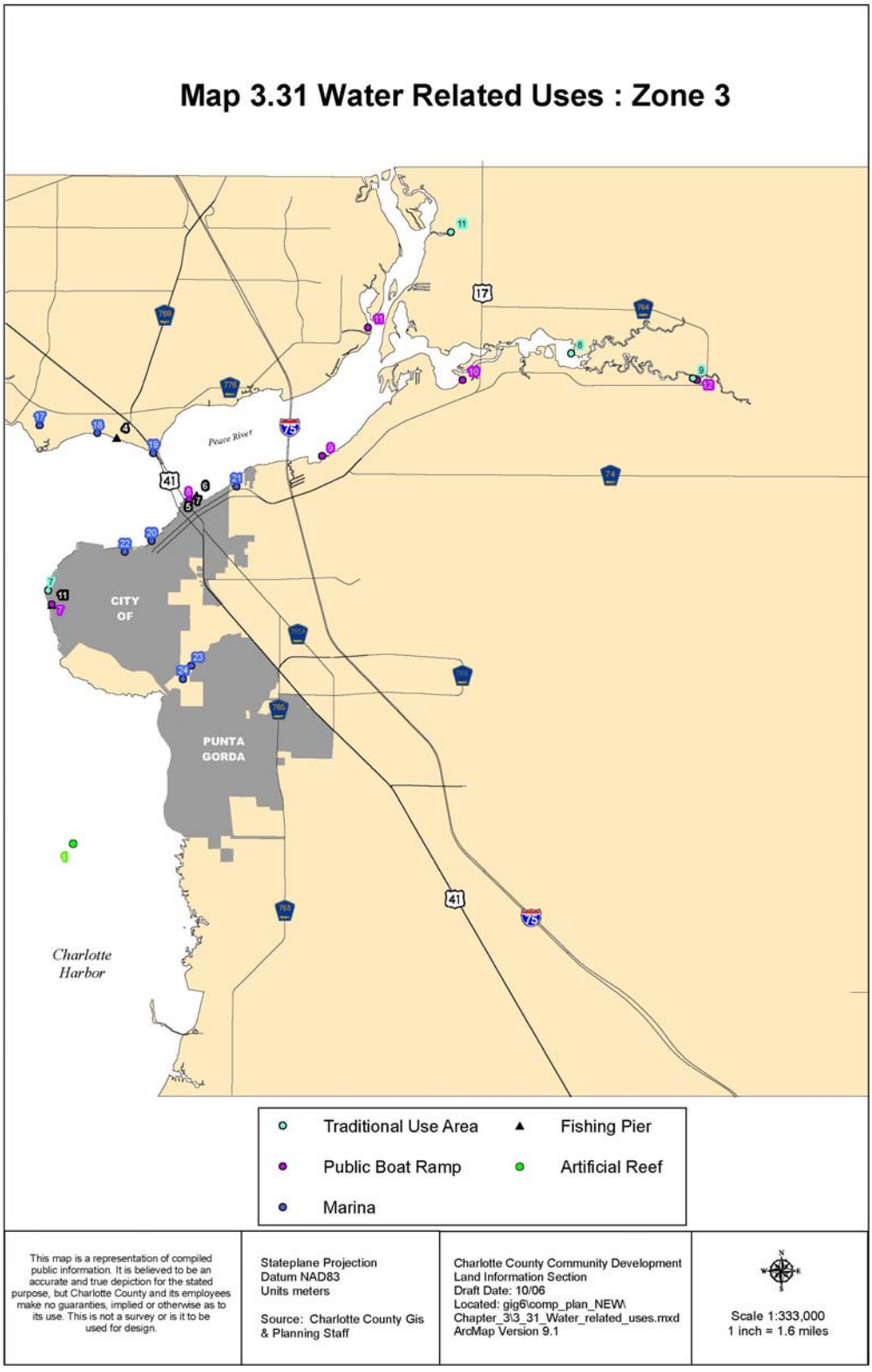

Map 3.31 Water Related Uses : Zone 3
Peace River
CITY OF
PUNTA GORDA
Charlotte Harbor
Traditional Use Area
Fishing Pier
Public Boat Ramp
Artificial Reef
Marina
This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.
Stateplane Projection
Datum NAD83
Units meters
Source: Charlotte County Gis & Planning Staff
Charlotte County Community Development
Land Information Section
Draft Date: 10/06
Located: gig6\comp_plan_NEW\Chapter_3\3_31_Water_related_uses.mxd
ArcMap Version 9.1
Scale 1:333,000
1 inch = 1.6 miles

Table 3.23
Marinas, Boat Ramps, Fishing Piers, Artificial Fishing Reefs, and Traditional Use Areas
(as of October 2006)

Reference Number on Map Series 3.31	Name of Facility, Notes	
Marinas[1]		
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	
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

Table 3.23
Marinas, Boat Ramps, Fishing Piers, Artificial Fishing Reefs, and Traditional Use Areas
(as of October 2006)

Reference Number on Map Series 3.31	Name of Facility, Notes	
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
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

Table 3.23
Marinas, Boat Ramps, Fishing Piers, Artificial Fishing Reefs, and Traditional Use Areas
(as of October 2006)

Reference Number on Map Series 3.31	Name of Facility, Notes	
		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	
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 SR 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	

[1]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 SeaGrant program.
Sources: Charlotte County Parks, Recreation and Cultural Resources Department

In 1981, Charlotte County had 7,735 registered boats; by 1991, that number increased by 79.4% (compared to the State-wide increase of 42.4%) 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%. Table 3.24, below, provides a summary of boating registration for the County through the year 2005.

Table 3.24 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 water front 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 build 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 by Table 3.25, below, trailerable-sized 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%) of the number of boats registered in Charlotte County through the year 2005. As evidenced by the Bell study, approximately 75% 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 3.25 Boat Registrations for All Sizes in Charlotte County for the year 2005* and Projected for the year 2010 *				
Size Class	Actual 2005	% of boats	2010 Projected	% 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	

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 re-developed 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 Map Series 3.31, fishing facilities include seven salt water fishing piers, two bridges and eleven traditional fishing areas. Fishing Piers have remained stable in numbers. Parking has been re-defined and expanded at existing locations. The Englewood Myakka Fishing Pier was closed following the loss of parking as a result of a Florida D.O.T. project but an additional pier was added in the West County Planning District 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.

As also shown, 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.

G. Public Access and Shoreline Conflicts

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 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 Parks, Recreation and Cultural Resources Department, the Environmental & Extension Services Department, and Community Development with input from numerous advisory committees.

H. Natural Disaster Planning Concerns

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 update, and during the debates regarding the extension of the one percent (aka "one cent") sales tax, hurricane evacuation and shelters were consistently brought up as one of the issues the 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 (compare Map 3.1 with Map 3.12). According to the Hurricane Evacuation Study 2001, completed by the Southwest Florida Regional Planning Office, 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 (also known as the West County Planning District) which is, as illustrated by Map 3.13 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 manmade 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 from 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 West County Planning District 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 Planning District is based on three major roads: State Road 776 and County Roads 771 & 775. SR 776 plays a critical role in West County evacuation in that both CR 771 & CR 775 connect with it and evacuees must travel at least a portion of SR 776 to get out of harm's way. Evacuation north along SR 776 through Sarasota County tends to follow the coast, and so in itself SR 776 is not a good alternative. However, moving east then north, SR 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 a one way away from the coast. This strategy reduces the choke potential for this bridge.

The other route off of the Cape Haze peninsula also involves SR 776 which intersects with the recently constructed Winchester Road, which was conceived from the start as an evacuation route. Winchester Road runs north from SR 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 CR 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 calculated for Charlotte County. The County has reviewed alternate routes such as US 17 and County Road 74, for Charlotte County evacuees to use to follow a successful evacuation plan. All of the County's evacuation routes are illustrated on Map 3.32.

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 23rd 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

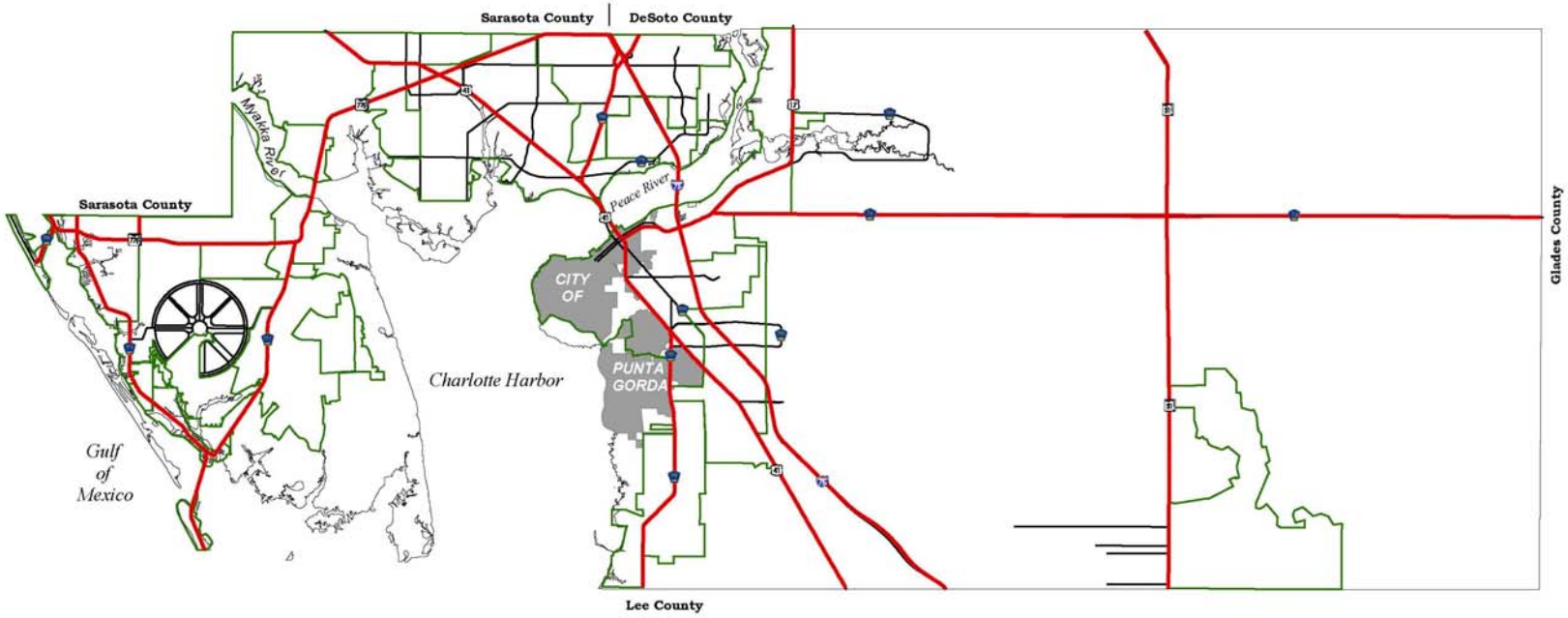
the loss of property and potentially life would certainly have been much greater. Part of the problem is that the County's platting and development pattern has placed many of the major roads and evacuation routes within the 100 year floodplains or other lower areas which makes them highly prone to flooding.

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 that 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 that requires critical bridges to be either replaced or repaired.

US 17 also serves as an evacuation route for local residents. US 17 lies in the South County Planning District 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 WalMart 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 Planning District, this project provides regional benefits, notably to Lee County evacuees, as well.

Improvements are also underway for the Mid County Planning District. 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.

