2040

City of Punta Gorda Comprehensive Plan

Conservation Element

Adopted XXXXX
Resolution #

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I. EXECUTIVE SUMMARY

The purpose of the *Conservation Element* is to plan, promote and manage the conservation and protection of the City's natural resources. It is important for the City to plan for development in such a way that development mitigates risk, maximizes economic value, and conserves natural ecosystems. This element addresses measures to protect areas that are necessary for threatened and endangered species and subject to destruction by land development, while developing and promoting the City's economic engine and is integrally connected with the *Future Land Use, Coastal Management, Recreation and Open Space, Infrastructure*, and *Transportation Elements.*

The *Conservation Element* inventories and describes the City's existing and proposed natural preserves and conservation areas within and adjacent to the City. The preservation and enhancement of these natural areas and the protection of the undeveloped areas are the major concerns of this element. The preservation of waterfront property from development also contributes to the maintenance of water quality standards by limiting the discharge of pollutants resultant from development.

Other concerns include the enhancement of traditional economic activities that rely on a healthy ecosystem by the mitigation of adverse effects from the development by promoting compact urban form and the protection and restoration of natural resources.

The greatest potential impact to the natural resources of Punta Gorda and its environs is population growth in unsustainable patterns. The City is committed to implementing strategies that will balance growth, including residential and commercial development and the associated infrastructure, through innovative and creative approaches that will least impact the natural systems.

II. INTRODUCTION

Purpose

The purpose of the *Conservation Element* is to plan, promote and manage the conservation and protection of the City's natural resources including air, water, wetlands, forests, fisheries and wildlife, marine habitat, minerals, and other natural and environmental resources. It is important for the City to plan for development activities in areas that would mitigate or otherwise lessen the disturbance of upland or coastal resources. This element predominantly addresses measures to protect the natural and environmental resources in the area.

Relationship to the City's Comprehensive Plan

The *Conservation Element* provides the underlying foundation and detailed policies regarding conservation, use and protection of natural and coastal resources. It relates to the other elements as follows:

- It is through the *Future Land Use Element* and the Future Land Use Map that the City'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 planning goals and objectives, and that the policies of the *Future Land Use Element* promote compatibility between development activities and the conservation of natural resources.
- The *Coastal Management Element* contains key data and goals concerning exceptional natural estuary areas, beach and waterway access and other issues having implications for park and recreation location criteria, and water based recreation activities. It is essential that development activities implement sound coastal policies that protect the natural and coastal resources.
- The *Recreation and Open Space Element* identifies the potential recreational opportunities for which these natural 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 Drainage, Solid Waste and the provision of Sewer and Potable Water services, is directly related to the *Conservation Element*. The impacts of existing and proposed facilities on natural systems must be taken into consideration during the establishment of levels of service for water and sewer facilities, facility site location criteria, and overall policies regarding the City's infrastructure. Dealing with these challenges is accomplished through the policies of the drainage section of the *Infrastructure Element*.
- The *Transportation Element* deals with the City's street network and addresses bicycle, pedestrian, transit, port and aviation facilities. The policies of the *Transportation Element* must reflect those of the *Conservation Element* to ensure that roads are sited in the least sensitive areas possible, designed in a manner which minimizes impacts to the surrounding environment and provide adequate hurricane evacuation times.

III. LEGISLATION

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

Federal Regulations

The Rivers and Harbors Act (1899)

The Rivers and Harbors Act (1899) regulate 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 other activities interpreted as affecting navigable waters. The primary enforcement agency for this act is the U.S. Army Corps of Engineers.

The Clean Water Act

The Federal Water Pollution Control Act of 1972 [Clean Water Act (CWA)], was signed into law in 1972 as a rewrite of the Federal Water Pollution Act of 1948, it was then amended in 1977, 1987 (Section 320 added), 2000 (Clean Waters and Estuaries Act –

CCMP implementation), and 2016 – revision to Section 320. 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 on surface waters, and provides the greatest protection for wetlands of any federal legislation.

The Clean Air Act (1970, 1990)

The Clean Air Act (1970, 1990) establishes emission standards for point source emitters of airborne pollutants and 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 Marine Mammal Protection Act of 1972

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.

Endangered Species Act (ESA)

Adopted by Congress in 1973, the Endangered Species Act (ESA), and subsequent updates, establishes 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 Safe Drinking Water Act of 1974

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

State Regulations

Florida Statutes

The Florida Endangered and Threatened Species Act

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

The Preservation of Native Flora of Florida Act

The Preservation of Native Flora of Florida Act recognizes the native plant species that are endangered, threatened, or commercially exploited.

Chapter 163, FS

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.

Chapter 370, FS, and Chapter 16N-35, FAC,

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

Chapter 380, FS

As required by Chapter 380.24, local government abutting the Gulf of Mexico or the Atlantic Ocean, or which include or are contiguous to waters of the state where marine species of vegetation listed by rule as ratified in s. 373.4211 constitute the dominant plant community, shall develop a coastal zone protection element pursuant to s. 163.3177.

The Florida Manatee Sanctuary Act

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

The Water Resources Act establishes state water policy and implementation measures, which include the creation of the five regional water management districts. This act mandates the formulation of a state water use plan. The City of Punta Gorda lies within the Southwest Florida Water Management District (SWFWMD).

The Florida Water Quality Assurance Act

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

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

The 1984 Groundwater Protection Rule

The 1984 Groundwater Protection Rule establishes guidelines for the restoration, conservation, and management of the State's groundwater resources.

The Florida Solid Waste Management Act (1988)

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.

The Surface Water Improvement and Management (SWIM) Act of 1987

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 identified, including detailed schedules of implementation.

The Mangrove Trimming and Preservation Act

The Mangrove Trimming and Preservation Act was enacted during the 1995 legislative session and provides standards for the selective trimming of mangrove trees, and establishes a permitting program to allow such activities. It was amended during the 1996 session to provide regulations for trimming and altering mangroves on private and public property.

Local Regulations

City Ordinance

Chapter 6, Boats, Docks, and Waterways Ordinance

Boats, Docks, and Waterways Ordinance, Chapter 6 of the City Code of Ordinances provides authority to the City to regulate waterways within the City limits. The provisions include regulation of boats, sanitation rules, mooring and speed zones, construction in waterways, maintenance of seawalls, and commercial harvesting of shellfish. The code defines the 5 member Canal Maintenance District, and a governing body with specific powers.

Chapter 6A, National Pollution Discharge Elimination System

National Pollution Discharge Elimination System, Chapter 6A of the City Code of Ordinances was adopted for the purpose of maintaining efficient economic and safe operation of storm sewer system and for the safe operation of the health safety and general welfare of the public within the City. It ensures that land development activities are conducted in a manner which minimizes the loss of top soils, controls run-off through the application of "best management practices".

- Article I is intended to prevent and abate pollution through the regulation and control of connections and discharges to the separate storm sewer system of the City of Punta Gorda and to limit the use of the separate storm sewer system to the collection, conveyance, treatment and disposal of stormwater through appropriate regulation and enforcement.
- Article II includes provisions for environmental protection and promotes public welfare through the regulation of the design, construction, use and maintenance of any development or other activity which disturbs land or removes the vegetative cover or results in the movement of soils on construction sites within the City.

Chapter 26, Land Development Regulations

Chapters 26, of the City Code of Ordinances are known as the Land Development Regulations (Codes) and deal with a variety of natural resources issues.

- Article 8, Section 13, Soil Conservation: provides for the installation of erosion control barriers during development, the stabilization of soils ensures that land development activities are conducted in a manner which minimizes the loss of top soils and ensures the application of "best

management practices" for agricultural land uses.

- Article 8, Section 16, Transfer of Development Rights: provides for the transfer of density units associated with real property. This subsection promotes the protection and conservation of environmentally sensitive areas of the City such as wetlands, mangrove clusters and endangered species habitats. The ordinance establishes an incentive for the dedication and/or discounted sale of property to the City for general purposes such as parks, roads, right-of-ways, government service sites, public access and affordable housing and continues to provide limitations and conditions for transfer of density units for the establishment of a land acquisition trust fund.
- Article 12, Landscape Standards: establishes minimum landscape design standards including approved native and prohibited plant species lists, and landscaping standards on all commercial, multi-family and single family development within the City limits.
- Article 14, Flood Hazard Areas: It is the purpose of this Article to mitigate potential losses due to flood conditions in specific areas by provisions.

IV. INVENTORY AND ANALYSIS

The common theme of the *Conservation Element* is the continued conservation, use and protection of the natural resources and other native environments within the City of Punta Gorda. By conserving and protecting these areas, the City maintains and sustains our minerals, soils, and native vegetative communities, including forests, from destruction by development activities Because all of the City's surface water runoff discharges into the Charlotte Harbor estuary , which is critical both ecologically and economically to the City.

The City of Punta Gorda lies within a sub-tropical environment dominated by pine-palm-palmetto low-lying uplands separated from the Charlotte Harbor estuary by extensive mangrove forests and salt marsh ecosystems along most of the shoreline. The two most significant environmental events that have impacted the City are the development of the residential canal communities and the preservation of thousands of acres of native habitat through state acquisition. Most of these preservation areas that surround the City are owned by the State of Florida and are known as the Charlotte Harbor Preserve State Park. In addition to State owned lands there are significant lands held by the City, Charlotte County and private individuals that lie between Charlotte Harbor and the urbanized areas of the City providing some relief from climate changes such as sea level rise. The greatest potential impact to the natural resources of Punta Gorda and its environs is the population growth in unsustainable patterns and rapid suburbanization within the coastal area. This growth, including residential and commercial development and the associated infrastructure, creates a significant impact to all natural systems through land clearing practices and surface water quality issues from stormwater runoff.

The Punta Gorda area receives an average annual rainfall of fifty-four (54) inches, with approximately sixty percent (60%) falling during the summer months of June through September in a

typical wet season/dry season. The summer rainfall patterns consist of short duration, intensive storms typically occurring in the late afternoon. It is this type of rainfall event that causes the highest volumes of storm water runoff with the potential of spot flooding and potentially damaging effects to Charlotte Harbor.

The topography of the City of Punta Gorda, identified in Map #12 in the Future Land Use Element, and its environs is generally flat with elevations ranging from sea level to approximately fifteen (15) feet above sea level. Three vegetative zones can be distinguished:

- The coastal marsh is predominantly tidal mud flats, mangroves, and grass marsh areas ranging in elevations from zero (0) to five feet (5) above mean sea level.
- The transitional zone connects the coastal area with the inland prairie area. This zone varies in elevation from approximately five (5) to fifteen (15) feet above sea level. Most development has occurred in the transitional zone because it provides the most topographical relief therefore was the best drained land. The ridges of the transitional zone generally formed the location of the earliest transportation links including the railroad, Tamiami Trail (US 41), and US 17.
- The inland prairie is normally drained by overland sheet flow due to a lack of natural stream beds. The flood condition of the prairie during heavy rainfall restricts development; however, this condition enhances recharge of the underground aquifers.