Map 3.32 Hurricane Evacuation Routes



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Land Information Services
Draft Date: 10/06
Located: gig6\comp_plan_NEW\Chapter_3\3.32_Hurr_evac_routes.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units: meters

Source: Charlotte County GIS

Evacuation Routes
Urban Service Area Overlay

Scale 1:205,920
1 inch = 3.25 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

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 3.26, 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 illustrates 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 SR 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 3.26
Total Evacuation Time Exiting Storm (hours)

Storm Surge Category	Evacuation speeds	Evacuation Time 1995		Evacuation Time 2001		Evacuation Time 2005*	
		July	November	July	October	July	October
1	Slow	3.7	4.1	2.3	2.4	2.6	2.8
	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 Study, Southwest Florida/1995 and Southwest Florida/2001 Southwest Florida Regional Planning Council
*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 (miles of canals were included as part of the platting) the water. The majority of the platting in Charlotte County occurred in areas vulnerable to storm surges; Table 3.27 identifies 73% 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 3.27
Number of Platted Lots within Storm Surge Zones

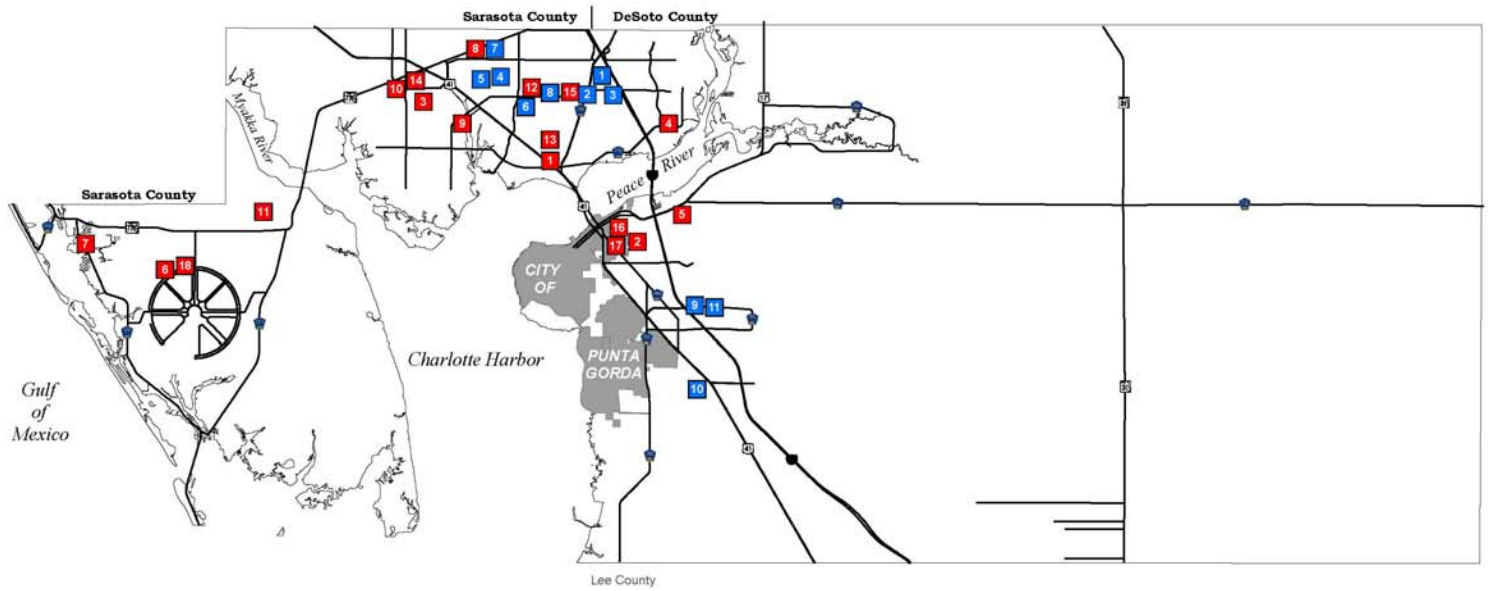
Storm Surge Zones	# of Platted Lots	% of Lots w/in Hurricane Vulnerability Zone
TS	18,292	7
1	15,218	6
2	97,612	38
3	57,573	22
TOTAL	188,695	73

Source: Community Development 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), FS). Unfortunately, as shown by Map 3.33, 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.

Map 3.33 Hurricane Shelters As Defined By The Regional Planning Council



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Land Information Services
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ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units: meters

Source: Charlotte County GIS, Charlotte County Fire Department, Southwest Regional Planning Council

Primary Shelters

1	Charlotte Harbor School	10	Murdock Middle School
2	Charlotte High School	11	Myakka River Elementary School
3	Charlotte Vo-Tech School	12	Neil Armstrong Elementary School
4	Deep Creek Elementary School	13	Peace River Elementary
5	East Elementary School	14	Port Charlotte High School
6	L.A. Ainger Middle School	15	Port Charlotte Middle School
7	Lemon Bay High School	16	Punta Gorda Middle School
8	Liberty Elementary School	17	Sallie Jones Elementary School
9	Meadow Park Elementary	18	Vineland Elementary School

Secondary Shelters

1	Victoria Estates
2	Maple Leaf Estates Clubhouse
3	Pilgrim United Church Of Christ
4	Pt Charlotte United Methodist
5	St James Episcopal Church
6	First Presbyterian Church
7	Liberty Elementary Cafeteria
8	Port Charlotte Middle School Cafeteria
9	Ventura Lakes Clubhouse
10	Friendship United Methodist Church
11	Friendside Oaks Clubhouse Building

Scale 1:158,400
1 inch = 2.5 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

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 3.28 below.

Table 3.28
Occupancy Rate by Unit Type

Unit Type	Seasonal Occupancy Rates	
	July	October
Single family/Duplex	95%	100%
Multi-family	61%	71%
Mobile Home	43%	75%
Travel Trailer	18%	41%
Hotel/Motel	40%	50%

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 3.29, 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 will need to seek shelter other than with friends, family, or other private arrangement is the critical issue.

Table 3.29
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, Southwest Florida/2001 Southwest Florida Regional Planning Council
*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% 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 3.30

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 3.30.

Table 3.30
Public Shelter Capacity Landfalling Storm*

Primary Refuges

Storm Category	Space	Evacuees		Percent Met		Space Needed to Open		Surplus/Deficit	
		July	October	July	October	July	October	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	October	July	October	July	October	July	October
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, Southwest Florida/2001 Southwest Florida Regional Planning Council
*Data is forecasted for 2005

As illustrated by Table 3.30, even with the inclusion of secondary shelters, 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 3.31 below shows the additional capacity available to evacuees if hotels and motels are as secondary shelters.

Table 3.31
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: Southwest Florida Regional Planning Council's Report on Hurricane Evacuation Study 2001
*Data is forecasted for 2005

The 2001 HES states that although limited, the friends and family option provides additional shelter capacity which diminishes as the ratio of evacuees to those not affected increases as shown in Table 3.32. The HES further points out that if an assumption is made "that ratios of 1:1 or better (0.8:1, for example), will enable those seeking shelter with friends will find them. (sic) This constitutes 13% of the population. Ratios of worse than 1:1 (2:1, for example), will diminish the likelihood in proportion to the ratio. 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% in July and 5.6% in October of the evacuees 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 3-31, below, summarizes the percent shelter space increase due to friends or relatives.

Table 3.32
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
*Data is forecasted for 2005

The preceding discussions are summarized in Table 3.33, below, which presents the shelter capacity situation for Charlotte County.

Table 3.33
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, which is located in the Category 5 zone along the County Line, represents one such opportunity.

Affect of Future Land Uses

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 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 decline (i.e., increase in length) as the County's population continues to swell.

I. Areas in Need of Redevelopment

Many of the existing structures in the Coastal Planning Area were built prior to the County's participation in the Federal Emergency Management Agency's (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 one hundred 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 fifty 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 Harbor 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 format 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 downtown area and the Mid and South County Planning Districts. Many of the older units were damaged or destroyed, not by flooding but by wind. A discussion of these properties is found in the Housing Element.

J. Post Disaster Redevelopment in the Coastal High Hazard Area

As previously stated, the Coastal High Hazard Area incorporates the "V" (velocity) zones depicted on the FEMA's Flood Insurance Rate Maps (FIRM), areas seaward of the Charlotte County Coastal Construction Control Line, 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 re-directing 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% 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 Coastal High Hazard Area (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 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 re-development 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% of their value, at which time they have to 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% rule. Several methods were available to calculate the 50% and many structures that may have otherwise been demolished were allowed to be gutted down to four standing walls and rebuilt.

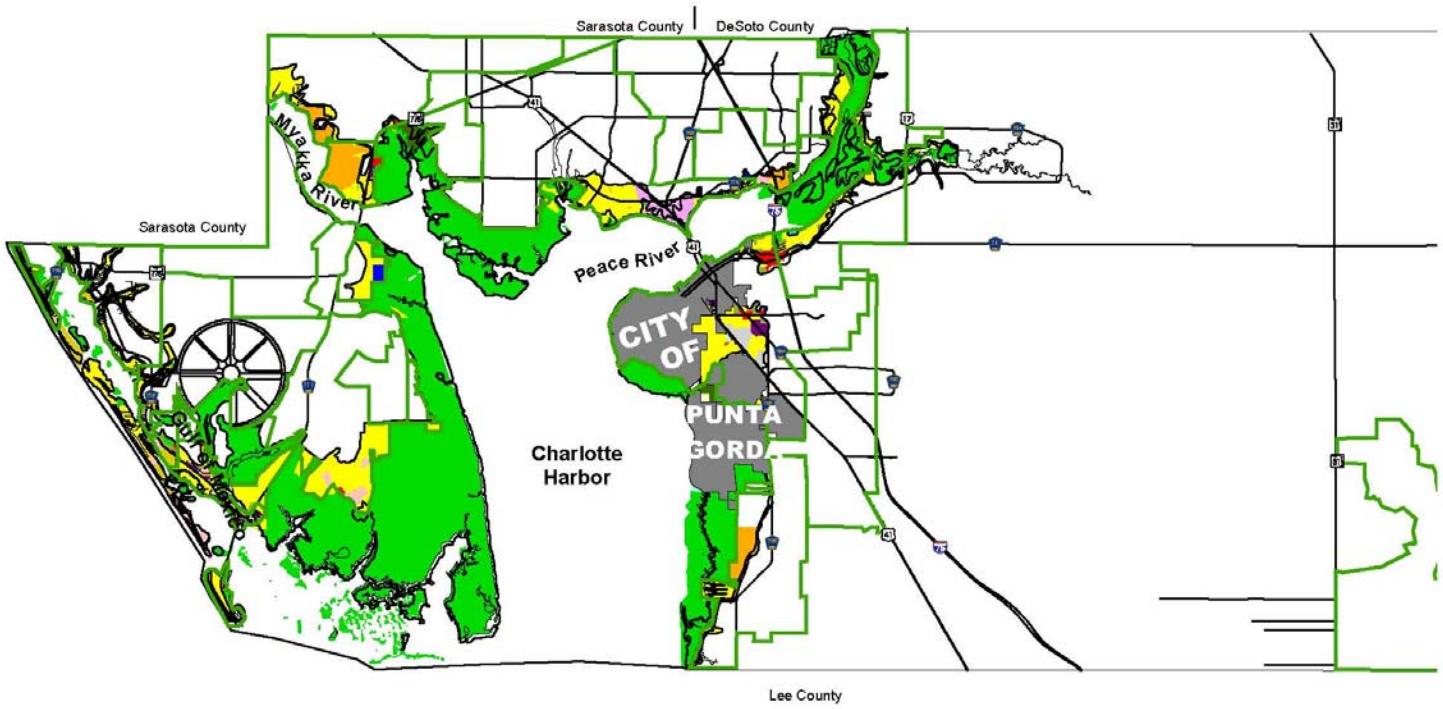
The uncertainty surrounding what vested rights exist for post-disaster redevelopment is complicated by the 1997 Comprehensive Plan which does not provide specific policies to reduce densities in the wake of a disaster, but instead focuses on ameliorating the scale of future potential disasters. It does 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 programs. Because this policy guidance is limited to future platting but is silent in regard to construction not requiring platting, an applicant is most likely able to rebuild in accordance with the property's underlying zoning and future land use designations.

As illustrated by Map 3.34, 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 1 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 10 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 1 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 1 dwelling unit per 10 acres within the USA with 1 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 re-development.

Map 3.34 Future Land Use Designations within Charlotte County Coastal High Hazard Area



Charlotte County Community Development
Land Information Section
Draft Date 10/06
Located:
M:\comdev\gig6\Comp_Plan_NEW\MAPS\Chapter_3\3_34_FLUM_CHHA.mxd
ArcMap Version 9.1

Stateplane Projection
Datum NAD83
Units meters

Source: Charlotte County GIS

- Agriculture
- Charlotte Harbor CRA
- City
- Coastal Residential
- Commercial Center
- Commercial Corridor
- High Density Residential
- High Intensity Industrial
- Low Density Residential
- Low Intensity Industrial
- Medium Density Residential
- Mixed Use
- Parks & Recreation
- Preservation
- Public Lands & Facilities
- Recreational Vehicle Park
- Resource Conservation
- Rural Estate Residential
- Coast High Hazard Boundary
- Urban Service Area Overlay

Scale: 1:269,905
1 inch = 4.9 miles

This map is a representation of compiled public information. It is believed to be an accurate and true depiction for the stated purpose, but Charlotte County and its employees make no guaranties, implied or otherwise as to its use. This is not a survey or is it to be used for design.

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

1. To limit 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. Continue to implement the 50 % rule as described above.
3. Charlotte County will continue 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 it lies within the 100 – year and 500 – year floodplains, the maps also designates areas which are located within coastal floodplains with velocity.
4. Charlotte County will continue through the development review process to ensure 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 to which the County is committed to developing. 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.

Disaster Assistance Programs

There are numerous disaster-related programs administered by various agencies, but primarily by the Federal Emergency Management Agency (FEMA), the Farmers Home Administration (FmHA), the Small Business Administration (SBA), and the U.S. Department of Housing and Urban Development (HUD). Several types of assistance are available, including assistance to individuals, families, businesses and local governments. Assistance can take the form of either grants or loans.

The greatest single source of federal disaster assistance is provided under the authority of the Disaster Relief Act of l974 (P.L. 93-288), implemented by the Federal Emergency Management Agency. Federal resources are made directly available to disaster stricken areas through provision of services, supplies, equipment, manpower, and by the expenditure of congressionally authorized funds for relief, rehabilitation and construction purposes.

Four classifications of disaster exist, indicating the extent of federal involvement. These include:

1. Major disasters declared by the President
2. Disasters declared by the SBA
3. Disasters declared by FmHA
4. Disasters in which no formal declaration is made.

The types and amounts of aid vary according to the above disaster classifications. Some disaster aid comes in the form of grants that do not have to be paid back, while other may come in the form of low-interest loans from SBA. Initial grants from the Federal Emergency Management Agency (FEMA) cover only basic housing needs and will not normally compensate individuals for their entire loss. Loans from SBA can provide the funding for a more complete recovery.

Grants from the Individual and Family Grant Program (IFG) administered by the state may be able to address unmet needs not covered by any other disaster assistance programs. But, in order to be considered for IFG, applicants must first fill out and return their SBA loan applications.

Other types of programs that deal with individual and family needs include the Food Stamp Program-Emergency issue, Food Distribution Program-Emergency Assistance and Legal Services (specifically low-income persons).

The following sections summarize the programs that are currently available. Programs are divided into three major categories: temporary housing, individual assistance, and public assistance.

Individual Assistance

Individual assistance includes the need for disaster relief programs for individuals or businesses, excluding temporary housing programs. They may include:

1. Assistance for Individuals and Households

This program, which may include cash grants of up to $26,200 per individual or household, includes:

- A. Housing Assistance
  - Lodging expenses reimbursement (for a hotel or motel)
  - Rental assistance (cash payment for a temporary rental unit or a manufactured home)
  - Home repair cash grant
  - Home replacement cash grant
  - Permanent housing construction in rare circumstances
- B. Other Needs Assistance
  - Medical, dental, funeral costs
  - Transportation costs
  - Other disaster-related needs

2. Low-Interest Loans

Most, but not all, federal assistance is in the form of low interest loans to cover expenses not covered by state or local programs, or private insurance. People who do not qualify for loans may be able to apply for a cash grant. The Farm Service Agency (FSA) and the Small Business Administration (SBA), offer low interest loans to eligible individuals, farmers and businesses to repair or replace damaged property and personal belongings not covered by insurance.

3. Veterans Benefits

The Department of Veterans' Affairs provides death benefits, pensions, insurance settlements and adjustments to home mortgages for veterans.

4. Tax Refunds
The Internal Revenue Service (IRS) allows certain casualty losses to be deducted on Federal income tax returns for the year of the loss or through an immediate amendment to the previous year's return.

5. Excise Tax Relief
Businesses may file claims with the Bureau of Alcohol, Tobacco and Firearms (ATF) for payment of Federal excise taxes paid on alcoholic beverages or tobacco products lost, rendered unmarketable or condemned by a duly authorized official under various circumstances, including where the President has declared a major disaster. Read more, (445 Kb Word Document)

6. Unemployment Benefits
Disaster Unemployment assistance and unemployment insurance benefits may be available through the state unemployment office and supported by the U.S. Department of Labor.

7. Crisis Counseling
The purpose of the crisis counseling program is to help relieve any grieving, stress, or mental health problems caused or aggravated by the disaster or its aftermath. These *short-term* services, provided by FEMA as supplemental funds granted to State and local mental health agencies, *are only available to eligible survivors of Presidential-declared major disasters*. Those who may require this confidential service should inquire about it while registering for disaster assistance. Or they may contact FEMA's toll-free Helpline number 1-800-621-FEMA (TTY 1-800-462-7585) to find out where these services can be obtained. Crisis counselors are often on-hand at Disaster Recovery Centers (when they are established). Eligible survivors may also learn more about where crisis counseling services are available via the media, and FEMA's Recovery Times newsletters. Crisis counseling services are also offered by the American Red Cross, the Salvation Army, other voluntary agencies, as well as churches and synagogues. Additional mental health information may be found on the U.S. Department of Health and Human Services, Center for Mental Health Services' website, www.mentalhealth.org.

8. Free Legal Counseling
The Young Lawyers Division of the American Bar Association, through an agreement with FEMA, provides free legal advice for low-income individuals regarding cases that will not produce a fee (i.e., those cases where attorneys are paid part of the settlement which is awarded by the court). Cases that may generate a fee are turned over to the local lawyer referral service. Individuals, families and businesses may be eligible for federal assistance if they live, own a business, or work in a county declared a Major Disaster Area, incur sufficient property damage or loss, and, depending on the type of assistance, do not have the insurance or other resources to meet their needs. To apply for Assistance for Individuals and Households, all you have to do is call the special toll free telephone number, 1-800-621-FEMA (TTY: 1-800-462-7585) and register. Specially trained operators at one of FEMA's National Processing Service Centers will process your application.

9. Equal Rights Office

Each Federal agency that provides Federal financial assistance is responsible for investigating complaints of discrimination in the use of its funds. If you believe that you or others protected by Civil Rights laws have been discriminated against in receiving disaster assistance, you may contact one of FEMA's Equal Rights Officers (ERO), who has the job of ensuring equal access to all FEMA disaster programs. The ERO will attempt to resolve your issues. You can read more about your civil rights on the FEMA site.

Major agencies providing individual assistance include FEMA, SBA, and FmHA.

Low Interest Disaster Assistance Loans

These programs can be utilized by individuals, as well as businesses. Individual programs include Unemployment Assistance, aid to businesses takes the form of Aid to Major Sources of Employment, Economic Injury Disaster Loans, and Physical Disaster Loans. Agricultural programs include Economic Injury Disaster Loans, Emergency Loans, the Emergency Food Program and the Emergency Conservation Program.

Public Assistance

The Public Assistance Program provides supplemental Federal disaster grant assistance for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations. The Federal share of assistance is not less than 75% of the eligible cost for emergency measures and permanent restoration. The State determines how the non-Federal share (up to 25%) is split with the applicants.

Eligible Applicants

- Eligible applicants include the States, local governments, Indian tribes and certain PNP organizations.
- Eligible PNP facilities must be open to the public and perform essential services of a governmental nature. Eligible PNP facilities generally include the following:
    - Medical facilities, such as hospitals, outpatient and rehabilitation facilities.
    - Custodial care facilities that provide institutional care for persons who require close supervision and some physical constraints in their daily activities.
    - Educational facilities, such as primary and secondary schools, colleges and universities.
    - Emergency facilities, such as fire departments, rescue squads, and ambulance services.
    - Utilities, such as water, sewer, and electrical power systems.
    - Museums, zoos, community centers, libraries, homeless shelters, senior citizen centers, shelter workshops and facilities which provide health and safety services of a governmental nature.

Eligible Work

To be eligible, the work must be required as the result of the disaster, be located within the designated disaster area, and be the legal responsibility of an eligible applicant. Work that is eligible for supplemental Federal disaster grant assistance is classified as either emergency work or permanent work.

- Emergency Work
  - Debris removal from public roads and rights-of-way as well as from private property when determined to be in the public interest.
  - Emergency protective measures performed to eliminate or reduce immediate threats to the public, including search and rescue, warning of hazards, and demolition of unsafe structures.
- Permanent Work
  - Work to restore an eligible damaged facility to its pre-disaster design. Work range from minor repairs to replacement.
  - Categories of permanent work include:
    - Roads, bridges and associated features, such as shoulders, ditches, culverts, lighting and signs.
    - Water Control Facilities including drainage channels, pumping facilities, and the emergency repair of levees. Permanent repair of Flood Control Works is the responsibility of the U.S. Army Corps of Engineers and the Natural Resources Conservation Service.
    - Buildings including their contents and systems.
    - Utility Distribution Systems, such as water treatment and delivery systems; power generation facilities and distribution lines; and sewage collection and treatment facilities.
    - Public Parks, Recreational Facilities and Other Facilities, including playgrounds, swimming pools and cemeteries.

Other Programs

Other programs include tax information and education (individuals can claim casualty losses on income tax returns) as well as private insurance programs. In addition, the Red Cross, an independent voluntary body with local chapters throughout the nation, provides services to individuals and families, including food, shelter, and rehabilitation. Its efforts, however, are limited to that which is not covered by other programs.

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 similar reoccurrence of destruction in the future.

To determine potential sites suitable for relocation of various land uses, first, 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 is 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 l (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 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.

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, like the Peace River, are potentially vulnerable to storm-related contamination. For groundwater sources, like the Burnt Store plant, 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 at 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:

(l) wait through an emergency period until the source quality is restored,
(2) switch to an alternative treatment technology, or
(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 manmade 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

The provision of wastewater facilities in the Category l Storm Surge zone is 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 that 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 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 l) 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 l Storm Surge zone are divided into three categories: ports, railroads, and roads. Port facilities, of necessity, must be located in the Category l 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 l Storm Surge Zone are those primarily crossing the flood zone at river crossings. Most rail related facilities are located outside of the Category l Storm Surge Zone; the need for relocation of these is minor.

Road facilities in the Category l 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 notable 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 to the availability of recreational uses.

As illustrated by Maps 3.27, 3.28, 3.29 and 3.30, 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 rail road 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.

K. 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 will define and identify 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. All local governments in Southwest Florida have adopted the Standard Building Code (formerly the Southern Standard Building Code) developed by the Southern Standard Building Code Conference. Many building codes contain hurricane-proofing provisions.

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, and,
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.

All local governments in the coastal areas of Southwest Florida have adopted subdivision regulations.

Conventional Zoning and Land Use Planning

A functioning community needs to provide the capability for virtually all types of development. The manner in which this development may locate is commonly accomplished through the zoning-land use planning process.

Zoning is a commonly employed development control device. It is used to regulate 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. Zoning regulates the height of structures, the use of structures and land, and the size of lots and density of use. One important aspect of zoning is the ability to specifically regulate flood hazard area land uses.

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 the 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 improvement but has one major difference, which is to make it more expensive to develop hazard areas, regardless of the cost of normal 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 that 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 off-site 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 are 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 initial approvals.

Special taxes are a form of fiscal policy which are applied through time, which may extend beyond the life of the development. Such taxes are perhaps most appropriate for unusual ongoing maintenance programs (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 regulation that reduced 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 spaces 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 discussed above to regulate, control, and influence growth and development. However, the Comprehensive Plan is currently the only technique intended specifically to proactively discourage growth 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, requiring development to 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, etc.).

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 services 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 Transfer of Density Units (TDU) process. In this process, which is described in Chapter 3-5 of the Charlotte County Code of Laws and Ordinances, residential development rights are severed from one parcel of land and transferred to another. The process involves creating a market for "rights" of development. This market was created when the Board of County Commissioners agreed that total residential development in the County should be "capped"; the only way a property owner can now increase density is to transfer it from some other property in the County. Very few communities in Florida have been able to establish these caps; where they can be enacted, however, a transfer of development rights program has unrealized capabilities.

The intent of the Transfer of Density Units ordinance 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. A property must meet one of the criteria listed in the ordinance in order to qualify as a Sending Zone (SZ) and meet all of the criteria listed in the ordinance in order to qualify as a Receiving Zone (RZ).

To transfer density, the SZ units must be Certified by the Board of County Commissioners. This means that the property was determined to be a suitable sending zone. Once the SZ is Certified, a certificate is issued to the property owner who now has the ability to sell density units to others or utilize them for their own projects. The property owner also has the ability to retain some units on the SZ property; however, areas that contain ecological or archeological resources must have all of the density from the resource area removed so that these areas can be preserved. In order to be approved, a covenant must be attached to the property. The covenant specifies the continued use of that property in perpetuity; for example, (1) develop X amount of density; (2) limited recreation; (3) depletion of development rights; and/or (4) the continuance of a bona fide agricultural use. Further, if the property contains wetlands or listed species habitat, the transfer of density does not preclude the property owner from using that land for mitigation. As part of the process, the property owner must agree to a plat vacation and/or a rezoning and Future Land Use Map (FLUM) amendment to reflect the decrease in developable density.

There are also criteria in order for a property to qualify as a Receiving Zone (RZ), the property to which the density is transferred. Developers proposing to create an RZ must apply for a rezoning and, if necessary, an amendment of the FLUM. The base density, that number of units that the property owner has the right to develop prior to transferring in density, is calculated upon the most restrictive of the zoning or FLUM densities. Developers can buy density from the County, buy density from someone who has a Certificate of Transferable Density or attempt to Certify density from other property they may own.

The TDU ordinance has also enacted land use controls on properties within the most vulnerable areas which are designated as the Coastal High Hazard Area (CHHA). The CHHA encompasses all the areas which would be evacuated in the event of a landfalling Tropical Storm or Category I Hurricane. Charlotte County's CHHA is illustrated by Map 3.26. In these areas, Charlotte County has limited the density of new plats to no more than 3.5 units per acre; however this restriction does not apply to multifamily development. In addition, density can be moved within the CHHA but density cannot be transferred from outside a CHHA to inside. All properties within the CHHA automatically qualify as a Sending Zone. Density is even more restricted in the West County Planning District, which is all land west of the Myakka River. Density can be moved around within this area but cannot be transferred from outside West County to inside the area. 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 shorelands, 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 may be 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 hurricane flood zone development.

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. A look at Map 3.1 reinforces the need to reduce the County's inventory of platted lots. 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.). As illustrated by Table 3.34 below, 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. The States acquisitions are listed in Table 3.35.