Air Quality

Air quality within the City of Punta Gorda is well within the standards set by State and Federal regulatory agencies. The air quality is monitored by the Florida Department of Environmental Protection (FDEP) for carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulfur dioxide. FDEP monitors are concentrated in areas of high population densities. The one air quality monitoring station in the area was located at the near the Charlotte County Airport, however, this monitoring station was removed many years ago. Automobile exhaust was previously identified as the most significant individual threat to the City's and Charlotte County's air quality. While improved automotive exhaust pollutants technologies have reduced that threat significantly, auto-dependent development patterns in conjunction with increasing populations will increase auto related air pollutants over the planning horizon.

Open burning is another common source of air pollutants, as a result of development activities or in the form of wildfires. The major pollutants that result from open burning are suspended particulates and carbon monoxide. The size of the particles released through open burning are directly linked to a high potential for causing health problems. However, the emissions produced from open burning are generally short term and localized in nature. Open burning occurs around the City to a lesser extent including wildfires and prescriptive burns for land management purposes. 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, and wildlife management as an essential land management tool. One of the major benefits of prescriptive burning of lands, such as the Charlotte Harbor Preserve State Park, is to periodically reduce the accumulation of dry leaf litter and other dead plant materials in forests and prairies, and thus prevent highly destructive wildfires from occurring.

Water Resources

Surface Water Systems

As provided by Chapter 403, *Florida Statute (FS)*, Florida's surface waters are classified into five categories according to their present and future most beneficial uses. Table 2.1 divides the five (5) categories of surface waters identified in Section 62-302.400, *FAC*:

Table 2A.1 - Surface Water 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/Wildlife
Category IV	Agricultural Water Supplies
Category V	Navigation, Utility, and Industrial Use

Source: Florida Department of Environmental Protection

Category I surface waters are generally the highest quality and subject to the most stringent protective measures. Category II and III waters may, for certain uses and water quality parameters, receive equal or even greater protection. Category IV water bodies are generally located in agricultural areas. Category V Waters are generally industrial in nature. There are no Category IV or V waters within the City of Punta Gorda.

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

- Outstanding Florida Waters - waters designated by the Environmental Regulation Commission as worthy of special protection because of their natural attributes.
- 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 most circumstances.
- Aquatic Preserves - 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*). The City of Punta Gorda contains a portion of the Gasparilla Sound-Charlotte Harbor Aquatic Preserve.

The most significant surface water features in and adjacent to the City of Punta Gorda are the Peace River and Charlotte Harbor to the north and west; and Alligator Creek to the south; have been designated as aquatic preserves by the State. The City is bordered on the west by mangrove forest and tidal marsh areas that form part of the Charlotte Harbor Preserve State Park.

Rainfall accumulations during the wet season flood the area. As the water table rises above the land surface, the water drains either through natural channels, such as sloughs, creeks and rivers, or by slowly moving across large areas of flat land. This process is known as sheet flow movement and it allows water to filter out pollutants as it moves slowly across the large areas.

Historically, much of the City drainage sheet flowed generally west and north into the harbor. Early populations settled on well drained lands to avoid seasonal flooding. However growing populations and land development disrupted the natural drainage patterns as urban development and agricultural needs increased. These activities employ the draining of lands through the construction of canals and ditches.

Significant alterations of natural drainage features include:

- Creation of man-made canals
- Use of surface water as potable water
- Development activities which result in the reduction of drainage basins
- Destruction of sloughs that served as natural flow ways
- Loss of wetlands that serve as water storage areas
- Alteration or elimination or sheet flow due to development activities

The most significant man-made alteration to wetlands and natural drainage features was the construction of two (2) large dredge and fill residential canal communities, Punta Gorda Isles and Burnt Store Isles. These two (2) communities now include over one hundred (100) miles of seawall along the shores of canals that provide navigable access to Charlotte Harbor.

Surface Water and Drainage Basins Affecting the City

Surface water consists of the collective water flowing on the surface that develop into larger streams and eventually combine to form a river. The location of Charlotte Harbor to the City of Punta Gorda is critical to the economic engine of the City and it is in the City's best interest to support monitoring and protection programs related to the surface water, stormwater and drainage basins connecting to the Harbor.

Surface water studies through programs administered by the Southwest Florida Water Management District (SWFWMD) and the Charlotte Harbor National Estuary Program (CHNEP) collect and organize data necessary to monitor water quality. Both groups are committed to improving and maintaining Charlotte Harbor through similar goals.

Current data indicates the City's surface water resources are in generally good condition, with some localized areas of elevated chlorophyll, nutrients and turbidity levels. The enforcement of

State, Federal, and local regulations, coupled with the public's continually awareness of the need to conserve and protect water resources, have combined to enhance the protection of these waters from point and non-point source pollution. In addition, since its establishment in 1995, the CHNEP has fostered partnerships with the City and other agencies and organizations to improve the effectiveness of water quality, hydrologic and habitat protection and restoration programs. The primary threats to the City'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, and historic construction of dead end finger canals, that when built, limit water exchange.

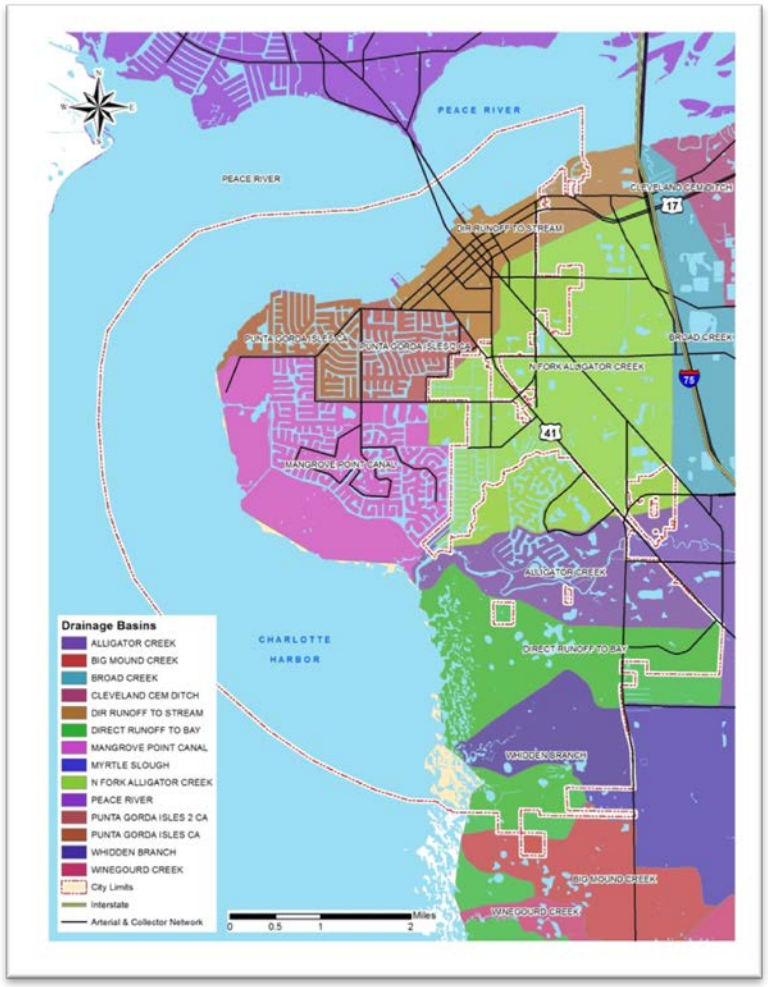
Non-point sources by their nature are difficult to isolate and identify, other than by their proximate causes as stated above. It is even more difficult to develop and successfully implement programs to reduce the amount of such pollutants which enter the surface water system because such programs usually rely on public education and voluntary compliance

Map #18 – City of Punta Gorda Drainage Basins, identifies the City of Punta Gorda's drainage basins. A drainage basin is the topographic region from which a stream receives runoff, sheet flow and groundwater flow. Drainage basins are divided from each other by topographic barriers which will define water flow patterns. Thirteen (13) basins are included within the City's boundaries. The largest basin is identified as the Alligator Creek. The flow from this basin transects the City as the North and South Forks of Alligator Creek, eventually discharging to Charlotte Harbor south of the large residential community of Punta Gorda Isles and north of the Charlotte Harbor Preserve State Park.

As one of five (5) contiguous aquatic preserves within the greater Charlotte Harbor estuary complex, the Charlotte Harbor Aquatic Preserve receives protection under the Florida Aquatic Preserve Act of 1975. In addition to the two (2) major tributaries that drain into the preserves, the preserves connect to several extensive residential canal systems located in Punta Gorda, Port Charlotte, and Cape Haze in northwestern Charlotte County. The locations of the Aquatic Preserves in association with the City are shown on Map #19 - Aquatic Preserves. Any impacts received to the tributaries and the canal systems may negatively affect the preserve. The City of Punta Gorda shall review new developments and support monitoring activities occurring along these areas in efforts to prevent and reduce negative impacts such as nutrient run-off to the preserve.

A drainage basin, sometimes called a watershed, is an area where all surface water shares the same drainage outlet. Drainage basins act like funnels by collecting water within an area and channeling it into a waterway. They are divided by topographical boundaries. Surface water and drainage systems form hydrologically and ecologically interconnected and mutually interdependent system. The following brief discussions describe the City's major surface waters features.

Map #18 - City of Punta Gorda Drainage Basins



Map #19 - Aquatic Preserves

The Peace River

The Peace River begins in the waters of the Green Swamp in Polk County (Black, Crow and Eidsness, 1976). After coalescing into a defined stream near Bartow, it flows generally southwest for approximately one hundred and five (105) miles until it empties into Charlotte Harbor draining twenty-four hundred (2,400) square miles of land area (Hand, et. al., 1994) as shown in Map #20 – Peace River Drainage Basin.

Water Quality

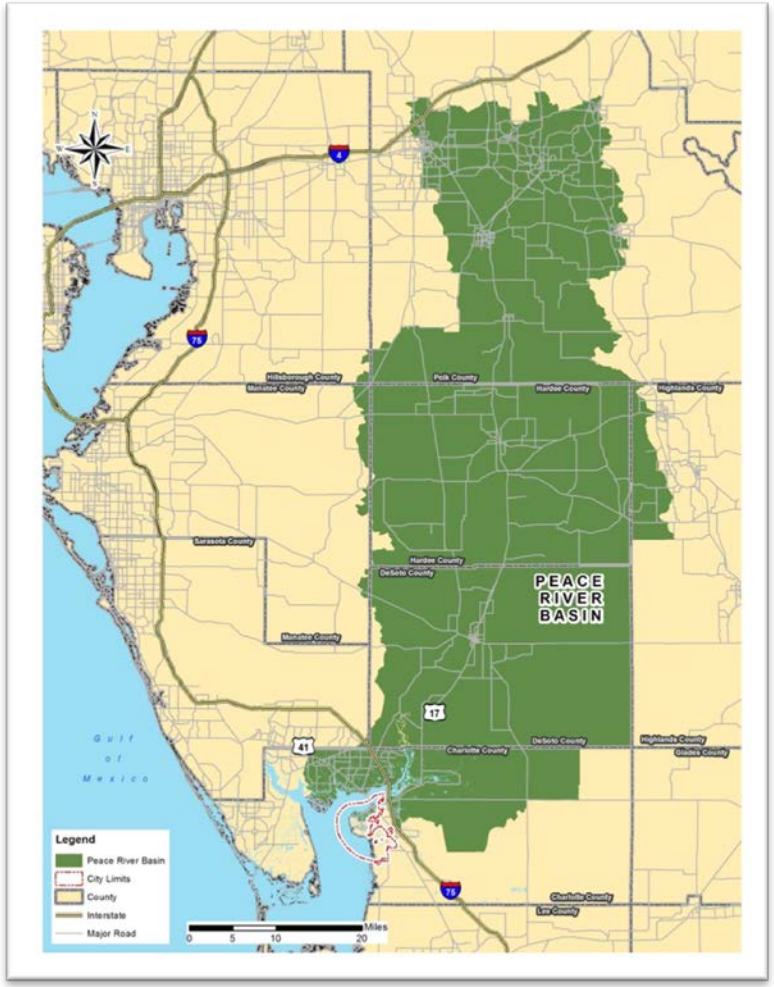
The Peace River, the largest of Charlotte Harbor's tributaries, contributes well over half the freshwater which flows into the estuarine system and is the principal source of potable water for much of the greater Port Charlotte area, as well as an important river for industry, agriculture, tourism and the environment.

Although the main body of Charlotte Harbor and its adjacent estuarine systems are in relatively good condition, the watershed reflects the effects of diverse human activities. As the population continues to grow throughout the watershed, these stresses must be addressed to provide sustainable uses of the natural resources while protecting the current health of the natural systems and reducing future risks. The City utilizes its opportunities to participate with local agencies, such as the Charlotte Harbor National Estuary Program (CHNEP), to protect and restore its adjacent watersheds by promoting common goals including:

- Managing and protecting fish, wildlife and shellfish habitats, including oysters, seagrasses and mangroves;
- Securing new water supply sources for growing populations and business;
- Managing waste generated by septic tanks and storm sewer outfalls;
- Protecting wetland areas for water retention, groundwater recharge, and wildlife habitat;
- Improving the efficiency of freshwater usage;
- Restoring natural water flow ways; and
- Enhancing community understanding and stewardship of natural resources and human connections to them.

Achieving CHNEP's and others' watershed management goals is significantly affected by land use decisions made by local governments. Local governments are facing challenging land use and management issues which include securing a reliable water supply, treating residential wastewater, and preserving natural habitats and green spaces for human enjoyment. These challenges become more difficult to manage effectively and efficiently as the population increases, especially if not planned for long term sustainability. These challenges can be intensified if there is a lack of coordination of land use decisions among local governments within the watershed.

Map #20 - Peace River Drainage Basin



The DEP, in coordination with the Southwest Florida Water Management District (SWFWMD), has completed a resource management plan for the Peace River Basin. This plan recommends a number of regulatory and non-regulatory approaches toward reducing cumulative impacts in the basin. The plan incorporates many existing programs from the FDEP, SWFWMD and the Florida Department of Agriculture and Consumer Services (FDACS). Recommended actions include:

- Development of a land acquisition plan and funding strategy for the Peace River Basin through collaboration of local, state, and regional conservation land acquisition entities to assure a coordinated and equitable approach;
- Development of a proposal to ensure adequate funding for the Non-mandatory Mine Reclamation Program targeted at specific water resource benefits in the basin;
- Joint reviews by DEP and SWFWMD on Environmental Resource Permitting;
- Consideration in combining the Environmental Resource Permit and Conceptual Reclamation Plan approval processes into a streamlined and more protective, comprehensive phosphate mining authorization to enhance environmental protection and restoration; and
- Work with the SWFWMD and area local governments to evaluate, plan and initiate financing for the necessary environmental infrastructure to assure sustainable water supplies and improved water quality in the Peace River Basin.

Primary conclusions of the study indicate the following:

- Long-term variations in rainfall have led to substantial declines in average and above average flows over the last 60 years;
- Groundwater withdrawals have caused a loss of spring flow and base flow in the upper part of the watershed, resulting in the periodic loss of perennial flow in the river between Bartow and Homeland during low flow conditions;
- Increased dry season flows from agricultural runoff have led to water quality degradation;
- Land use and cover patterns in the watershed have changed dramatically since the 1940s, with most changes occurring prior to 1979; and
- Water quality improvements have been made with respect to some parameters over the watershed as a whole, however, some portions of the watershed continue to experience water quality degradation.

Charlotte Harbor

Charlotte Harbor is designated as a priority waterbody of the SWFWMD's Surface Water Improvement and Management (SWIM) program and identified as a critical waterbody by the 2002 *Southwest Florida Strategic Regional Policy Plan*, (SRPP). In 1995, Charlotte Harbor was included in the National Estuary Program administered by the US Environmental Protection Agency. With a surface area of approximately 270 square miles and a drainage basin of approximately 4500 square miles (SWFWMD, SWIM Plan 1993), Charlotte Harbor, 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, and a provider of habitat for a variety of endangered species, the Harbor is the focal point of the City's waterfront. The harbor's major tributaries are the Peace, Myakka, and Caloosahatchee Rivers. Numerous smaller creeks and streams also feed into the harbor.

Charlotte Harbor's Shoreline

Charlotte Harbor's shoreline is characterized by large areas of mangrove swamps with limited urban development occurring in some areas of the Harbor (Port Charlotte) and at the mouth of the Peace River (Punta Gorda). Along the southern basin boundary behind the existing Charlotte Harbor Preserve State Park larger residential developments exist or are being planned.

Water Quality

While the Florida Department of Environmental Protection (FDEP), State Regional Policy Plan (SRPP) and CHNEP data show that the water quality in the Lower Peace River and Upper Charlotte Harbor is generally good, there are some locations and parameters of concern. FDEP lists some of the tributaries as impaired for nutrients, including nitrogen and phosphorus, chlorophyll and bacteria. CHNEP status and trends analyses indicate that there are increasing levels of chlorophyll and nutrients near the mouth of Peace River. And the CHNEP Water Clarity Report Card reflects declining water clarity in the Tidal Peace River and Upper Charlotte Harbor. Water clarity is important for sustaining the submerged seagrasses and associated fishery populations. Sources of excess nutrients, chlorophyll and bacteria within the tributaries and estuary

adjacent to the City include stormwater runoff from urban impervious areas, construction sites, and agricultural areas, as well as improperly functioning septic systems.

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

The watershed reflects the pressure of increasing human activities. Urban development continues to change the character and ecology of river mouth and coastal waters. Mangroves are removed or aggressively trimmed, red tide events cause public health warnings, seagrass areas have declined or have been damaged, and groundwater pumping has continued to increase. If the watershed's population continues to grow in unsustainable patterns, these pressures must be addressed to prevent further threats to natural systems and to protect current uses of resources.

The Charlotte Harbor Estuary provides many benefits and opportunities to the City of Punta Gorda. The establishments of the CHNEP program, goals were developed to provide guidance to protect this estuary; however development and implementation of a formal Charlotte Harbor management plan will be necessary for achieving goals of estuary protection.

The City's challenges include not only water quality issues but management of mangrove areas, protection of seagrass area, restoration of oyster reefs,, establishment and protection of new water supply sources for growing populations and businesses, management of waste generated by septic tanks and storm sewer outfalls, protection of wetland areas for water retention, groundwater recharge, and wildlife habitat, and improving the efficiency of freshwater usage.

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. The agreement requires five samples be taken monthly in a variety of locations including the ten samples in upper Charlotte Harbor. These sample sites can be seen on Map #21 - Charlotte Harbor Water Quality Monitoring Stations. 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 (CHEC) utilizes this system as well. This agreement has been extended through 2008 with the anticipation of additional extensions at the time of expiration.

Map #21 - Charlotte Harbor Water Quality Monitoring Stations

Prairie and Shell Creeks

In an unusual arrangement for South Florida coastal communities, the City of Punta Gorda uses surface water as its sole source of potable water. This surface water is drawn from an in-stream reservoir on Shell Creek. Shell Creek and Prairie Creek are discussed in this section as they have supplied potable water for the City of Punta Gorda since 1965.

Water Quality

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 #22 – Prairie and Shell Creeks are both classified as Class I Outstanding Florida Waters from the reservoir to their headwaters.

As a Class I Outstanding Florida Water, data is collected at various stations indicating 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 and again in 2006-2007 monitoring identified elevated amounts of total dissolved solids.

Map #22 - Prairie and Shell Creeks

Ongoing Water Monitoring

The City of Punta Gorda monitors a number of stations both up and downstream of the dam since 1995 (Environmental Quality Lab, 1995). Under the guidance of the Florida Department of Environmental Protection (FDEP) a group was created in 2001 to address water quality issues of elevated levels of minerals and chemicals identified in the water from activities such as run-off from development and agricultural lands which may negatively impact the watershed. However, supervision is now transferred to the SWFWMD to pursue a water management plan which addresses the water quality issues of the entire watershed. More detailed information associated with the Shell and Prairie Creek Water Management Plans can be obtained from the following website:
http://www.swfwmd.state.fl.us/documents/plans/spjc_wmp.pdf

Intergovernmental coordination efforts to protect the City's potable water supply resulted in Charlotte County creating and adopting the Special Surface Water Protection Overlay District (SSWPOD) in 1989 around Prairie and Shell Creeks as an overlay to the County's Future Land Use Map. The Charlotte County Watershed Overlay District, as it is now called, is identified in Map #13. The Ordinance, as amended, requires all land use activities within this area, including agricultural, to be reviewed for potential water quality impacts prior to the issuance of a County development approval. The Watershed Overlay District also specifically prohibits petroleum pipelines.

Although the current water quality is generally considered good, increased development occurring in the area of Prairie and Shell

Creeks may pose a threat to water quality if not managed properly. Leaking septic tanks, increasing use of fertilizers, pesticides, and other impacts associated with urbanization constitutes threats to the system. The City will continue to coordinate reviews of land use activities in and around this area that may impact water quality and threaten the potable water source.

Conservation Resources

The Infrastructure Element details the water conservation efforts utilized by the City which have resulted in a decrease in the per capita demand (from 145gallons per day (gpd) in 1990 to 113gpd in 2009). Although the City has made considerable progress in its conservation efforts during the past ten (10) years, the City is committed to further reducing individual levels of potable water consumption and continues to do so. Future conservation efforts will likely focus on education and outreach to increase public awareness, as well as the Inflow and Infiltration Study discussed in Section 3.5.2 to move toward the City's reuse goal. Existing and potential future conservation programs are detailed in Section 3.4.4 of the Infrastructure Element.

The City will continue to utilize Shell Creek as a water source and construct an off-line reservoir to incorporate elements to be considered an alternative water supply project. This source is included in the SWFWMD Regional Water Supply Plan with sufficient quantities to meet the City's 10-year water demands. The definition of alternative water supply includes surface water captured predominantly during wet weather flows, which requires the City to construct an off-stream reservoir for Shell Creek to be considered an alternative water supply project.