Table 3.34
State and County Joint Land Acquisition Projects

Project Name	Acres	Location	Storm Surge Zone	# Units*	Land Acquisition Program	Cost to County	Cost to State	Total Cost
Tippecanoe Scrub	448±	Mid County, south of SR 776, west & south of Ranger Stadium	Tropical Storm & Category I	1,225	Florida Communities Trust	$350,000	$357,000	$707,000
Tippecanoe Scrub II	150+	East of Flamingo Waterway, south of SR 776, west of Flamingo Blvd.	Category II	528	Florida Communities Trust	Unknown, acquisition ongoing	$175,495	unknown
Amberjack Slough/ Scrub	223+	West County, east of CR 775, south and west of Gasparilla Pines Blvd.	Tropical Storm, Category I & II	1,232	Florida Communities Trust	$408,000	$2,064,000	$2,472,000
Charlotte Flatwoods Addition	600±	South County, adjacent to Zemel Road north of County landfill	Category V	1,100	Florida Communities Trust	$51	$2,300,000	$2,300,051
Oyster Creek	137±	West County, south and east of Lemon Bay High School, crossing Oyster Creek	Tropical Storm, Category I & II	133	Florida Communities Trust	$258,728	$2,340,000	$2,605,728
San Casa	141±	West County, an extension of the Oyster Creek project	Tropical Storm, Category I, II,	153	Florida Communities Trust	$2,100,000	$1,661,000	$3,761,000

Table 3.34 State and County Joint Land Acquisition Projects								
Project Name	**Acres**	**Location**	**Storm Surge Zone**	**# Units***	**Land Acquisition Program**	**Cost to County**	**Cost to State**	**Total Cost**
			III & IV					
Sunrise Park	40±	Mid County, adjacent to Edgewater Drive on the south side, north up the canal from the Beach Complex	Tropical Storm	84	Florida Communities Trust	$124,000	$1,113,000	$1,237,000
Englewood Beach/Windward	2.7±	West County, behind Captains Club + a sliver adjacent to the South end of Englewood Beach	Tropical Storm	34	Florida Communities Trust	$766,200	$510,800	$1,277,000
Totals	*1,946.7*±			*3,499*		*4,006,979+*	*9,026,395*	*13,033,374+*

***Numbers of lots includes both existing and potential based on historic platting, as well as zoning and land use designations.**

Table 3.35 State Land Acquisition Projects***								
Project Name	**Acres**	**Location**	**Storm Surge Zone**	**Number of Lots***	**Land Acquisition Program**	**Cost to County**	**Cost to State**	**Total Cost**
Cape Haze/ Charlotte Harbor**	5,900±	West County, 2 main portions, one south of South Gulf Cove, one south of the Rotonda	Tropical Storm	12,000	Conservation and Recreation Lands & Save Our Rivers	$0 (Staff Time)	$10+ Million	$10+ Million
Charlotte Harbor Flatwoods	5,300±	South County, straddles Charlotte/Lee line between US 41 and Burnt Store Road	Category V	500 +	Conservation and Recreation Lands	$0	$10 Million +	$10 Million +
Charlotte Harbor Buffer Preserve**	26,900±	Mid, West, and South County around Charlotte Harbor	Tropical Storm, Category I & II	3,000 +	Conservation and Recreation Lands	$300,000 (1983)	$14.8 Million	$14.8 Million
Myakka Estuary**	1,100±	Mid County, west side of Tippecanoe Bay, and generally south of Manchester Interceptor waterway	Tropical Storm and Category I	2,400	Save Our Rivers and Conservation and Recreation Lands	0	approx $1M	approx $1M
State Totals:	*37,200*±			*17,900*		*$300,000 (1983)*	*$25.8 Million*	*$25.8 Million*

*Numbers of lots includes both existing and potential based on historic platting, as well as zoning and land use designations.
**All collectively considered the Charlotte Harbor Buffer Preserve.
Acreage for Charlotte Harbor, Charlotte Harbor Flatwoods, and Myakka Estuary projects should be considered approximate and are based on information provided by the Florida Department of Environmental Protection's Division of State Lands
***This is not a complete list of State land acquisition projects

IV. Goals, Objectives and Policies

Goal 1: To conserve, protect, enhance, and where necessary restore and manage Charlotte County's environmental and natural resources to ensure their long-term quality for the future; increase public access to the shoreline and coastal waters; protect human life in areas subject to natural disaster; and limit public expenditures in areas subject to natural disaster.

Objective 1.1: Air quality in Charlotte County shall be suitable to safeguard human health and prevent damage to the natural environment. This shall be accomplished by meeting or exceeding air quality standards established by the U.S. Environmental Protection Agency (USEPA); the State Implementation Plan; and the Florida Department of Environmental Protection (FDEP), under Chapter 62, FAC.

Policy 1.1.1: If air quality in Charlotte County declines below levels established by State and Federal regulations for extended periods, Charlotte County will amend its Code of Laws and Ordinances, pursuant to Section 163.3202, FS, to require industries to take appropriate measures to ensure that State and Federal standards for air pollution are met. If these standards are not met, the amended codes will set forth penalties which will include, but are not limited to, fines and denials of building permits or other forms of development approval.

Policy 1.1.2: Charlotte County shall support the continued monitoring and enforcement of air quality standards by applicable State and Federal agencies. To better assess Charlotte County's air quality, the County will continue to request that an air quality monitoring station be established in an urbanized area of the County or City. The County's request will specifically ask that air quality parameters monitored at the new station include carbon monoxide, hydrocarbons, nitrogen oxides, lead, and ozone in addition to total suspended particles.

Policy 1.1.3: Charlotte County shall ensure the maintenance or improvement of air quality during site planning for land development by:

a. Requiring the landscaping of parking lots and heavily traveled roadways outside of recovery zones.
b. Researching, supporting or providing for alternative means of transportation such as car-pooling, privately-operated forms of mass transit, and bicycle and pedestrian paths.
c. Entering into agreements with surrounding counties as well as regulatory agencies to ensure that local concerns are addressed during the permitting stages of potential point source pollution generators, as provided in the Intergovernmental Coordination Element.

Policy 1.1.4: New land uses requiring air quality permits from the USEPA or FDEP shall not occur within one-half mile of any residential area, including vacant properties designated by the Future Land Use Map for low, medium, or high density residential development. This policy shall not apply to crematoria or incinerators located within

hospitals, medical centers, or funeral homes intended for the sole use of the facility, or to other facilities requiring air quality permits which pre-date the adoption of this policy.

Policy 1.1.5: In order to prevent the degradation of air quality which may occur as a result of a catastrophic wildfire, the County recognizes the importance of and shall continue to support the use of prescriptive burning as permitted by the Florida Division of Forestry (DOF) in order to reduce and maintain low fuel loads. Fire Management Plans (FMPs) have been developed and implemented for county managed lands, such as Tippecanoe Scrub, Cedar Point and Amberjack Environmental Park, by qualified County staff, and with assistance, as needed, from qualified agencies and/or contractors. Land management plans that include FMPs (when it has been determined that prescribed burning meets the criteria for best management practices) will be required for county lands acquired with Florida Communities Trust Funds in accordance with 9K.4, FAC. Charlotte County will permit removal of understory vegetation, through prescribed burning, under exemption for Tree Removal Authorization, for residential and commercial lots, when permitted by the DOF.

Policy 1.1.6: Charlotte County shall encourage the use of clean alternative energy sources and technologies, such as active and passive solar technology, to reduce the input of fossil fuel emissions into the atmosphere and conserve energy. New construction will comply with Energy Performance Index standards as required by the Florida Energy Efficiency Code for Building Construction. Charlotte County will encourage the use of solar technologies according to standards established by the Solar Energy Center under Section 377.05 FS.

Policy 1.1.7: Charlotte County shall prohibit the creation of deed restrictions within new developments which prohibit the use of solar technology for water heating and other applications.

Policy 1.1.8: Charlotte County shall ensure compliance with these policies regarding air quality.

Objective 1.2: The surface waters of Charlotte County shall be protected to ensure that their quality is maintained or improved to, at a minimum, meet the standards established by Chapter 62, FAC and the Clean Water Act, 3 USC 1251.

Policy 1.2.1: Except for bona fide agricultural operations and incidental domestic uses, land use activities which utilize, store, or generate hazardous materials, or which involve the bulk storage or continuous transmission of petroleum products or other hazardous substances, shall be prohibited within any area included within the Special Surface Water Protection Overlay District. The agricultural and domestic exemptions - all which are reviewed prior to the issuance of the approved exemption - shall not be construed to relieve these activities from compliance with applicable State and Federal regulations pertaining to the installation and use of above- or below-ground storage tanks, or other structures or improvements intended for the use, storage, or generation of petroleum products or other hazardous substances.

Policy 1.2.2: The County will continue to review all activity and development that impact Charlotte County's wetlands and apply restrictions in accordance with the Goals, Objectives and Policies of the Comprehensive Plan and County Land Development Regulations and limit any or all impacts of development which directly or indirectly adversely affect wetland resources.

Policy 1.2.3: Charlotte County will protect its surface waters through implementation of the following standards and guidelines:

a. On-site sewage disposal systems, including their associated drain fields, will be located as far landward as feasible on waterfront properties so as to reduce or prevent unnecessary nutrient and pathogen loading into surface waters.
b. The discharge of run off, wastewater, or other potential sources of contamination into surface waters resulting in the degradation of the quality of the receiving water body below the standards set forth in all applicable sections of Chapter 62 F.A.C. (including any antidegradation provisions), and any special standards for Outstanding Florida Waters and Outstanding National Resources Waters will be prohibited.
c. The most current best management practices identified in the Handbook, Urban Runoff Pollution Prevention and Control Planning, EPA/625/R-93/004, which control erosion and limit the amount of sediment reaching surface waters shall be used during all development activities.
d. Removal or control of submerged, emergent, or floating vegetation shall be limited to that necessary to provide reasonable access and aquatic weed control and conducted according to the guidelines provided in Chapter 62C-20, Florida Administrative Code, as permitted by the Florida Department of Environmental Protection and in compliance with control standards outlined in Chapters 403 and 369, FS. This policy shall not apply to the removal of nuisance species such as hydrilla, water hyacinth, or water lettuce.
e. Charlotte County will continue to provide treatment as governed by Chapter 388 F.S., Mosquito Control, and where feasible, use non-chemical means and best management practices as alternatives to insecticides and herbicides for the control of aquatic weeds and mosquitoes.
f. Withdrawals from, or discharges to, surface waters which alter hydroperiods shall require the appropriate permits through FDEP, the appropriate Water Management District, or the USACoE, and shall not reduce the quality or productive capability of water dependent ecosystems.
g. Development proposals must demonstrate that post development discharges into surface waters, or diversion of freshwater inflow into surface waters, will not lower the quality or productive capability of the receiving water body. All development proposals which require Environmental Resource Permits as provided by Chapter 40 and 62, Florida Administrative Code, will be reviewed for consistency with the Goals, Objectives and Policies of the Charlotte County Comprehensive Plan and Land Development Regulations. All development proposals must demonstrate post development discharges into marine and estuarine systems, or waters which flow into estuarine systems will not adversely affect the aquatic system in question. Such

discharge must not exceed the legal limit for established surface water quality parameters to include, but not limited to, biological oxygen demand, dissolved oxygen, nutrients, bacteriological quality and turbidity, for the appropriate class water, as outlined in Chapter 62, FAC.

h. The design and construction of artificial waterbodies will provide sufficient water quality, fish and wildlife habitat values and functions consistent with the requirements of state and federal agency permits and the intended use of the water body.
i. Boat speeds shall be limited as necessary to avoid shoreline erosion, siltation and protect natural functions by establishing and enforcing speed zones and other prohibited activities in vulnerable areas.

Policy 1.2.4: Charlotte County shall support and encourage continued water quality monitoring by local, State, and Federal agencies that will identify and formulate plans to address point and non-point pollution of Charlotte County's surface waters. Charlotte County shall continue to participate in the Charlotte Harbor National Estuary Program by selecting professional staff, elected officials, and citizens to sit on the CHNEP's advisory committees, and will continue to participate in the implementation of the goals and objectives of the Charlotte Harbor Surface Water Improvement and Management plan.

Policy 1.2.5: Charlotte County will use applicable State and Federal standards in designing and reviewing surface water quality monitoring programs as previously stated in Policy 1.2.4.

Policy 1.2.6: Charlotte County shall continue to work toward compliance with the requirements of the National Pollutant Discharge Elimination System and will utilize all available means, including stormwater units, MSBU's, and other revenue sources, to provide funding for these necessary requirements and programs to ensure that water quality and productive capability meets or exceeds the standards provided in Chapter 62, FAC and the Clean Water Act, 33 USC 1251. At such time when nutrient load reduction goals are promulgated through the Charlotte Harbor SWIM program, Charlotte County will review and, as necessary, revise its Code of Laws and Ordinances to ensure that these goals are met through the County's development review processes.

Policy 1.2.7: Charlotte County shall ensure compliance with these policies regarding surface water quality.

Policy 1.2.8: As provided in the Intergovernmental Coordination Element, Charlotte County shall pursue interagency and intergovernmental cooperation to ensure that the County's surface waters are protected, and shall resist efforts to further divert freshwater inflow into the County's surface waters from land use and other activities in the surface water drainage basins, and outside those drainage basins as well.

Policy 1.2.9: Charlotte County shall continue to protect the County's surface waters through implementation of land acquisition programs which will provide opportunities to protect and manage lands adjacent to surface waters.

Policy 1.2.10: Charlotte County will partner with the US Department of Agriculture Natural Resources Conservation Service, the FDEP, SWFWMD, SFWMD, FDAC and other agencies to implement the Shell Creek and Prairie Creek Watersheds Management Plan which was created to preserve and improve water quality and ecology of Shell Creek, Prairie Creek and Joshua Creek.

Objective 1.3: Charlotte County will protect its marine and estuarine habitats and finfish and shellfish resources to ensure long-term viability and productivity for scientific, commercial, sport, and recreational purposes.

Policy 1.3.1: Water quality will be protected in accordance with the standards and policies stated within the Comprehensive Plan.