A summary of the projected water demands and available sources for City supply is provided in Table 2.2. As shown, the City has sufficient permitted raw water supply to meet the 10-year water demand projections. The City plans to expand its water treatment plant to 16 mgd to meet the projected future peak day demand of 15.75 mgd at build-out between 2027 and 2035. The expansion is planned to come online by 2014 when the peak day demand is expected to exceed the existing WTP capacity.

Some of the Conservation measures that have been considered for the City and/or may be evaluated again in the future include: a more aggressive rate structure, additional public education and outreach, ordinances requiring water conserving architecture and landscaping, plumbing and fixture rebates and retrofit, and special educational programs for high water use customers.

Table 2A.2- Summary of Water Demands, Facility Capacity and Permits

Year			
Annual Average Demand (mgd)	4.41	4.61	4.80
Annual Average Permitted Quantity (mgd)	8.088	8.088	8.088
Annual Average Permitted Surplus (mgd)	3.508	2.868	1.588
Peak Day Demand (mgd)	7.45	7.79	8.11
Available WTP Capacity (mgd)	10.00	10.00	16.00
Field Capacity Surplus (mgd)	2.00	0.92	4.70

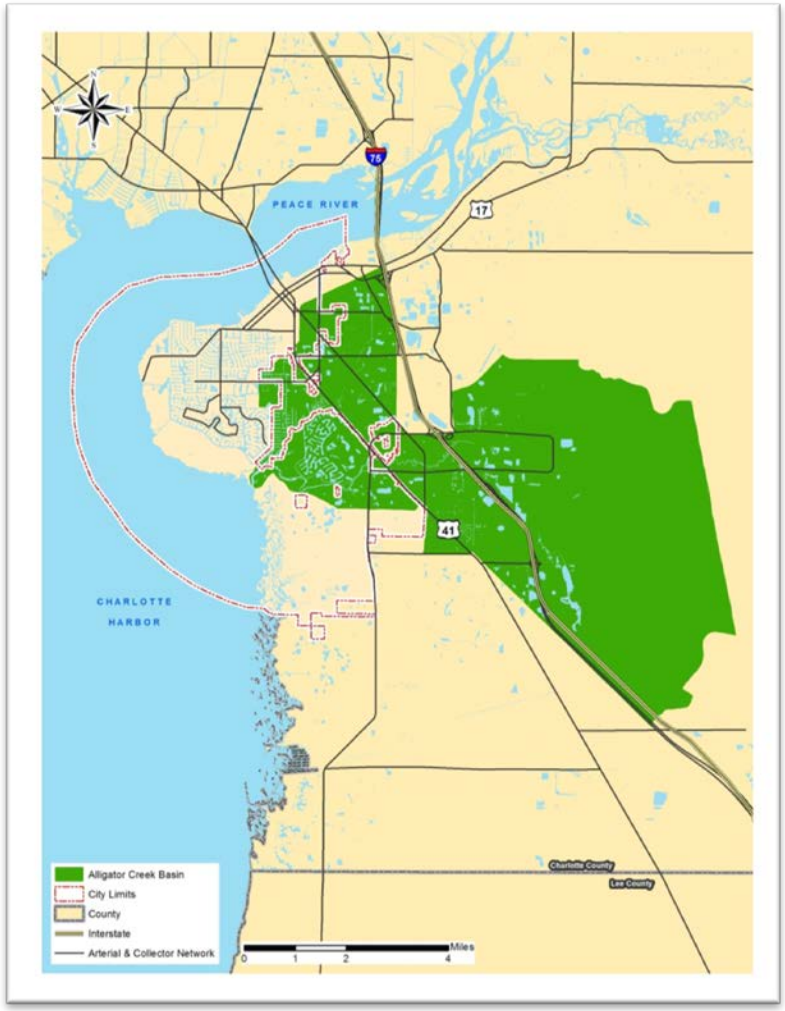
Notes: The City's WTP will be expanded from 10 to 14 mgd by 2020
Source: Carollo Engineers

Alligator Creek

Alligator Creek, shown on Map #23 – Alligator Creek Drainage Basin, rises in central Charlotte County and flows generally westward, drains a basin of approximately thirty-eight and a half (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 (from 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.

Land uses along Alligator Creek currently include native range and undeveloped woodland (both in private and public ownership) as well as residential and some commercial uses including the Indian Springs Cemetery. However, this area is coming under increasing development pressure due to its proximity to US 41 and the I-75 interchange at Jones Loop Road. Included in this area is "the Loop" (newly annexed into the City) originally proposed as a mixed-use development of over 1 million square feet of commercial retail and office space and numerous residential units. On its way to Charlotte Harbor, Alligator Creek passes through the State-owned lands which comprise the Charlotte Harbor State Preserve Park. The CHEC occupies approximately twenty (20) acres of the State Park in the vicinity of Alligator Creek, and provides opportunities for outdoor education and recreation.

Map #23 - Alligator Creek Drainage Basin



Water Quality

Alligator Creek is subject to extended periods of little or no flow and is also known to have elevated levels of chlorides and dissolved solids as well as periods of low dissolved oxygen (Black, Crow, and Eidsness, 1976). Because of its past use as potable water supply and Class I designation, Alligator Creek was also included in the County's Special Surface Water Protection Overlay District. Though it is no longer a potable water supply, the City of Punta Gorda continues to monitor the South Alligator Creek monthly for alkalinity, pH, chlorides, total hardness, sulphates, iron, TDS, color, NTU, and Conductivity. The monitoring occurs at the Taylor Road Bridge near the salinity barrier.

Ongoing Water Monitoring

Water sampling is performed by a variety of groups. Over the past two (2) years, Charlotte Harbor Environmental Center (CHEC) has submitted test results to the database on the World Water Monitoring Day web site. However, 2004 proved to be quite a challenge due to the hurricanes that passed through the area. When testing commenced, the volunteers found that the waters were full of sediments and other debris churned up by the storms. Sampling is scheduled to continue.

Man-made Canals

The City of Punta Gorda has over 40 miles of man-made canals which were constructed as part of the Punta Gorda Isles, Burnt Store Isles and other residential subdivisions. These canal

systems were created through dredge and fill operations in and around natural drainage features as well as excavated uplands. These canals serve a number of purposes, including drainage, creation of waterfront property, boating 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.

Water Quality

The Burnt Store Isles' and Punta Gorda Isles' canal systems do not drain into an interceptor lagoon for treatment. These systems are somewhat self-contained 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.

Ongoing Water Monitoring

Analysis of existing data indicates that water quality within the City's canal systems is generally good, although problems are becoming apparent and are identified in recent studies. These studies of the Punta Gorda canal system report dissolved oxygen levels below State standards indications of increasing levels of nutrients in the water column as well as increasing levels of metals in bottom sediments.

Surface Water Management Activities

The City's surface waters patterns are associated with the County's surface water system and were identified through the 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 this trend continued with the inclusion of Charlotte Harbor in the National Estuary Program. Balancing the needs of natural systems and the effects of the surface water run-off with economically and socially desirable water-oriented recreational and commercial activities requires careful consideration in the City's use of the waterfront.

Section 208 Studies

Assessing the impact of non-point sources of pollution on the estuaries was the subject of two water quality management studies (Section 208 studies) conducted by the County in l976-77 for the Charlotte Harbor 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. High levels of these pesticides may adversely affect the estuary.

Charlotte Harbor Resource Planning and Management Plan 1981

In January, 1979, the Charlotte Harbor Resource Planning and Management Committee was formed to address problems related to rapid population growth, the need to improve and expand public services, and to protect 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. 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 intended to preserve the estuary.

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 the Southwest Florida Water Management District's (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. This is a benefit to the City of Punta Gorda.

Four (4) primary goals were developed for the Charlotte Harbor SWIM program are:

1. Preserve natural and functional components of the ecosystem while restoring, where feasible, such conditions to the degraded portions of the system;
2. 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;
3. Establish an ongoing public education program to communicate the beneficial reasons for the long-term conservation and preservation of the Charlotte Harbor system; and
4. 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. All of the projects are important to the overall health of the estuary which ultimately is important to the City's waterfront activities.

Charlotte Harbor National Estuary Program

In l995, Charlotte Harbor established as a National Estuary Program (NEP) by the Environmental Protection Agency to implement the Clean Water Act. The CHNEP study area includes substantial portions of Lee, Charlotte, DeSoto, Hardee, Polk, Sarasota, and Manatee Counties. The CHNEP is administered locally, with the City of Punta Gorda acting as the fiscal host for the CHNEP.

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 CHNEP are contained in a comprehensive conservation and management plan (CCMP) updated 2013. The CCMP is implemented through research, restoration, legislative advocacy, and public outreach. 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. The CHNEP CCMP identifies the following Priority Problems, with associated Priority Actions needed to address the problems:

- **Hydrologic (Water Flow) Alterations:** Adverse changes to amounts, locations and timing of freshwater flows, hydrologic functions of floodplain systems and of natural river flows.

- **Water Quality Degradation:** Including, but not limited to, pollution from agricultural and urban runoff, point-source discharges, septic tank system loadings, atmospheric deposition and ground water.

- **Fish and Wildlife Habitat Loss:** Degradation and elimination of headwater streams and ther habitats caused by development, conversion of natural shorelines, cumulative impacts of docks and boats and establishment of exotic species.

- **Stewardship Gaps:** Limitations in people's knowledge of choices and management decisions that will lead to sustainability within their community. These gaps include overarching issues such as public outreach, advocacy and data management.

Peace River Cumulative Impact Assessment (PRCIA)

In 2003, the Florida Legislature directed the Florida Department of Environmental Protection (FDEP) to assess the cumulative impacts in the Peace River in accordance with Chapter 2003-423, Laws of Florida. The purpose of the study, published in January

2007, was to assess the cumulative impacts of activities in the Peace River Basin, and to form the basis for preparation of a resource management plan. Punta Gorda needs to review these results in addition to land and water use issues throughout the watershed with the municipalities, counties and jurisdictional agencies regarding any negative impacts upstream which may affect the waters surrounding the City. The cumulative effects of land use, water use, and climate changes within the study area on Peace River can also adversely impact water flows, water quality, and ecological factors.

The PRCIA Report contains a database of existing information and applied statistical and analytical techniques to assess the degree of influence various factors have had on the Peace River drainage basin and Charlotte Harbor.

The FDEP, in coordination with the Southwest Florida Water Management District (SWFWMD), completed a resources management plan based on the PRCIA for the Peace River Basin which recommends approaches toward reducing cumulative impacts in the basin. The plan incorporates many existing programs from the FDEP, the SWFWMD and the Florida Department of Agriculture and Consumer Services. The resource management plan identified regulatory and non-regulatory means to minimize future impacts to the basin. These efforts are described in the following three categories:

- Hydrological Alterations: Mitigation of human alterations to natural hydrological flows.
- Nutrient Enrichment: Reduce nutrient flows into the basin due to development activities including wastewater discharges, fertilizer run-off and mining activities.
- Habitat Loss: Mitigation of Habitat Loss due to development activities by restoration of potentially viable lakes and tributaries.