Policy 1.3.2: Charlotte County shall actively participate in the formulation and implementation of the goals, policies, and programs of the Charlotte Harbor National Estuary Program as outlined by the CHNEP enabling act and will provide appointed representatives to the CHNEP technical, management and policy advisory committees and the services of professional staff in implementing the goals and objectives of the CHNEP management plan. Charlotte County will continue to support the CHNEP program by providing matching funds and/or in-kind services for approved projects which improve, restore and enhance the ecological function of Charlotte Harbor and educate the public on the values of the Charlotte Harbor estuary.

Policy 1.3.3: Charlotte County shall continue to participate in the ongoing programs of the Charlotte Harbor Surface Water Improvement and Management program, including but not limited to the long-term ambient water quality monitoring programs; establishing pollutant load reduction goals; monitoring freshwater inflow for Charlotte Harbor as recommended by the SWIM plan (this will be accomplished through selection of a representative on the scientific peer review panel which is mandated by SWFWMD permit number 2010420.20 (Peace River Option permit) which will review the results of the on-going hydrobiological monitoring program associated with that permit); and other funded projects such as the Charlotte Harbor Microbial Pathogen Sampling program.

Policy 1.3.4: Except as permitted by FDEP pursuant to Chapter 373, FS and Chapter 253, FS; the SWFWMD through the environmental resource permitting procedure pursuant to Chapter 40D-4 and 62-330, F.A.C.; the SFWMD through the environmental resource permitting procedure pursuant to Chapter 40E-4 and C62-340, FAC; and the USACoE pursuant to the Clean Water Act , 33 USC 1251 in association with docks, boat ramps, and navigation channels (as described in Policy 1.3.5, below), impacts to seagrass beds, oyster bars, soft bottoms, and other benthic communities shall be prohibited. Charlotte County shall coordinate the approval of such facilities with these agencies to ensure that every effort is made to locate these facilities away from such resources, particularly seagrass beds. Such activities will be reviewed by County environmental staff to maintain the long-term presence and viability of populations of

endangered and threatened species, as required by the FGFWFC Chapter 39 F.A.C. and applicable FGFWFC policies and guidelines. In addition these activities will be subject to review pursuant to Chapter 3-5, Article XV, Special Water and Wetland Protection as well as Zoning Regulations Section 3-9-70. These areas shall include but not be limited to the following: those seagrass areas mapped by the FDEP's Florida Marine Research Institute; those areas identified in the Charlotte Harbor, Gasparilla Sound and Placida Harbor; and those areas identified for the County Habitat Inventory Map.

Policy 1.3.5: Although a permit is issued by a jurisdictional regulatory agency for a dock, boat ramp, or channel, the County may withhold issuance of a local building permit if the proposed dock, ramp, or channel impacts seagrass beds, oyster bars, or other sensitive benthic communities and a better, alternative location is available which serves the subject property.

Policy 1.3.6: In order to avoid impacts (notably propeller scarring and silting) to benthic resources caused by boaters' attempts to reach deep water at the end of existing, maintained channels, Charlotte County shall undertake a program to provide and maintain a depth of minus 5 feet mean low water from the origin of a channel at the end of the residential canal system to that point where natural water depth equals minus 5 feet for the existing channels listed below.

Countryman Waterway	Springlake Waterway	Sunrise Waterway
Ackerman Waterway	Elkam Waterway	Gardner-Olman Wtrwy
Beeney Waterway	Pompano Inlet	Bass Inlet
Cross Isles Channel	Ponce De Leon Inlet	Alligator Creek
Pirate Harbor	South Gulf Cove	Hayward Canal
Suncoast Waterway	Harbour Heights	Laishley Park
Fisherman's Village	Charlotte Harbor Yacht Club	

Policy 1.3.7: All channels crossing through seagrass beds shall be clearly marked with signage directing boaters to stay within marked channels and out of the seagrass beds.

Policy 1.3.8: Charlotte County shall fund the maintenance and, where necessary, creation of these channels through the establishment of MSBUs, MSTUs, and other special districts as appropriate. The County will also apply for funding from grant sources including, but not limited to, WCIND, the Florida Boating Improvement Program, the Florida Recreation Development Assistance Program, and others as appropriate and available.

Policy 1.3.9: Charlotte County shall amend its Mangrove Protection Ordinance (92-03) to provide standards and criteria which are, at a minimum, as stringent as those provided under Chapter 403.9321- .9333 F.S. the Mangrove Trimming and Preservation Act as of 1996 for the protection and lawful trimming of mangrove trees in unincorporated Charlotte County.

Policy 1.3.10 Charlotte County shall commit to protect the Charlotte Harbor estuarine system, which includes the upstream portions of the Peace, Myakka, and Caloosahatchee rivers as well as numerous tidal creeks and sloughs which supports a multi-billion dollar economic engine founded on tourism, commercial fisheries, sport fishing, aquaculture, pleasure boating, and other industries all of which rely on a productive aquatic system by continuing to monitor and object to any activities upstream of the Harbor that may negatively impact the quality, quantity, and timing of freshwater flows which are essential to the estuary.

Objective 1.4: The quality of Charlotte County's groundwater resources shall not be degraded - either directly or indirectly - by human influences below the minimum criteria for groundwater provided in Chapter 62-520 FAC, and shall be maintained or, as necessary, improved to ensure the availability of this resource for present and future generations.

Policy 1.4.1: Except for bona fide agricultural operations and incidental domestic uses, land use activities which utilize, store, or generate hazardous materials, or which involve the bulk storage or continuous transmission of petroleum products or other hazardous substances, shall be prohibited within recharge areas for the intermediate aquifer system, and or within cones of influence and watershed areas for public water supply wells. The agricultural and domestic exemptions shall not be construed to relieve these activities from compliance with applicable State and Federal regulations pertaining to the installation and use of above- or below-ground storage tanks, or other structures or improvements intended for the use, storage, or generation of petroleum products or other hazardous substances. These land use activities shall be consistent with the Goals, Objectives and Policies of the Comprehensive Plan and be reviewed through the County's review of development applications which may affect these areas, and implementation of applicable Land Development Regulations.

Policy 1.4.2: The construction of new canals which may result in saltwater intrusion or transmission of pollutants is prohibited by the County.

Policy 1.4.3: Charlotte County shall work with the Water Management Districts to have free-flowing artesian wells plugged under the Quality Water Improvement Program (QWIP) or by methods approved by the appropriate Water Management District and County.

Policy 1.4.4: Charlotte County will review State and Federal agencies' monitoring of all closed or abandoned landfills in Charlotte County to determine whether such monitoring adequately assesses whether these sites pose a threat to the quality of groundwater resources. If it determines that such agencies' monitoring does not provide reasonable assurance that such sites do not pose a threat to groundwater resources, Charlotte County will undertake monitoring as necessary to determine whether a threat exists and will take appropriate action, including legal action against known violators, to correct situations which pose a threat to the health, safety, and welfare of the general public.

Policy 1.4.5: To assess whether there are any existing or potential threats to groundwater resources, Charlotte County shall request copies of groundwater monitoring reports and other groundwater data from the Florida Department of Environmental Protection and the Water Management Districts for projects within their jurisdiction that require permitting and monitoring by these agencies in order to be apprised of any potential adverse impacts to groundwater quality.

Policy 1.4.6: Charlotte County shall continue to require connection to central water and sewer service when such service is available in order to reduce the direct demand on groundwater for domestic use and reduce the potential for contamination from septic tank leachate consistent with the Goals, Objectives and Polices of the County Comprehensive Plan and Land Development Regulations.

Policy 1.4.7: Charlotte County shall ensure compliance with these policies regarding the quality of its groundwater resources.

Policy 1.4.8: Charlotte County shall continue discussions with the Water Management Districts, SWFRPC, and jurisdictional local governments to determine what measures may be taken to help prevent impacts to recharge areas and other hydrogeologic features which occur outside Charlotte County's boundary and are connected to the County's groundwater.

Objective 1.5: Charlotte County's soils will be protected and conserved as an essential natural resource and integral part of the County's economy.

Policy 1.5.1: Through the establishment of resource conservation areas, use of transfer of density units, and other property-specific measures such as voluntary operating agreements as may be deemed appropriate, Charlotte County shall encourage the continuation of bona fide agricultural practices which optimize the use of soils for the long-term, sustainable production of food and fiber for society.

Policy 1.5.2: Non-agricultural land clearing shall be prohibited prior to the issuance of County tree removal authorization.

Policy 1.5.3: Best management practices, including sodding, seeding, mulching, and preservation and maintenance of vegetation, shall be utilized throughout and following development activities in order to reduce the erosion of soil by wind and water and to conserve the functions of natural systems.

Policy 1.5.4: All fill slopes steeper than 3 Horizontal to 1 Vertical will be stabilized through sodding, mulching, or other means acceptable to Charlotte County.

Policy 1.5.5: During its review of site plans and proposed developments, Charlotte County shall consider how the subject property's topography, vegetation, and hydrology may affect the potential for erosion and erosion control.

Policy 1.5.6: To conserve and protect native soils and protect the functions of natural systems, Charlotte County shall encourage the use of stemwalls or pilings as alternatives to the use of fill material to achieve elevation of buildings necessary for flood protection and other design criteria.

Policy 1.5.7: Charlotte County shall ensure compliance with these policies regarding the protection of its soil resources.

Objective 1.6: Excavation activities in Charlotte County shall be conducted in a manner which minimizes the detrimental effects to groundwater, surface water, wildlife and wildlife habitats, surrounding land uses and values, and the health, safety, and welfare of the general public.

Policy 1.6.1: During its review of proposed excavation activities, Charlotte County will ensure that:

a. Wetlands, and upland communities which provide habitat for wildlife species listed as endangered, threatened, or of special concern, shall be protected throughout all excavation and reclamation activities. No excavation activities shall be allowed in wetlands or in protection zones established for listed species except as allowed by State and Federal regulations and guidelines. Such activities which impact wetlands must receive permits from the appropriate Water Management District under the Environmental Resource Permitting Procedures outlined in Chapters 40D-45 and 62-330, FAC, and from the ACoE under the Clean Water Act, 33 USC 1251. Excavation activities, located in, on, or over wetlands or other surface waters which may adversely affect the conservation of fish and wildlife, including endangered or threatened species, and their habitats, or which may adversely affect significant historical and/or archaeological resources will be prohibited, unless otherwise permitted by the appropriate state agency pursuant to the conditions of the Environmental Resource Permit, Chapter 40D-4.3, FAC Such activities proposed within habitat utilized by state and federal listed species will be reviewed by county environmental staff for compliance with Chapter 39, FAC and applicable Florida Game and Fresh Water Fish Commission (FGFWFC) policies and guidelines (e.g., Nongame Wildlife Program Technical Reports) and the Endangered Species Act (ESA) 16 USC, 1531 and applicable USFWS guidelines (e.g., Habitat Management Guidelines for the Bald Eagle in the Southeast Region), respectively. All mitigation activities performed for such allowable impacts must be agreed upon by Charlotte County and the jurisdictional agency or agencies prior to the commencement of mining activities.
b. Permanent detrimental effects to groundwater and surface water resources are minimized.
c. Reclamation criteria are included as part of the proposed excavation operation. Reclamation plans shall include criteria for beneficial post-operation land use activities. Reclamation plans shall: maximize the reclamation of the resultant waterbodies for fish and wildlife and include the creation and planting of littoral

shelves with native plant species to provide wildlife habitat; help improve or maintain water quality; prevent erosion of the shoreline; restore pre-development functions and values, including restoration of similar native communities; and make the site aesthetically pleasing. Reclamation plans must be approved prior to the issuance of the excavation permit.

d. Impacts to surrounding land uses are minimized through the establishment of setbacks and buffer zones between extractive and non-extractive land use activities. A minimum of fifty (50) feet shall be required for such buffers.
e. The hydrological functions of natural flow ways and sloughs are maintained during and after the proposed excavation activities.
f. Excavation activities shall be phased as necessary to ensure that unavoidable negative impacts associated with such activities will be limited to one area at a time.

Policy 1.6.2: Charlotte County shall ensure compliance with these policies regarding excavation.

Policy 1.6.3: Commercial excavation activities are prohibited in designated preservation areas.

Policy 1.6.4: Charlotte County will oppose offshore gas and oil exploration and excavation activities which may be reasonably expected to threaten the quality of coastal beaches and estuarine ecosystems, place oil or gas related facilities on coastal beaches, islands, or wetlands, or require the placement of oil or gas storage facilities on barrier islands.

Objective 1.7: Charlotte County shall encourage the continuation of bona fide agricultural practices.

Policy 1.7.1: In voluntary cooperation with Charlotte County, the owners of agriculture lands may develop property-specific management plans to ensure the long-term viability of agricultural operations. Upon completion, such plans must be approved by the Board of County Commissioners. All agricultural activities included in plans approved by the County will be found consistent with the Comprehensive Plan for purposes of permit review, including Water Management District, FDEP, and USACoE applications. County staff, with assistance as appropriate from the Agricultural and Natural Resources Advisory Committee (ANRAC), as established by Section 1-2-11, County Code shall review voluntary management plans (VMPs) and provide recommendations to the Board of County Commissioners. Charlotte County will review such plans for consistency with the Comprehensive Plan.