All of these efforts combined will assist in maintaining a viable river and harbor which will positively impact the City's waterfront initiatives.

Ground Water

Aquifers

The groundwater underlying the County, including the City of Punta Gorda, has been found to be contained within four distinct complex aquifers (Sutcliffe, 1975, Wolansky, 1983). The four aquifers include the surficial aquifer, two (2) intermediate aquifers, and the deep Floridian aquifer 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). Discontinuities or breaks in the confining beds allow some hydraulic exchange between overlying and underlying aquifers.

Wolansky (1978) estimated that one hundred and fifty (150) million cubic feet of relatively good quality water is stored in surficial aquifer county wide. However, the majority of this water is located in the eastern third of the County, at least fifteen (15) miles from the population centers of Port Charlotte and Punta Gorda. Both natural and manmade impacts may affect the basin's resources. These impacts include hydrologic, geologic,

and vegetative changes from activities such as drought, mining and agricultural activities that occur outside of the City's boundaries.

In Charlotte County, the Floridian aquifer has an average thickness of seventeen hundred (1,700) feet and provides wells capable of producing thousands of gallons of water per minute. However, drawing water from the Florida aquifer close to the coast line can lead to increased salt water intrusion.

Ground Water Movement

The general direction of ground water movement in the surficial aquifer in the area of Punta Gorda is west and north toward Charlotte Harbor. These water levels closely follow the surface topography of the area. Available water level measurements in shallow wells, swamps, and lakes indicate that the water table varies from one (1) to five (5) feet below land surfaces dependent on the wet and dry season cycle.

Ground Water Quality

The ground water in the area of Punta Gorda is confined in the intermediate and Floridian aquifers and has concentrations of total dissolved solids, chloride, sulfate, and hardness (calcium and magnesium) in excess of drinking water standards. Any utilization of water from these aquifers would require desalination to be used as a public water source.

The surficial aquifer in Punta Gorda, while considered to be of poor quality, can be used as a residential source of potable water. As the City currently operates a potable water treatment facility, few wells are actually installed in Punta Gorda and are used mainly for commercial irrigation. Even these wells could potentially be contaminated by saltwater intrusion from the adjacent river and harbor.

Ground Water Contamination

While the surficial aquifer contains the highest quality ground water in the City, it is also the most susceptible to contamination. This contamination can be caused by saltwater intrusion, leaching from septic tank/drainfield systems, free flowing artesian wells, and stormwater runoff from commercial and residential areas. Another source of ground water contamination is from point source discharges which have occurred in small quantities over many years of operation. These types of discharge, specifically ones with buried tanks, are included in an early detection program implemented by the Florida Department of Environmental Protection (FDEP). This program provides property owners financial assistance for soil and ground water remediation.

The Peace River Management Plan identifies the historical groundwater withdrawals from mining agriculture and public water supply since the early 1930's, the reason for changes in the upper portion of the river. These changes were increased with the drought periods over the last decade (1999, 2000, 2001, 2002 and 2006). The Plan further points out:

"The City of Punta Gorda uses the combined flows of Shell and Prairie creeks as its sole source of potable water supply. Land use

practices in the sub-basin containing these two creeks have steadily shifted to more intensive forms of agriculture, with the associated need for more water for irrigation and freeze protection. Because high-quality fresh groundwater is very limited in this sub-basin, water of higher mineral content from the upper Floridan aquifer is used to ensure adequate agricultural supply. During the severe drought of 1999-2001, the quality of Punta Gorda's drinking water declined because agricultural discharges of mineralized groundwater increased the salt content of the surface water supply (PBS&J, 2007). At times, the city's drinking water was in violation of secondary (aesthetic) water quality standards. The drought has revealed the extent to which the long-term use of mineralized groundwater for agriculture has increased salts in the area's fresh surface waters and associated surficial aquifer."

As these impacts from upstream eventually affect the City, it is important that the City be advised of land use impacts and environmental changes occurring within the watershed. The City will continue to coordinate with the FDEP and the SWFWMD through management plans and through regulatory and non-regulatory means to minimize future impacts and when possible mitigate past impacts.

Recharge Areas

The City of Punta Gorda does not have any intermediate or Floridian aquifer recharge areas. The surficial aquifer is recharged by rainfall that has not been intercepted by evapotranspiration, runoff, foliage, or depression storage; upward leakage from the intermediate and Floridian 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 (1978) estimates that recharge to the surficial aquifer in Charlotte County ranges from less than one (1) inch per year to sixteen (16) inches per year depending on permeability and thickness of aquifer material and the topography.

Soils and Minerals

The City of Punta Gorda is situated at the mouth of the Peace River near its confluence with Charlotte Harbor. The location places the vast majority of City within the 100 year flood plain. The land in and around the City is very low, flat, and poorly drained. Much of the City's current area would not have been suitable for urban development had it not been for extensive dredge and fill operations that occurred in the 1950's, thru the 1970's. In general, the City's soils can be characterized as:

1. Developed/Disturbed Urban Complex;
2. Poorly drained low lying sand; and
3. Tidally inundated mucky soils

These three (3) areas generally support commercial and residential development, pine-palmetto forests and prairies, and mangrove swamps, respectively. These major soil classifications (SCS, Soil Survey, 1984) are presented in Table 2A.3 which follows.

Table 2A.3 - Major Soil Classification Types City of Punta Gorda

Soil Type	Description
Matlacha + Urban Land Complex	Developed/Disturbed
Smyrna + Urban Land Complex	Developed/Disturbed
Matlacha Gravelly Fine Sand	Developed/Disturbed
Hallendale Fine Sand	Pine/Palmetto + Upland
Boca Fine Sand	Pine/Palmetto + Upland
Oldsmar Sand	Pine/Palmetto + Upland
Wabasso Sand	Pine/Palmetto + Upland
Boca Fine Sand + Tidal	Tidal Marsh + Wetland
Isles Muck	Mangrove Swamp + Wetland
Wulfert Muck	Mangrove Swamp + Wetland
Kesson Fine Sand	Mangrove Swamp + Wetland
Isles Fine Sand	Freshwater Depressional

Source: SCS, Soil Survey, 1984

Matlacha soils are described as poorly drained soils that are mostly mixed sands with shell and limestone fragments. These soils are found in the major "dredge and fill" waterfront developments, including Punta Gorda Isles and Burnt Store Isles. The depth of the fill material varies, with as much as six (6) feet of fill over native soils. Because the urban areas of the City falls within the 100 year Flood Plain, the ground floor elevation of buildings are required to be above the level of the 100 year flood. Most of the fill soil used currently to elevate buildings is obtained from excavations of surface sand deposits, commonly referred to as "borrow pits." The City of Punta Gorda's major soils classifications can been seen on Map #11 – City of Punta Gorda Soils.

Soil Erosion

The topography of the City is extremely flat, thus accounting for the relatively low rates of soil erosion. Localized soil erosion problems have occurred as a result of poor land development practices. In the past large areas of land were often cleared and left undeveloped for several years, leaving bare soil exposed to erosion by wind and water. Additionally fill slopes and the side slopes of excavations were left unstabilized increasing the sediment load of swales and drainage canals. The problem is largely a thing of the past as the City of Punta Gorda enforces best management practices for erosion control for all new development activity.

Mineral Deposits

The City of Punta Gorda has no commercially valuable mineral deposits, with the exception of sand, shell and fill material occasionally excavated from a development site to be used on the project location.

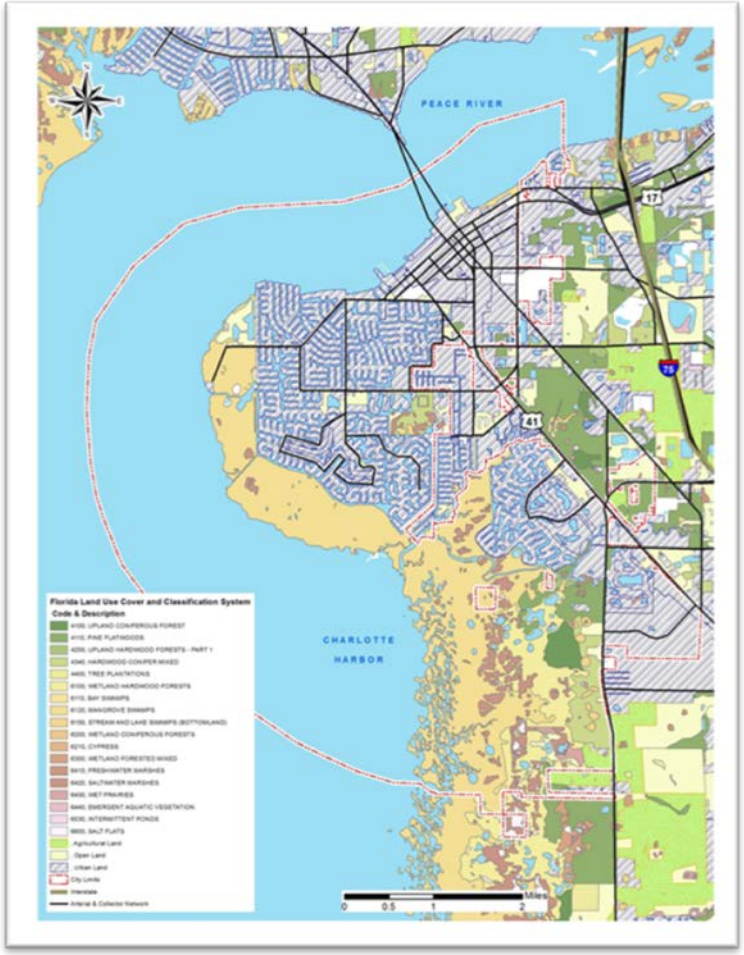
Native Habitat and Communities

The City of Punta Gorda is comprised of approximately thirty two (32) square miles of land and water. With substantial areas of water and conservation/preservation land the urbanized area of the City covers less than 9 square miles. The largest concentrations of urbanized areas are the City's central business district, Punta Gorda Isles, Burnt Store Isles, and Burnt Store Meadows. Another 8 square miles of the land area of the City contains various upland and wetland habitats held in preservation or conservation which perform a number of vital functions. Habitats include coastal wetlands, mangroves and tidal marshes. These habitats improve water quality, act as storm buffers, provide shelter for coastal wading birds and perform a vital role in the complex estuarine food chain. Upland habitats, such as pine forests, are important as 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.

These natural communities have been classified and described in Florida Land Use Cover System and Forms Classification (FLUCCS) and the "Guide to the Natural Communities of Florida" by the Florida Natural Areas Inventory (FNAI) and the Department of Natural Resources. The FLUCCS utilizes state of the art aerial photography with vegetative cover and provides a precise classification of land use, cover and forms and creates a flexible way of capturing data into a comprehensive and/use/cover/forms data base. The City's FLUCCS is identified on Map #24 - Florida Land Use Cover and Forms Classification System (FLUCCS).