Policy 1.7.2: Voluntary management plans developed through Policy 1.7.1, above, for properties which contain habitats utilized by wildlife species listed as endangered, threatened, or of special concern shall contain provisions which address the long-term maintenance of these species on the subject property. The density of habitat preserves established as part of a management plan may be used within the subject property

outside of the preserve or reserve area, with cluster development approval, or transferred to another property. Unless it is the desire of the property owner, the general public shall not have access to habitat preserve or reserve areas created pursuant to this policy. All necessary approvals shall be required for developments approved as a transfer of density units activity associated with a voluntary management plan. Potential impacts to designated preserve areas associated with increased development density in rural areas shall be offset by continued management of these preserve areas for optimal habitat conditions and continued listed species utilization upon review by environmental staff and coordination with the FFWCC per Chapter 39, FAC, and the USFWS per 16 USC 1531. Development resulting from increased density in rural areas shall be located in the most suitable portion of subject areas which will have the least impact possible. Development in such areas, having impact on listed species and associated habitat, must procure permits or other documents, such as habitat conservation plans, from the appropriate agencies prior to any development.

Policy 1.7.3: Charlotte County shall coordinate its review of management plans and agency permit applications with the Cooperative Extension Service and Natural Resource Conservation Service to encourage the use of pesticides and fertilizers which have the least impact upon native plants and wildlife.

Policy 1.7.4: Charlotte County staff shall continue to work with the Agriculture and Natural Resources Advisory Committee to develop and implement strategies to maintain agriculture as a viable business in Charlotte County while preserving and managing natural resources, including native wildlife and the habitats upon which they depend.

Policy 1.7.5: Development rights may be transferred from agricultural lands to a New Community or Rural Community development proposal in order to satisfy a portion of the required transfer of density.

Policy 1.7.6: Charlotte County shall encourage and support the use of Best Management Practices in all agricultural operations as these practices support the improvement of surface and groundwater resources.

Objective 1.8*(Amended on July 13, 1999, Ordinance #99-031)***:** Charlotte County shall protect existing natural reserves, preserves, and resource conservation areas, and will encourage the establishment of greenways by linking conservation and recreational lands along natural landscape features including, but not limited to, rivers, streams, shorelines, wildlife corridors, and man-made corridors such as abandoned railroad right-of-ways.

Policy 1.8.1: Charlotte County will cooperate with the FDEP in protecting the aquatic preserves, the Charlotte Harbor Buffer Preserve, Don Pedro State Recreation Area, and Stump Pass Beach State Park through its review of development applications which may affect these areas, and implementation of applicable restrictions and setbacks, such as length and minimum depth requirements for docks and marinas under Zoning Regulations, Article III, Section 3-9-70, County Code, upland buffer requirements to

wetlands and protection of seagrasses and sensitive bottom habitat under Surface Water and Wetland Protection, Article XV, Section 3-5, County Code. Charlotte County will cooperate in management of these areas as agreed upon by the various departments and as required by the applicable management plan. The aquatic preserves, Don Pedro State Park, and Stump Pass Beach State Park areas, being partially or entirely included within the Bridgeless Barrier Island Overlay District, will be subject to development review criteria established for this district.

Policy 1.8.2: Charlotte County will cooperate with the FFWCC in protecting the Fred C. Babcock - Cecil M. Webb Wildlife Management Area and the Charlotte Harbor Flatwoods/Yucca Pen Wildlife Management Area by ensuring that land use activities on adjacent properties consistent with such properties' zoning and land use classifications do not prevent the FFWCC from undertaking land management activities (such as prescribed burns) necessary to maintaining these areas' natural functions and values, and by reviewing applications for Plan Amendments and rezonings which will potentially affect these areas for consistency with the Comprehensive Plan. The appropriate advisory committee or county department, will review acquisition proposals and make recommendations to the Board of County Commissioners to prioritize state-funded acquisition projects which connect with, and augment, these wildlife management areas which, collectively, serve as wildlife corridors and provide greater protection for wildlife.

Policy 1.8.3: Charlotte County will cooperate with the USFWS in its management of the Island Bay National Wildlife Refuge by identifying these islands as environmentally sensitive, according to the FLUM, actively pursuing acquisition of adjacent mangrove islands under the existing CARL program and other acquisition programs, participating in the Charlotte Harbor Surface Water Improvement and Management Program and the Charlotte Harbor National Estuary Program to educate the public, protect and/or enhance existing preserves and resources, provide representatives for program committees and offer services, as agreed upon, under applicable management plans.

Policy 1.8.4: Charlotte County will continue to manage Amberjack Slough, Oyster Creek, San Casa, Tippecanoe Scrub and Cedar Point as educational, passive use recreational facilities consistent with the native habitats, wildlife, and other natural resources found on these sites.

Policy 1.8.5: In cooperation with their management entities, Charlotte County will work to increase public awareness, appreciation, and (consistent with the resources found at each site) access to the publicly owned preserves within the County's borders.

Policy 1.8.6: Charlotte County shall identify lands suitable for public acquisition which contain rare or unique ecological or botanical features, and which provide an opportunity for quality passive recreational activities. As local, State, or Federal funds become available, Charlotte County shall initiate efforts to acquire such parcels.

Policy 1.8.7: Charlotte County will administer the Environmentally Sensitive Lands Protection Program (Conservation Charlotte), which generates funds for the acquisition of environmentally sensitive lands.

Policy 1.8.8: Charlotte County shall accept lands offered for donation as nature preserves or other resource conservation uses when at least one of the following apply: such lands contain ecologically valuable habitat; or when public ownership of such lands would expand existing preservation or resource conservation areas; or when public ownership of such lands would provide increased protection for existing preservation or resource conservation areas.

Policy 1.8.9: For properties acquired pursuant to Policies 1.8.6 and 1.8.8, above, and 1.8.10 below, Charlotte County, or duly authorized management agencies, shall develop and implement long range management plans for preservation or conservation lands consistent with the natural resources found on these properties.

Policy 1.8.10*(Created on July 13, 1999, Ordinance #99-031)***:** Charlotte County shall seek public ownership of environmentally sensitive lands which provide viable wildlife habitat, scenic corridors, or public open space through joint county/state partnerships and funding programs such as Florida Communities Trust. Potential acquisition sites shall include scrub habitats, riparian corridors, floodplain areas, wetlands, wildlife corridors and habitats, or dune and coastal systems.

Policy 1.8.11*(Created on July 13, 1999, Ordinance #99-031)***:** In its public land acquisition efforts, Charlotte County will promote linkages between existing public parks, preserve areas, and similar areas serving conservation and wildlife habitat purposes in order to develop a system of interconnected greenways providing for public recreation while protecting the natural environment. Greenways may consist of woodlands, water bodies, open spaces, hiking/bicycle trails, parks, or educational facilities. Charlotte County will expand existing conservation lands along water bodies through existing county and state land acquisition programs.

Objective 1.9: Charlotte County will maintain an inventory of all native communities and natural habitats which will be used during land use decision-making, development review, and during consideration of land acquisition.

Policy 1.9.1: The Charlotte County Habitat Inventory Map will be updated and incorporated into the County's Geographic Information System's database.

Objective 1.10: Charlotte County shall protect wildlife species listed by the USFWS or FFWCC as endangered, threatened, or of special concern (listed species) and will conserve the habitats upon which they depend in order to maintain balanced, biologically productive ecosystems and native communities for the use and benefit of future generations.

Policy 1.10.1: Through monitoring of development activities and providing information regarding listed species on properties undergoing development review, Charlotte County will assist in the application of, and compliance with, all State and Federal regulations regarding such species through requirements of the USFWS, under the ESA, 16 USC 1531, FFWCC, under Chapter 39, FAC and any applicable Development Order as required for Developments of Regional Impact authorized under 9J-2, FAC.

Policy 1.10.2: When it is determined that properties undergoing development review contain habitat which may be utilized or is utilized by listed species, Charlotte County shall require surveys per the methods set by FFWCC. Charlotte County shall withhold development approval for properties which contain habitat utilized by listed species until such time as all applicable State and Federal permits, as required by the FFWCC, pursuant to Chapter 39, FAC and the USFWS pursuant to the ESA, 16 USC 1531, respectively, pertaining to such species have been obtained and copies provided to Charlotte County.

Policy 1.10.3: To expedite the development review process while ensuring the long-term viability of populations of listed species, Charlotte County will develop species-specific and project specific Habitat Conservation Plans as directed by the Board, and as authorized by the Endangered Species Act.

Policy 1.10.4: Charlotte County will administer the species specific Florida scrub-jay (*Aphelocoma coerulescens*) Habitat Conservation Plan, which was developed for four Capital Improvement Projects, when approved by the USFWS.

Policy 1.10.5: Until such time as county-wide Habitat Conservation Plans are developed, the County's review and approval of development proposals shall be consistent with the provisions of listed species guidelines promulgated by the FFWCC and federal guidelines, promulgated by the USFWS.

Policy 1.10.6: Charlotte County will continue to work for the establishment of mitigation parks and banks within the County to ensure that local impacts to listed wildlife species and native communities are mitigated locally.

Policy 1.10.7: Charlotte County will educate the public on the value of wildlife, native communities, and other natural resources through the placement of interpretive displays and the development of trails at appropriate County park sites.

Policy 1.10.8: Recognizing that the waters of Charlotte County provide important habitat for the endangered West Indian manatee (*Trichecus manatus*), protective measures including the establishment of "Slow Speed, Manatee Protection Zones" will be developed and enforced for the seagrass beds and surrounding waters in the vicinity of Bull Bay, Turtle Bay, Hog Island, Lemon Bay, the Myakka River, the Burnt Store area, Deep Creek, and Harbour Heights.

Policy 1.10.9: The Slow Speed, Manatee Protection Areas shall continue to be designated, marked, and enforced.

Policy 1.10.10: In cooperation with the Charlotte County Marine Advisory Committee, Cooperative Extension Service, Charlotte Harbor Environmental Center, Inc., West Coast Inland Navigation District, and Florida Marine Patrol, Charlotte County shall continue to provide educational materials and programs to inform the County's boating population of the presence of manatees and how to avoid destruction of manatee habitat as well as manatee/boat collisions.

Policy 1.10.11: Recognizing that seagrass beds help protect water quality by stabilizing sediments and absorbing nutrients, and provide essential habitat for many species of wildlife including the endangered West Indian manatee and many economically and recreationally important species of fish, Charlotte County shall establish and implement Seagrass Protection Zones within the Ice House Flats, Turtle Bay, Bull Bay and Gasparilla Sound.

Policy 1.10.12: Charlotte County shall continue to enforce its Sea Turtle Protection Ordinance which shall be amended to include a more expeditious and structured enforcement mechanism as well as revisions which specify that neither direct nor reflected light shall be visible in the nesting area from sundown to sunrise during the nesting season.

Policy 1.10.13: Charlotte County shall continue to support the efforts of the volunteer citizen turtle patrol in its conservation and monitoring efforts, and shall encourage the development of public-private partnerships to provide funding for sea turtle awareness programs, and shall encourage the distribution of educational pamphlets and other materials to promote public awareness of sea turtles' use of the beaches during nesting season.

Policy 1.10.14: Charlotte County will review development applications for compliance with state guidelines and/or permit requirements for activities which may impact protected (listed) plants under Plant Industry, Preservation of Native Flora, Section 581, FS and any applicable development order language for development activities within a DRI under Chapter 9J-2, FAC, prior to final development review approval. For development applications not subject to a development order for a DRI, county environmental staff will review development applications, and, based on listed plant species, imperiled habitats (as defined in the Guide To The Natural Communities of Florida, Florida Natural Areas Inventory and Department of Natural Resources, February, 1990) and other environmental features, determine suitable areas to be preserved as open space.

Objective 1.11: Impacts to Charlotte County's wetland resources shall be avoided, minimized, or mitigated by wetland restoration, creation, or local wetland mitigation banking to the extent that there is no net loss of functional values.

Policy 1.11.1: The County shall continue to protect and enhance the quality of its wetland resources by reviewing applications for consistency with applicable County Land Development regulations and the Goals, Objectives and Policies of the Comprehensive Plan and the rules, regulations, statutes, and acts as applied by the permitting agencies. Activities in wetlands shall be limited to the following:

a. Activities necessary to prevent or eliminate a public hazard, such as elimination of a dangerous curve in a road, dredging in order to clean up a spill of hazardous waste, or removal of underwater obstructions to boat traffic as permitted.
b. Activities which provide a direct benefit to the public at large which would exceed any public loss as a result of the activity, such as removal of exotic species, restoration of natural hydroperiods, or impacts associated with the maintenance of existing drainage works.
c. Resource oriented activities such as passive recreation, ecotourism, outdoor education or other uses for which wetland functions and values are the primary attraction.
d. Agriculture, including silviculture, as permitted by regional, State, and Federal regulatory agencies.
e. Water dependent uses and structures such as docks or boat ramps constructed in a manner which minimizes impacts to wetlands and aquatic resources
f. Use as a stormwater or other waste-water treatment/retention facility as may be permitted by regional, State and Federal regulatory agencies as long as the natural functions of the wetlands are not impacted.
g. Redevelopment of previously permitted structures, provided all development occurs within the footprint of the original structure.
h. Linear facilities which serve a public need which cannot be reasonably located outside of all wetlands may cross or occur in wetlands, provided the proposed facility impacts the least sensitive portions (i.e., narrowest, most impacted, etc.) of as many as possible of the affected wetlands
i. Residential development at densities prescribed by the underlying Future Land Use and Zoning categories as may be permitted by applicable County Land Development regulations and the Goals, Objectives and Policies of the Comprehensive Plan and the rules, regulations, statutes, and acts as applied by the permitting agencies.

Policy 1.11.2: Roads necessary for access to upland portions of a subject property may cross wetlands provided the proposed roads cross the least sensitive portion (i.e., narrowest, most degraded, etc.) of the affected wetlands. These activities would require permits from the appropriate water management districts under the environmental permitting procedures in the applicable rules, regulations, statutes, and acts as applied by the permitting agency. County staff will review these projects through the development review process.

Policy 1.11.3: All requisite permits as required by the applicable rules, regulations, statutes, and acts as applied by the permitting agencies shall be obtained, and those standards and criteria of the applicable County Land Development Regulations and the Goals, Objectives and Policies of the Comprehensive Plan satisfied, prior to the issuance

of development approval by the County for projects which impact wetland resources. All conditions placed on such permits by the issuing agencies - including upland buffer zone requirements, restrictions of use within the wetland, etc. - shall be incorporated into the final development approval issued by the County.

Policy 1.11.4: Septic tanks and their associated drainfields shall be prohibited within wetland areas.

Policy 1.11.5: Except as necessary for activities allowed through Policy 1.11.1, above, the use, storage, transmission, or generation of hazardous substances, or substances which may artificially accelerate the eutrophication of wetlands and waterbodies, is prohibited within wetlands.

Policy 1.11.6: Through the platting review process, Charlotte County will ensure that no new parcels of land shall be created which do not contain adequate upland area sufficient for the placement of the number of dwelling units or other structures allowed by the subject parcels' zoning and future land use classifications. This policy shall not apply to the creation of parcels intended for use as part of a stormwater or wastewater treatment/storage facility as permitted by regional, State, or Federal regulatory agencies, parcels which are intended for use as part of a bona fide agricultural operation, or parcels created due to the development of uses described in Policy 1.11.1. a. and h., above. This Policy shall not be construed to imply any form of vesting of such new parcels for residential or other uses not specifically referenced herein if the allowable use for which the parcel was created ceases.

Policy 1.11.7: Charlotte County, in conjunction with the permitting agencies, may undertake a study to determine whether mitigation activities are providing the intended benefits, and whether they will continue to do so over the long term.

Objective 1.12: Charlotte County will encourage the development of siting standards for linear facilities except where such are already subject to siting criteria in existing State and Federal regulations.

Policy 1.12.1: Charlotte County, in conjunction with appropriate State, County, and municipal agencies will formulate and propose State legislation governing siting standards for linear facilities the operation of which may result in undesirable environmental impacts.

Policy 1.12.2: Standards applying to the siting of linear facilities shall include the requirement of an environmental impact assessment and alternative routes analysis, both of which must be performed by qualified professionals.

Objective 1.13: Charlotte County shall protect its beach and dune systems, including native dune vegetation, from human induced erosion.

Policy 1.13.1: Charlotte County shall utilize State approved dune walk-over structures at all County-owned and maintained beaches to prevent impacts to native vegetation and dune systems.

Policy 1.13.2: The County shall require the use of dune walk-over structures for all beach front development permitted subsequent to the date of adoption of this plan, and will encourage the use of such structures for development permitted prior to that date.

Policy 1.13.3: All construction activity is prohibited seaward of the Coastal Construction Control Line (CCCL) except as permitted by the FDEP under Beach and Shore Preservation, FS 161. Charlotte County shall review proposed CCCL construction permit applications for compliance with applicable County Land Development Regulations and the Goals, Objectives and Policies of the Comprehensive Plan. The county shall submit a letter of no objection and compliance with the county code for acceptable development proposals within the CCCL as required by state Permit Application Requirement Procedures. The county's Beaches and Shores Advisory Board, as established by Resolution 88-150 will review and provide recommendations to the Board of County Commissioners for projects which may impact the coastal zone.

Policy 1.13.4: Except in the case of emergency as provided in Chapter 161, FS, the construction of artificial shoreline hardening structures shall be prohibited. The emergency use of such structures constructed in compliance with Chapter 161, FS, is categorically consistent with the Comprehensive Plan.

Policy 1.13.5: Except for the minimal disturbance necessary to accomplish County and State approved beach restoration or renourishment activities, as well as the minimum disturbance associated with activities permitted pursuant to Policies 1.13.1, 1.13.2, and 1.13.3, above, the excavation or destructive alteration of beach and dune systems is prohibited.

Policy 1.13.6: Charlotte County shall require the use of indigenous plant species for public and private dune restoration or renourishment projects.

Policy 1.13.7: The operation of motor vehicles is prohibited on beaches and frontal dunes except in association with law enforcement activities, emergency medical services, public land management, or as necessitated by an approved restoration, renourishment, or emergency project.

Policy 1.13.8: Except for emergencies, all coastal construction projects, including beach restoration and renourishment projects, shall protect sea turtle nesting areas by limiting construction in dune and beach areas to non-nesting periods. In historic shore-bird nesting areas construction must begin prior to shorebird nesting. Establishment of marked protection zones around sea turtle and shorebird nest areas is required to ensure that impacts associated with construction activities landward of the dune and beach system are limited to the actual construction site.

Policy 1.13.9: Lots and parcels created subsequent to October 7, 1997 shall be of sufficient size and dimension to ensure a 50 foot buffer between any structures or improvements (except dune cross-overs) and the landward edge of the primary dune. This buffer will remain in its natural state except for the minimum disturbance necessary to accommodate dune crossover structures.

Policy 1.13.10: Charlotte County shall ensure compliance with these policies regarding beach and dune protection.

Policy 1.13.11: Recognizing that sand and coastal processes do not recognize political boundaries, Charlotte County will continue discussions with the Southwest Florida Regional Planning Council, FDEP, USACoE, and coastal governmental bodies in the Southwest Florida region to determine the feasibility of undertaking a cooperative, regional sand source study and beach management program.

Policy 1.13.12: Charlotte County will work with its Beaches and Shores Advisory Committee and FDEP to identify areas along the County's coastal barriers which are experiencing severe beach erosion in order to prioritize sites for beach stabilization.

Policy 1.13.13: Charlotte County will evaluate alternative methods and technologies to traditional beach renourishment and stabilization practices.

Policy 1.13.14: Charlotte County will continue to promote the formation of special erosion control taxing units, and will research grants and other funding mechanisms, to provide funds for beach renourishment, restoration, and management projects.

Policy 1.13.15: Charlotte County will promote coordination between state and county agencies when issuing permits for projects along dune systems which require review by the state agencies.

Objective 1.14: Charlotte County shall increase public access and quality of service to its shoreline and coastal waters.

Policy 1.14.1: With the assistance of the Beaches and Shores Advisory Committee, Recreation and Parks Advisory Committee, and other suitable advisory committees, Charlotte County will identify coastal properties suitable for acquisition to provide increased public access to the Gulf of Mexico.

Policy 1.14.2: Charlotte County will continue to seek State and Federal funding, as well as assistance from sources such as the Trust for Public Land and local revenues such as the tourist tax or impact fees, to purchase beach front properties intended to provide public access to the Gulf of Mexico.

Policy 1.14.3: Charlotte County shall pursue interlocal agreements or memoranda of understanding with the FDEP to allow the County to wholly or in part manage Stump Pass Beach State Recreation Area.

Policy 1.14.4: Charlotte County shall assist FDEP in locating and acquiring a mainland site to provide parking and ferry service for Don Pedro Island State Park and Stump Pass Beach State Recreation Area.

Policy 1.14.5: Charlotte County shall encourage concessionaire provision of public access to Don Pedro Island State Park and the Stump Pass Beach State Recreation Area.

Policy 1.14.6: Charlotte County will study the feasibility of providing economic and other incentives to encourage the provision of public access at privately-owned beach front properties. Such incentives may include tax relief, density bonuses, or other benefits to the property owner intended to offset financial or other burdens associated with providing public access.

Policy 1.14.7: With the assistance of the Marine Advisory Committee and Recreation and Parks Advisory Committee, Charlotte County will identify waterfront properties suitable for acquisition and development for boat ramps to provide improved public access to the Gulf of Mexico. The County will seek funding from WCIND, FRDAP, and FBIP as well as other sources, including local revenues, for development of ramp facilities.

Policy 1.14.8: Existing publicly owned ramp facilities will be maintained and improved as necessary and economically feasible.

Policy 1.14.9: Charlotte County shall require access to public shorelines in all publicly funded coastal renourishment projects.

Policy 1.14.10: Charlotte County shall continue to protect beaches, dunes, and coastal vegetation from vehicular and pedestrian traffic by providing vehicular parking, and dune walkovers.

Objective 1.15: To site marina and boat ramp facilities using criteria from the Marine Land and Water Use Siting Study upon its formal adoption by Charlotte County and encourage the preservation of recreational and commercial working waterfronts and public access to water.

Policy 1.15.1: New marinas shall conform to the following standards:

a. Adequate parking for vehicles and boat trailers shall be provided, and all parking, dry storage, and non-water dependent facilities shall be built on existing uplands.
b. Access for the general public shall be provided at new marinas whose development directly results in unavoidable impacts to living marine resources, particularly seagrass beds and oyster reefs.

c. Marinas which provide overnight moorage of habitable vessels shall be required to have sewage pump-out facilities sufficient to handle 100% of anticipated occupancy and shall document usage.
d. Through sloping and use of curbs and other structural improvements, fuel facilities shall be designed to contain spills on the landside of the facility and prevent runoff into the surface water.
e. The design and construction of marinas shall include catchment systems for filtering pollutants from stormwater originating in boat repair and painting areas, and bilge water from boats removed from the water at ramps or lifts.
f. Except for ramps and other water-dependent facilities which, due to their function, must slope towards the water, all impervious surfaces in new marinas must be designed and constructed such that run-off water flows away from surface waters and wetlands.
g. Prior to final plan approval, proposed marinas must demonstrate that the facility will be able to contain spills within surface waters.

Policy 1.15.2: Charlotte County shall ensure compliance with these policies regarding marina siting and development.

Policy 1.15.3: Charlotte County will discourage the conversion of working waterfront businesses or those land designations that allow development of waterfront uses to residential or mixed-uses, to the extent allowed in the County's Code of Laws and Ordinances and this Plan, and when such conversion reduces public access to water or does not provide additional public benefit.

Objective 1.16: Charlotte County shall reduce the threat of loss of life and property to catastrophic hurricanes and locate new public facilities outside of the Coastal High Hazard Area except as necessary to ensure public health and safety and in instances where location-restricted amenities (such as boat ramps or parks) cannot be located elsewhere.

Policy 1.16.1: The Coastal High Hazard Area includes all areas located within a landfalling Tropical Storm or Category 1 Hurricane Storm Surge zone as illustrated on Map 3.26.

Policy 1.16.2: Within the Coastal High Hazard Area, Charlotte County will prohibit new publicly-funded buildings, except for restrooms and other structures including, but not limited to: boat ramps, boat docks, picnic shelters, bridge tender's building, landscape or facility maintenance sheds, boat lock, and food or rental concession stand, along with the necessary water, sewer and road infrastructure which are appropriate and necessary for public use and recreation and cannot be located elsewhere. Public buildings and structures along with the necessary water, sewer and road infrastructure associated with essential life safety services, such as police/sheriff district stations, fire stations, or emergency medical service stations may be developed or redeveloped in Coastal High Hazard Area as needed to protect the public health, safety, and welfare. This policy shall not apply to buildings and structures proposed within developments of

regional impact for which master development orders have been adopted pursuant to Chapter 380, Florida Statutes prior to the date of adoption of this policy.

Policy 1.16.3: Charlotte County will not approve Future Land Use Map Amendments, Rezonings, subdivisions, or Planned Developments (PDs) which will, upon development, cause increased traffic along evacuation routes which serve the site in violation of concurrency requirements.

Policy 1.16.4: The density of development platted subsequent to April 19, 1993 in unincorporated Charlotte County within the Coastal High Hazard Area shall not exceed 3.5 units per gross acre.

Policy 1.16.5: In accordance with the provisions of Ordinance 90-58, population density on the bridgeless barrier islands is limited to one unit per gross acre; areas on the bridgeless barrier islands platted prior to the date of adoption of Ordinance 90-58 shall have an allowable density of one unit per platted lot.

Policy 1.16.6: Charlotte County will actively facilitate the removal of density from the Coastal High Hazard Area by plat vacation and other means.

Policy 1.16.7: Bridgeless barrier islands and areas within the Coastal High Hazard Area may be used as sending zones for transfers of density units.

Policy 1.16.8: Charlotte County will utilize the help of the Southwest Florida Regional Planning Council to determine the cumulative impact of new development on hurricane evacuation times on annual basis and shall include appropriate funding within the five-year schedule of capital improvements to ensure that those improvements most needed to reduce evacuation times are provided.

Policy 1.16.9: To protect the public health, safety, and welfare and to mitigate property loss in the built environment, Charlotte County shall enforce:

a. the most recent state adopted Standard Building Code which provides for wind resistant building construction, and
b. the Federal Emergency Management Agency's Managing Floodplain Development through the most recent National Flood Insurance Program, which address floodplain and coastal construction management.

Policy 1.16.10: To increase protection of property and encourage the purchase of flood insurance by property owners, Charlotte County shall continue to participate in the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System.