In 2007, with funding from the Florida Department of Environmental Protection (FDEP), Division of State Lands, the Florida Natural Areas Inventory (FNAI) began a process of updating the "Guide to the Natural Communities of Florida" (the Guide), first published in 1990 by FNAI and the then Florida Department of Natural Resources (now FDEP). The purpose of the update was to clarify distinctions between communities by listing characteristic species and features distinguishing similar communities, as well as to add information for each community on variations throughout its range (with common variants noted specifically), range, natural processes, management, and references. Habitats that have been severely impacted by humans and do not fit into FNAI's Natural Community Classification are recognized using the altered landcover types. These are used to describe the most common non-natural habitats observed on conservation lands in Florida. (see Map #25 - Florida Natural Areas Inventory (FNAI))

Map #24 - Florida Land Use Cover and Forms Classification System (FLUCCS)



Map #25 - Florida Natural Areas Inventory (FNAI)

As the City's urban center continues to develop, there is little chance of ecological diversity occurring. However the City is "very low-lying with significant areas of wetlands and open lands principally on the east shore of Charlotte Harbor and along Alligator Creek. The City's Climate Adaptation Plan describes the topography of the City of Punta Gorda, and its environs as generally flat with elevations ranging from sea level to approximately fifteen feet above sea level. Three vegetative major zones can be distinguished:

- The coastal wetlands are predominantly tidal mud flats, mangroves, and marsh grass areas with elevations from zero to five feet above mean sea level.

- The transitional zone connects the coastal area with the inland prairie area. This zone varies in elevation from approximately five to 15 feet above sea level. Most human development has occurred in this transitional zone because it provides the most topographical relief with the better drained land. The relict coastal shore ridges of the transitional zone generally formed the location of the earliest transportation links including the railroad, Tamiami Trail (US 41), and US 17.

- The inland prairie is normally drained by overland sheet flow due to a lack of natural stream beds. The flood condition of the prairie during heavy rainfall restricts development; however, this condition enhances recharge of the underground aquifers. The inland prairies are dominated by a combination of mesic and hydric pine flatwoods, wet prairies and freshwater marshes."

Listed Species

The City is fortunate to host a great diversity of wildlife species in its preservation and conservation areas. The City is home to a number of species which have been designated as endangered, threatened, or of special concern by State and Federal agencies. The City requires environmental surveys as part of the development review process on wooded or otherwise undisturbed tracts of land. Though the Federal Endangered Species Act (ESA) and Florida Wildlife Code (FWC) 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 FWC; "special concern" is a designation applied by the State of Florida and not used by the USFWS).

Most of the City is an urban development and the majority of the listed species exist within the Charlotte Harbor State Buffer Preserve. Although some species like the Burrowing Owl are existing within the residential developed areas.

- Burrowing owl (Athene cunicularia): Listed as a species of Special Concern, the burrowing owl was found throughout

the Punta Gorda Isles area. Threats to habitat include construction activities development and harassment by humans and domesticated animals.

- Gopher tortoise (Gopherus Polyphemus): Listed as a threatened species by the FFWCC. Habitat loss due to a variety of land use activities is the principal threat to this species. The same areas preferred by gopher tortoises are also preferred for development. 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.
- Florida pine snake (Pituophis melanoleucus mugitus): is listed as a species of special concern by the FFWCC. The Florida pine snake often co-exists with gopher tortoises.
- Other Listed Species of interest may include (not inclusive); Sherman's fox squirrel (Sciurus niger shermani); Florida sandhill crane (Grus canadensis pratensis); Wood Stork (Mycteria americana); Southeastern America kestrel (Falco sparverius paulus); and the Gopher Frog (Rana capito)

Protection is provided to the species through coordination efforts with the Florida Fish and Wildlife Conservation Commission, U.S. Fish and Wildlife Service, the Ponce de Leon Wildlife Rescue Center and local residents.

Wetlands in Punta Gorda

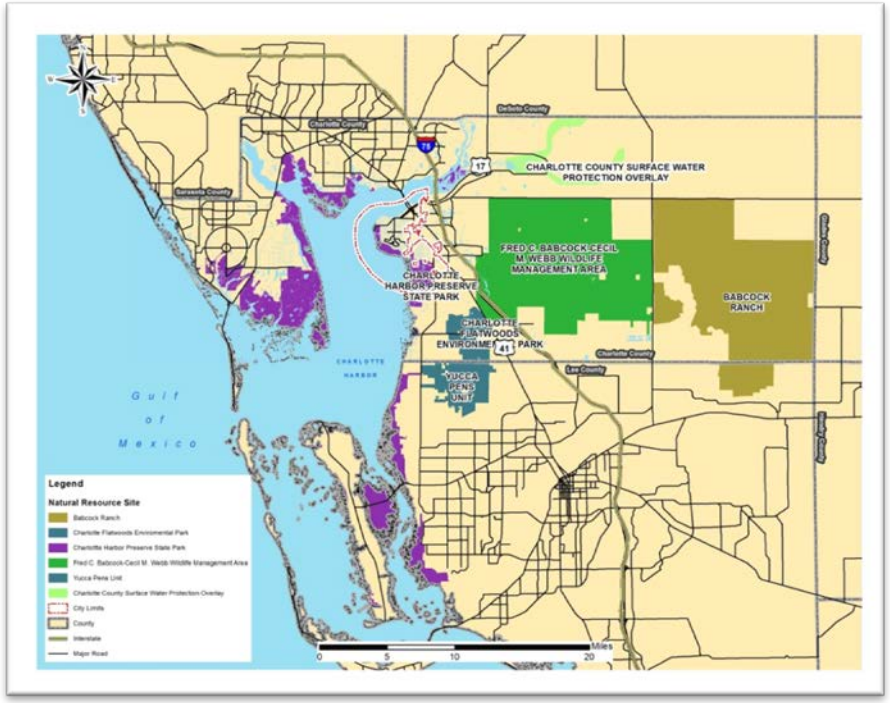
Once a wide expanse of wetlands, the vast majority of wetlands in the City of Punta Gorda now occur within the 4,900 acres of public/private open space in the form of conservation, preservation and public parks. This land area comprises approximately 47% of the total area of the City. Much of this protected land provides a significant natural buffer between the urban development and the Charlotte Harbor estuarine system. Approximately two-thirds of the City's shoreline remains in its natural condition, specifically mangrove forest or tidal swamp. These areas are generally inaccessible and are nearly 100% jurisdictional wetlands. As such, any development in these areas would require permits from a number of state and federal regulatory agencies, including but not limited to, the FDEP, SWFWMD, and the U. S. Army Corps of Engineers. The City's Land Development Regulations including Transfer of Development Rights encourage shifting of any development activity on these properties to less sensitive upland areas and require applicant to provide appropriate permit authorization from these regulatory agencies prior to issuance of any development permits from the City. The City supports the purchase of these privately held environmentally sensitive lands by governmental or non-profit organizations for the purposes of permanent protection.

Inventory of Natural Resources

Sites within the City Boundaries

There are a variety of natural resources sites within the City boundaries. The sites immediately affecting the City are briefly described below and are shown on Map #26 – Natural Resource Sites Affecting the City of Punta Gorda.

Map #26 - Natural Resource Sites Affecting the City of Punta Gorda



Charlotte Harbor Preserve State Park

The Charlotte Harbor Preserve State Park (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. The park encompasses approximately 42,518 acres. Approximately 7,000 acres are uplands and 35,518 acres are wetlands and open waters.

The Charlotte Harbor State Preserve State Park is the single largest natural area within the City of Punta Gorda. This area includes many plant and animal species from various habitat types identified by the Florida Natural Areas Inventory Classification system. This area serves as a natural buffer between the City of Punta Gorda's residential communities and the waters of Charlotte Harbor.

Charlotte Harbor Environmental Center (CHEC)

CHEC lies within the Charlotte Harbor Preserve State Park and is a non-profit corporation with board members from Charlotte County, Charlotte County School District, the City of Punta Gorda and the Peace River Audubon Society. CHEC operates four nature centers within Charlotte County of which the primary lies within the City limits of Punta Gorda.

The site's uplands bordering South Fork Alligator Creek provide natural, scenic vistas of a mixed tropical/sub-tropical forest. This combination of vegetation of oak/palm hammock, brackish marsh, and mangrove forest, results in an unusually high scenic quality of riverine shoreline and is a rare occurrence in such close proximity to the extensive mangrove swamps of Charlotte Harbor. Few other creeks flow into the Harbor, and those that do traverse lowlands and wetlands of little topographic relief and drain those areas primarily by sheetflow. Alligator Creek is the only one which has both an extended upland watershed and sufficient relief within it to have developed a discrete stream valley.

The CHEC site is a diverse mosaic of plant and animal communities terrestrial and aquatic, freshwater, and estuarine. These communities provide habitat for a number of species listed by either the U. S. Fish and Wildlife Service or the FFWCC.

Charlotte Harbor Environmental Center's (CHEC) Fossil Pit

Within the CHEC site exists a fossil pit with over one hundred and seventy-five (175) distinct species or sub-species and thirty-four (34) unique species believed to occur nowhere else (Ken Campbell, DNR Bureau of Geology, pers. comm.). This fossil formation is known as the "Acline Fauna" which has yielded collections and contributed significantly to geologists' understanding of the stratigraphy and geologic history of the Charlotte Harbor area and of Southwest Florida. In the early 1930's and again in 1958, paleontologists collected fossils from a shell pit on the CHEC property which is within the City Limits in the Buffer Preserve. Map #27 – Archeologically Significant Areas, also identifies the Archeologically Significant Areas and their relation to land uses. Careful preservation of these areas, as well as others, will protect the remaining fossils and other artifacts for future study.

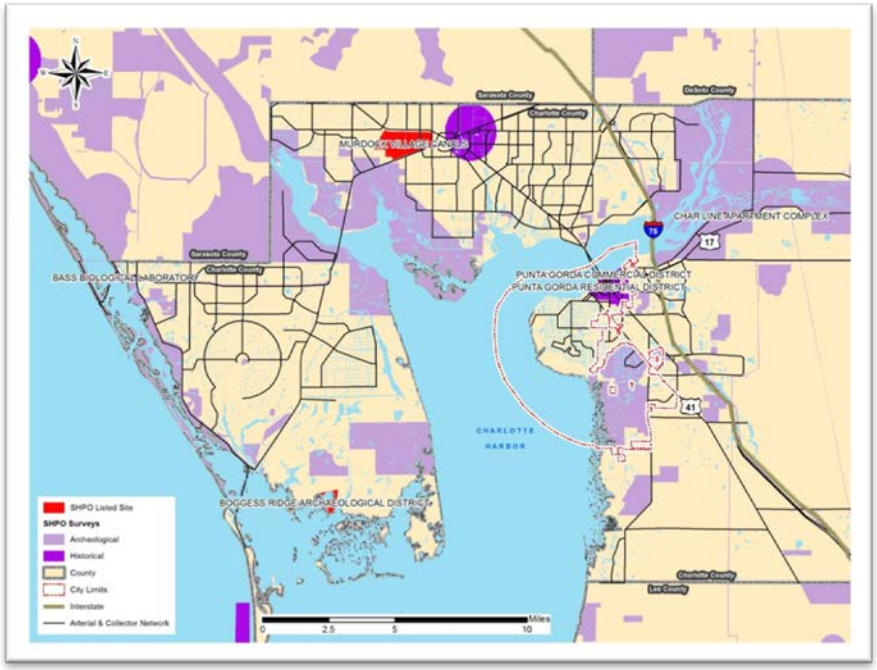
Sites Outside The City Boundaries

Briefly described below are a variety of natural resources sites outside the City boundaries which are shown on Map #27 - Archeologically Significant Areas.

Charlotte Harbor Environmental Center's (CHEC) Fossil Pit

Within the CHEC site exists a fossil pit with over one hundred and seventy-five (175) distinct species or sub-species and thirty-four (34) unique species believed to occur nowhere else (Ken Campbell, DNR Bureau of Geology, pers. comm.). This fossil formation is known as the "Acline Fauna" which has yielded collections and contributed significantly to geologists' understanding of the stratigraphy and geologic history of the Charlotte Harbor area and of Southwest Florida. In the early 1930's and again in 1958, paleontologists collected fossils from a shell pit on the CHEC property which is within the City Limits in the Buffer Preserve. Although this area lies within the City Boundaries it is identified on Map #27 - Archeologically Significant Areas. Careful preservation of these areas, as well as others, will protect the remaining fossils and other artifacts for future study.

Map #27 - Archeologically Significant Areas



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

The bulk of this 79,013 acre tract was purchased from the Babcock Florida Company in 1941 using Federal Aid Project funds 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 (FWC), 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 FWC. The Webb-Babcock is located in south-central Charlotte County and managed by the FWC for hunting, fishing and general outdoor use by the public. Surrounded by citrus groves, improved pasture, and limited residential development, Webb-Babcock 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-Babcock area. A controlled burning program serves to maintain desirable habitat conditions and to support diverse plant and wildlife populations. Web-Babcock 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.

Babcock Ranch and Telegraph Swamp

In 2006, the State of Florida in cooperation with a private developer, Lee County, Charlotte County and South Florida Water Management District completed the largest conservation purchase in Florida's history from the Babcock Florida Company. The complex transaction placed over 74,000 acres of land into public ownership in Lee and Charlotte Counties for the purposes of habitat protection and natural resource preservation. The vast majority of the property preserved is in Charlotte County with approximately 9,000 acres located in Lee County. The largest and most ecologically significant feature of the preserved lands is

the area known as Telegraph Swamp which lies within the Babcock Ranch boundaries. Telegraph Swamp represents over 7,000 acres of contiguous swamp and marsh habitats which drain generally southward, from eastern Charlotte County toward the Caloosahatchee River. Currently, Telegraph Swamp is maintained largely for conservation purposes, including water management, ecotourism through Babcock Wilderness Adventures, hunting, and fishing. The Telegraph 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.

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 stands, 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. This area consists of a patchwork of private ownerships, making it difficult to preserve. Private land use rights exist on each parcel allowing for the properties to be developed as residential single family. With the increased urban development the potential of negative impacts from fertilizers and pesticides increase.

In an effort to protect the City's drinking water, Charlotte County created a Special Surface Water Protection Overlay District (SSWPOD), now known as the Charlotte County Watershed Overlay District, previously shown on Map #13 around these creeks. Although the district contains designated boundaries which prohibits certain intensive land use activities, and scrutinizes other activities, it does not ensure maintenance of a natural upland and wetland ecosystems. The City should coordinate with the County to review the need for such maintenance. 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.

The Peace River Wetlands

The wetlands and islands located near the mouth of the Peace River functions as prime wildlife habitat. Many of these wetlands are privately owned; however, three of the islands, Bird Key, Coon Key and Long Island are owned by the State and contain wading bird rookeries.

Yucca Pens Unit

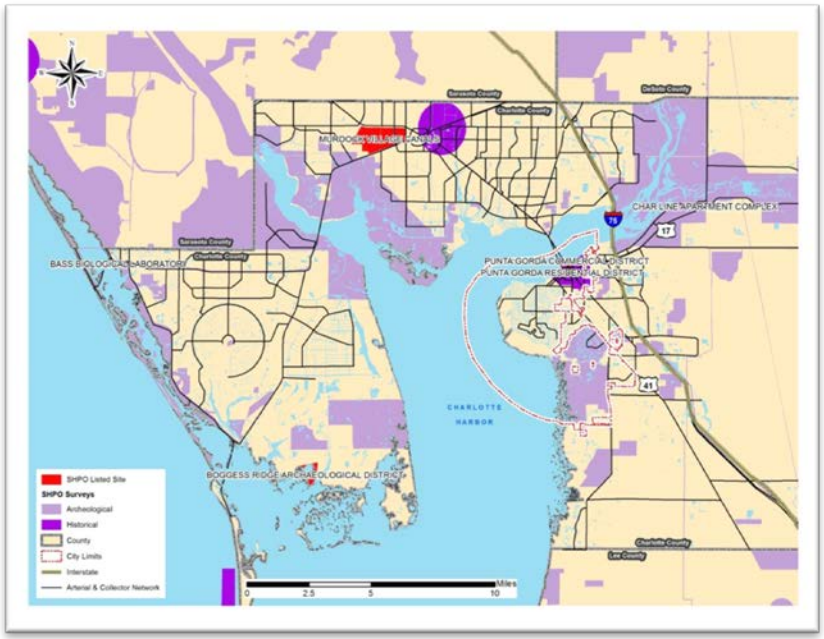
The Yucca Pens Unit is a part of the Fred C. Babcock-Cecil M. Webb Wild Life Management Area which contains an extensive slough system that lies between Charlotte Harbor and U.S. 41

south of Punta Gorda. The Yucca Pens Unit is composed of a network of freshwater swamps, marshes, and wet prairies. The slough system is bisected by Zemel Road, and 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 project is a part of the Florida Forever project which straddles the Lee/Charlotte line encompassing approximately 23,700 acres of which 14,389 acres have been acquired. The Yucca Pens Unit forms a critical link between the State's coast and its interior and serves as a natural urban sprawl barrier.

Archeological Sites Affecting the City

There are many significant archeological and historical sites located within and adjacent to Charlotte Harbor. The sites affecting the City of Punta Gorda are identified on Map #27 – Archeologically Significant Areas. Include shell middens, Indian mounds and a fossil pit.

Map #27 – Archeologically Significant Areas



Natural Habitat Acquisition & Preservation Programs

A variety of state and federal programs are available to the City for the acquisition of natural habitat and preservation. They include Conservation and Reclamation Land, Save Our Rivers, and the Florida Communities Trust Programs. The Florida Forever Program, the State of Florida's ten-year, $3 billion land acquisition funding legislation, provides the majority of the money for these programs. These programs provide funding for the acquisition of land to be set aside for natural resource preservation which provides excellent opportunities for public recreation and education.

In 2006 Charlotte County voters passed the Conservation Charlotte referendum to provide local funds for land preservation, water access, and passive recreation purposes. The Conservation Charlotte Program is expected to generate $77 million, from a .20 mil ad valorem tax which will sunset in 2027 to pay for land acquisition and conservation easement purchases.

While The City does not have any dedicated funding sources for natural resource preservation, it does pursue the use of innovative techniques for the acquisition of natural habitat. These techniques may include 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. The challenge facing the City 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. The City employs the following techniques to preserve lands:

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 factors include the diversity of habitats; the diversity of plant and animal; the character of surrounding land uses and the size of the area preserved. The establishment of preserves in a piece-meal fashion result in isolated, fragmented natural areas which are disconnected from one another by disturbed and developed land. The populations of wildlife found within these fragmented sites are more susceptible to impacts from fire, drought, flooding, and infectious disease.

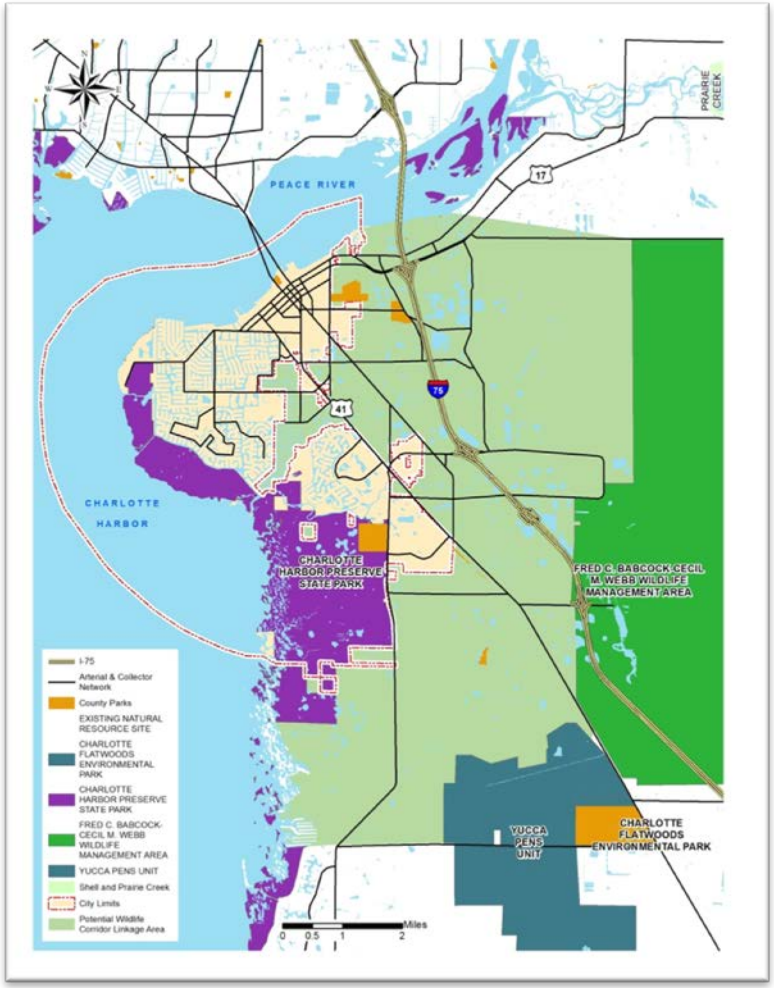
A solution to these problems is to establish linkages between existing and planned natural or semi-natural lands in order to provide greater areas and diversity of interconnected habitats. With proper management, these linkages are likely to increase fitness and potential for long-term survivability; provide avenues for escape from fire or other catastrophic events; facilitate recolonization following local extinctions; and provide 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 (DRI). The FWC 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 (FWC 2000).* The acquisition of carefully considered parcels of land coupled with the development of Preservation and Conservation Areas, Habitat Conservation Plans, and other less than fee simple measures, the City will be able to fully participate in this State-wide effort to preserve the most important segments of Florida's natural heritage. Map #28 – Publically Managed Lands & Potential Wildlife Linkages identifies those areas that are now owned and managed by the State, County, City or other agencies and the City areas for potential linkage connection. The City remains committed to participate in the State-wide effort to preserve, those important areas necessary to complete wildlife linkages, habitat plans and conservation areas.

As the City moves forward with its annexation strategy, the City is actively working with the FDEP to annex those state lands that lie adjacent to the City's current boundaries to clarify jurisdictional responsibilities.