Policy 1.16.11: Charlotte County will amend its Code of Laws and Ordinances to meet the requirements of the Disaster Mitigation Act of 2000, P.L 106-390, regarding emergency preparedness and assistance programs.

Objective 1.17: Charlotte County's hurricane evacuation system shall be improved to ensure that evacuation times will be maintained, at a minimum, and reduced if possible.

Policy 1.17.1: Through its Emergency Management Office, Metropolitan Planning Organization, Community Development Department, and Public Works Division, Charlotte County shall continue to work with Sarasota County to establish effective evacuation routes off of the Cape Haze Peninsula.

Policy 1.17.2: Improvements to Charlotte County's primary hurricane evacuation routes shall be consistent with this function, and shall be maintained at elevations above the Category 3 or Category 4 Storm surge, as feasible and applicable, based on the Southwest Florida Regional Planning Council's SLOSH model.

Policy 1.17.3: Charlotte County shall continue to develop and improve the hurricane evacuation signage program.

Policy 1.17.4: Hurricane evacuation corridor improvements shall be based on the following criteria:

a. The roadway heads inland and away from the coast.
b. The roadway rises out of areas affected by storm surge.
c. Water crossings are minimized.
d. The roadway provides a direct route to high ground and shelter.
e. The roadway is not subject to roadway flooding.

Policy 1.17.5: The Charlotte County Comprehensive Emergency Management Plan shall be used as the operational guide in preparation of, response to, and recovery from a tropical storm, hurricane or other emergency.

1) Management techniques which address immediate repair and cleanup which protects public health and safety:
   a. Charlotte County shall analyze each form of critical infrastructure and prioritize function based on risk and vulnerability. The County shall catalogue materials, parts, and supplies that can be accessed expeditiously and identify areas for stocking piling needed parts and supplies.
   b. Charlotte County shall develop design criteria for wind resistance and flood proofing protection based on each critical infrastructure system's assets determined by the analysis outlined in the preceding management technique. All new construction shall comply with the design criteria for wind resistance and flood proofing. Existing facilities shall be retrofitted according to priority and rank as determined by the previous management technique.
   c. Charlotte County shall coordinate the auxiliary power supply at all key utilities and facilities and promote incentives for utilities and facilities to implement the most cost-effective system possible to deal with future disasters.

2) Management techniques which address long-term repair and redevelopment:

a. Charlotte County shall develop an ordinance which requires the preparation of a post-disaster redevelopment plan.
b. Charlotte County shall identify and implement long-term cost effective mitigation measures, including flood proofing operating facilities to the 25 year event and eliminate flood water inflow and infiltration into sanitary sewer systems.
c. Charlotte County shall enhance the provision of the local building code or floodplain management ordinance which requires that substantially damaged building (which are repairable) be brought into compliance with current code and ordinance requirements during the repair process.
d. Charlotte County shall identify and implement technically feasible methods of retrofitting undamaged portions of (less than substantially) damaged buildings for compliance with current code requirements.
e. Charlotte County shall implement a program that offsets retrofit burdens. Financial assistance through such vehicles as loan supports, tax credits, and insurance incentives as well as public funding are possible financial components of a retrofit program.
f. Charlotte County shall develop and adopt a building code for all new structures which addresses the issues of roof, weather envelope, and window and roof failures. Specifically, address requirements and incentives for shutters, improved roof connections, and creation of a safe shelter space within the living areas of each residence.
g. Charlotte County shall adopt and implement wind and flood design, and siting requirements for mobile homes and pre-engineered housing.
h. Charlotte County shall adopt and implement local ordinances governing the installation of hazardous materials storage containers not currently regulated to minimize the impact of flood and fire hazards. This includes residential propane tanks.
i. Charlotte County shall implement a comprehensive effort to enforce adopted codes, to include the following:
   (1) Mandatory certification program for inspectors and certification for building inspectors emphasizing wind-resistant construction.
   (2) Amend all building codes to require the number of inspections necessary to ascertain that all critical load path members and connections comply with code requirements. These include, roof sheathing, framing anchors, tie downs, roof framing, wall framing, and wall sheathing.
j. When in need of additional building inspectors, Charlotte County shall use the Building Officials Association of Florida and establish mutual aid agreements for use of building inspectors from other cities and counties during reconstruction efforts.
k. Charlotte County shall strengthen the procedures and guidelines under which variances to building codes and zoning ordinances may be granted, to avoid compromising regulations designed to minimize losses of life and property.

3) Management techniques which address removal, relocation, or structural modification of damaged infrastructure:

a. Charlotte County shall make all critical facilities disaster resistant by retrofitting or through relocation.
b. Charlotte County shall develop acquisition and relocation ordinances for storm damaged buildings located in high hazard areas which can be converted into open space or less vulnerable land uses.
c. Charlotte County shall identify parcels which are located in the Special Flood Hazard Areas.
d. Charlotte County shall determine whether critically damaged key infrastructure and facilities should remain in place or be relocated.
e. Charlotte County shall note possible relocation sites for key infrastructure and facilities on the Future Land Use Map.
f. Charlotte County shall consider the structure of secure living quarters for skeleton crews at key work stations when the presence of operations is essential for operations of facilities.
g. Charlotte County shall investigate the use of solar energy and alternative sources of power to reduce dependence on vulnerable supplies for short or long-term operations.

4) Management techniques which address redevelopment in areas of repeated damage:
   a. Charlotte County shall prohibit development and other activities which disturb coastal dune systems, and ensure and promote the restoration of coastal dune systems that have been damaged.
   b. Charlotte County shall continually generate new floodplain information and revise floodplain boundaries through land development.
   c. Charlotte County shall further coordinate with local and private floodplain studies for updating FIRMs.
   d. Charlotte County shall adopt a cumulative substantial damage and improvement limit for all structures in the special flood hazard area.

5) Management techniques which address the incorporation of recommendations of interagency hazard mitigation reports:
   a. In order to enhance hazard mitigation planning and subsequent mitigation actions, the Charlotte County Office of Emergency Management will take a proactive lead to ensure coordination between other governmental agencies.
   b. Charlotte County shall pre-establish and update a network of state and local contacts to coordinate Charlotte County needs.
   c. Charlotte County shall establish and protect the essential flow of information before, during, and after a disaster.
   d. Charlotte County shall ensure that the Charlotte County Hazard Mitigation Plan incorporates appropriate hazard mitigation measures as reflected in each agency's Emergency Support Function, interagency hazard mitigation report, or Departmental Standard Operating Procedures.
   e. Charlotte County will employ growth management strategies, where feasible, which address the reduction of density, in an effort to overcome the number of

evacuees which would be generated if the County were to build out as currently platted.

Policy 1.17.6: Charlotte County shall implement its Post Disaster Redevelopment Plan which seeks to reduce potential damage from storm events through mitigation, and to guide recovery and redevelopment activities from natural and man-induced disasters.

Objective 1.18: Charlotte County shall maintain and increase shelter space available for general evacuees and special needs populations.

Policy 1.18.1: Multi-level structures located within the Category 3 or higher hurricane evacuation zones shall be assessed for use as vertical shelters.

Policy 1.18.2: All new publicly funded buildings in Charlotte County shall be designed to serve as evacuation shelters. Law enforcement, fire rescue, and emergency medical buildings shall be designed to function as emergency shelters for their mission personnel and equipped with a flood proof emergency power supply.

Policy 1.18.3: Charlotte County will encourage the construction of nursing homes, adult congregate living facilities, and hospitals outside of the Category II Hurricane Vulnerability Zone.

Policy 1.18.4: Charlotte County shall continue to amend and implement its Land Development Regulations to require all newly constructed nursing homes, adult congregate living facilities, and hospitals to include shuttering or the use of shatterproof glass, as well as independent emergency power supplies located above base flood elevation or otherwise protected from flooding, as part of such facilities' design and construction.

Policy 1.18.5: Charlotte County shall continue to work with the American Red Cross to identify potential sites for consideration as designated hurricane shelters.

Policy 1.18.6: Charlotte County will continue discussions with the Charlotte County School Board to consider hurricane shelter needs in the siting and design of school facilities in general.

Objective 1.19 (Limitation of Expenditures in CHHA): Charlotte County shall limit additional public investment in the Coastal High Hazard Areas except as necessary to ensure public health or safety and in instances where location-restricted amenities (such as boat ramps or parks) cannot be located elsewhere.

Policy 1.19.1: Charlotte County shall prohibit the construction or reconstruction of County funded facilities or infrastructure in the Coastal High Hazard Area except for recreation facilities and those necessary to ensure public health and safety.

Policy 1.19.2: Charlotte County may use the power of eminent domain and regulatory authority to relocate threatened or damaged public structures and infrastructure landward of the Coastal High Hazard Area when appropriate.

Objective 1.20 (Directing populations away from the CHHA): Charlotte County shall direct concentrations of population away from Coastal High Hazard Areas.

Policy 1.20.1: Charlotte County shall prohibit any new mobile home zoning on the Barrier Islands or within the Coastal High Hazard Areas.

Policy 1.20.2: Charlotte County will evaluate development orders for their impacts on traffic circulation, evacuation routes, on-site hurricane shelter provisions, and proximity to off-site shelter facilities within the Storm Surge Zones of 1, 2, and 3.

Policy 1.20.3: Charlotte County will limit maximum residential development in the Coastal High Hazard Areas to those densities depicted on the Future Land Use Map as part of this Comprehensive Plan, unless a change of land use is accompanied by a transfer of density (no density may be transferred from other areas of the County into the West County Planning Area).

Policy 1.20.4: Charlotte County will evaluate the costs of acquisition of privately-owned, developed properties - for which the County provides infrastructure - that have been severely or repetitively damaged by tropical storms, hurricanes, floods, or other natural disasters. The acquisition cost shall be compared against the costs associated with rebuilding the required infrastructure for that property or the rebuilding of the property itself. This will be done in order to determine the most cost-effective options for addressing loss, mitigation, or prevention.

Policy 1.20.5: Any structure that does not meet the flood mitigation standards and current building codes must be rebuilt to the current standards and code should they sustain substantial damage - damage which equals or exceeds 50 percent of the market value of the structure before the damage - after a natural or man-made disaster. An existing structure is considered to be substantially damaged if damage from any origin is sustained and the cost of restoring the structure to its pre-damaged condition is equal to or exceeds 50 percent of the market value of the structure before it was damaged.

Objective 1.21: Charlotte County shall develop, with the assistance of the Southwest Florida Regional Planning Council and the Department of Community Affairs a model Post Disaster Redevelopment Plan which shall consider the following:

a. land uses and public facilities in the Coastal High Hazard Area;
b. areas of known high-hazard;
c. the effects of hurricanes on the dynamics of coastal areas; and
d. the direct and indirect costs of a major storm disaster.

Policy 1.21.1: Upon adoption of the Post Disaster Redevelopment Plan, the Plan shall be incorporated into and be made part of, the Comprehensive Plan.

Policy 1.21.2: The Post Disaster Redevelopment Plan shall contain an estimate of the potential damage done to property and what debris removal might cost in order to determine eligibility for State and Federal assistance. The plan shall also contain provisions for a thorough determination of damage assessment in dollar value, and of the economic and social effects of that damage upon the county immediately after the occurrence of a disaster. In regards to the assessment of damages, the plan shall also contain provisions for Charlotte County to coordinate with public and private agencies, and to establish County Damage Assessment Teams as outlined in the Charlotte County Recovery and Mitigation Plan.

Policy 1.21.3: The Post Disaster Redevelopment Plan shall outline how emergency work (which includes efforts to save lives, protect property and maintain operation of essential facilities until permanent restoration can be made) will be conducted. The emergency work provisions shall include plans to repair and restore damaged water and sewer treatment facilities immediately after the storm event in order to function consistently within health and environmental plans and shall also evaluate emergency sewer disposal procedures.

Policy 1.21.4: The Post Disaster Redevelopment Plan shall outline how permanent work (which involves actions necessary to repair, restore, reconstruct, or replace public and certain private non-profit facilities damaged or destroyed by the disaster) will be conducted, and will include provisions for the following:

a. Determination of whether critically damaged key infrastructure and facilities should remain in place or be relocated.
b. Consideration of acquisition and relocation ordinances for damaged buildings in high hazard areas, and when appropriate, relocation of damaged public structures and infrastructure landward of the Coastal High Hazard Area with the power of eminent domain and regulatory authority.
c. Evaluation of the costs of acquisition of privately-owned developed properties - for which the County provides infrastructure - that have been severely or repetitively damaged by tropical storms, hurricanes, floods, or other natural disasters against the costs associated with rebuilding in order to determine the most cost-effective options for addressing loss, mitigation, or prevention.
d. Compliance with current code and ordinance requirements during the repair process of substantially damaged, but repairable buildings.

Objective 1.22(Created July 13, 1999, Ordinance #99-031)**:** To protect and preserve the function and value of marine and freshwater natural shoreline ecosystems. These systems serve a variety of functions including, but not limited to, wildlife habitat, flood control and erosion control.

Policy 1.22.1(Created July 13, 1999, Ordinance #99-031)**:** Charlotte County shall protect natural estuarine and freshwater shorelines in order to protect the function of the estuary, enhance water quality, and preserve shoreline wetlands.

Policy 1.22.2(Created July 13, 1999, Ordinance #99-031)**:** Charlotte County shall maintain the functional integrity of natural estuarine and freshwater shorelines on newly acquired public lands by removing exotic and nuisance vegetation from the shoreline.

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