Map #28 - Publically Managed Lands & Potential Wildlife Linkages



Protective Measures

Once lands are acquired for its natural habitat or preservation aspects, the City takes additional steps to protect the endangered and threatened species and their habitats through a variety of methods. This method is important as the City continues to grow. These protection measures include:

- **Ordinances** which depict the general policies for limiting uses in environmentally sensitive lands within the city for the purpose of protecting natural resources from the potential adverse impacts of future land development activities.
- **Intergovernmental coordination efforts** which implement protection measures of Outstanding Florida Waters (OFWs), Class I and Class II waterbodies, and adjacent uplands; specific habitats; and wildlife corridors.
- **The Future Land Use Map (FLUM)** which is used to advise landowners, land developers, and the City that land development proposals for lands within the Preservation and Conservation designations are subjected to a more comprehensive environmental review process and may be subject to more restrictive plan policies which, in turn, may alter development potential.
- **Manatee Protection**: In April of 1995, a manatee protection plan for the City of Punta Gorda was approved by the State, in conjunction with the review of a Laishley Park Development of Regional Impact (DRI). During subsequent reviews for other applications, the plan did not make recommendations that were consistent with manatee data analysis. While the City of Punta Gorda and other municipalities may not be within Charlotte County's jurisdiction to review projects, the federal and state wildlife agencies (USFWS and FWC) will use the Charlotte County Manatee Protection Plan (MPP) for guidance during the permit review process for all projects within the county boundaries.
- **Burrowing Owl Protection**: The FWC identifies the burrowing owl as a Species of Special Concern (Florida Administrative Code (FAC) 68A-27.005). Burrowing Owls and their nests are also afforded protection under the Federal Migratory Bird Treaty Act. Seasonal occurrence of Burrowing Owls occurs throughout the year in Florida's open native prairies and cleared areas that offer an expanse of short, herbaceous groundcover. Punta Gorda works with the Peace River Wild Life Center each breeding season to identify and flag the nest as to protect the nests' entrance from lawn mowers, vehicles and other forms of human interference.
- **Seagrass Protection** is necessary in areas within the Charlotte Harbor National Estuary Program (CHNEP) estuaries. Seagrasses are the most abundant and productive submerged habitat in the coastal CHNEP waters. They provide shelter, food, and nursery habitat for a great diversity of invertebrates, shellfish, fishes and marine mammals including shrimp, scallops, bait fish, sport fish, and manatees. Seagrasses provide a good indicator of overall estuarine health within CHNEP

  Charlotte Harbor is Florida's second largest open water estuary, and provides some of the most productive estuarine ecosystems in southwest Florida. The Southwest Florida Water Management District's Surface Water Improvement and Management (SWIM) Program released the results of the 2014

seagrass mapping study showing a 5.2 percent increase in seagrass coverage in Charlotte Harbor.

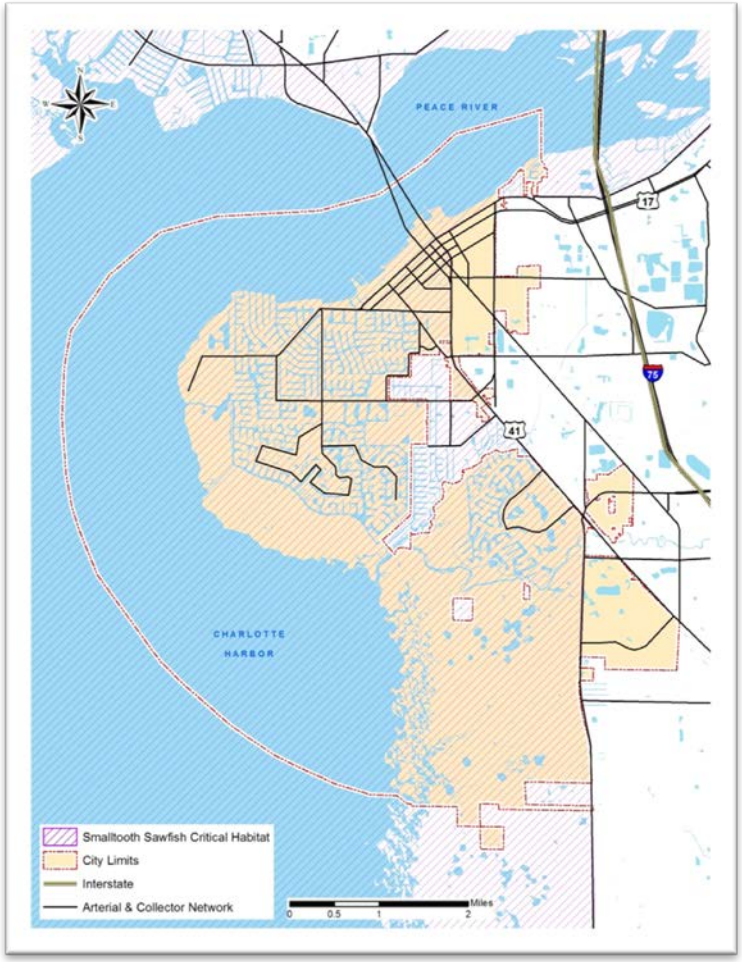
In addition, the Charlotte Harbor Wateratlas provides a "report card" on the water clarity within the CHNEP estuaries which is essential for healthy seagrasses. The seagrass protection and restoration targets for each of the CHNEP estuary segments can be found below http://www.chnep.wateratlas.usf.edu/water-clarity/ .

The most recent seagrass occurrences along the City boundaries are identified on Map #29 – Seagrass Area Along the City Boundaries. The City will continue to monitor the results of seagrass protection as they are used to not only track trends in seagrass population but also to evaluate ongoing water quality improvement efforts. The City will continue to review projects which may impact seagrasses and coordinate with the jurisdictional agencies to promote seagrass protection.

- **Smalltooth Sawfish Protection**: The smalltooth sawfish, designated as an endangered species, are found along the shallow waters of Charlotte Harbor. These waters are critical habitat for the species. The City is partnering with the Charlotte Harbor National Estuary Program and the Nature Conservancy, through FWC, on restoring oyster reef habitat in Charlotte Harbor. FWC, supported by TNC, is monitoring for the smalltooth sawfish and the City will review the results for added protection. The habitat of the sawtooth sawfish is identified on Map #30 – Sawtooth Sawfish Area along the City's Boundaries.

Map #29 - Seagrass Areas along the City's Boundaries

Map #30 – Sawtooth Sawfish Areas along the City's Boundaries



- **Oyster Reef Protection**: The restoration of oyster reefs along vulnerable mangrove stands in Charlotte Harbor, Florida, will assist in protecting the City of Punta Gorda, its residents and coastal ecosystems making them less vulnerable to the climate change impacts of sea level rise and increased storm intensity. Staff reviewed the Charlotte Harbor National Estuary Program Oyster Habitat Restoration Plan, prepared by Jaime G. Boswell, Independent Contractor, Judy A. Ott, Charlotte Harbor National Estuary Program, Anne Birch, The Nature Conservancy and Daniel Cobb, Southwest Florida Regional Planning Council. The City realizes the need for oyster reef protection and restoration. According to the report, world-wide oyster populations have been lost at a staggering rate, with a total estimated loss of 85% globally over the last two centuries (Beck et al. 2011). This rate of loss makes oysters the most imperiled marine habitat in the world (Brumbaugh et al. 2010). The degradation and loss of native oysters in Florida and the need for restoration has been recognized for over 100 years (Smeltz 1898). However, it has only been over the past couple of decades that the critical role that oysters play in the larger ecosystem has been recognized along with the full array of benefits that could be realized through restoration (Coen et al. 2007a, Grabowski and Peterson 2007, Coen and Luckenbach 2000).

  Oyster reefs stabilize sediments, shorelines and adjacent habitats by buffering wave energy, further aiding water quality (Scyphers et al. 2011, ASMFC 2007, Grabowski and Peterson 2007, Piazza etal. 2005, Bahr and Lanier 1981). Sediment stabilization and bio-deposition can result in an increase in sediment elevation (Bahr and Lanier 1981). Along with the

potential for oyster reefs to sequester carbon and buffer wetlands and developed properties (Nicholas Institute 2011), sediment stabilization is an important factor when considering future sea level rise and climate change. For this reason Needelman and others (2012) identify oyster reef restoration as a good conservation target because of their ability to help mitigate the impacts of sea level rise through shoreline and sediment stabilization. Oyster reef creation has specifically been identified as a means of reducing shoreline erosion and loss of saltmarsh habitat due to sea level rise in Charlotte Harbor (Geselbracht et al. forthcoming).

Partnering with the agencies over the next decade may prove to be one of the City's strongest climate adaptation implementation strategies. The City continues to monitor the advances in oyster reef restoration and the benefits it provides to climate adaptation planning.

I. CONCLUSION

The City will continue to plan, promote and manage the conservation and protection of the City's natural resources through the implementation of the strategies detailed throughout the document. The goals, objectives, and policies of the *Conservation Element* will provide the direction necessary to address development occurring within the urban and coastal areas. As the City has adequate lands placed in Preservation and Conservation, the City will address development and redevelopment by continuing to:

- Conserve and protects the quality and quantity of current and projected water sources and waters that flow into estuarine waters or oceanic waters and protect from activities and land uses known to affect adversely the quality and quantity of identified water sources, including surface waters used as a source of public water supply.
- Provides for the emergency conservation of water sources in accordance with the plans of the regional water management district.
- Conserve and protect minerals, soils, and native vegetative communities, including forests, from destruction by development activities.
- Conserve and protect fisheries, wildlife, wildlife habitat, and marine habitat
- Restrict activities known to adversely affect the survival of endangered and threatened wildlife.
- Protect existing natural environments identified in the *Recreation and Open Space Element*.
- Seek opportunities to enhance or restore natural environments.
- Maintain cooperation with adjacent local governments to conserve and protect unique vegetative communities located within more than one local jurisdiction.
- Designate environmentally sensitive lands for protection based on locally determined criteria which further the goals and objectives of the *Conservation Element*.
- Manages hazardous waste to protect natural resources.

- Protect and conserve wetlands and the natural functions of wetlands.
- Direct future land uses that are incompatible with the protection and conservation of wetlands and wetland functions away from wetlands.
- Continue to partner with agencies that advance climate adaptation planning strategies.

The City will continue to coordinate and communicate with the City's stakeholders as the plans for future developments continue. Organizational and technical assistance in consensus building among the competing interests of waterfront users, including the city, investors, business owners, residents, and visitors for the development of the waterfront area, and preservation of public access, will be provided by staff through citizen participation sessions. The City is committed to implementing strategies that will balance growth, including residential and commercial development and the associated infrastructure, through innovative and creative approaches that will least impact the natural systems.

V. GOALS, OBJECTIVES AND POLICIES

Goal 2A.1: The City's conservation programs are directed toward the long term conservation and protection of its natural resources.

Objective 2A.1.1: Punta Gorda will protect the quality of its air by promoting a compact development pattern which limits the need for automobile trips and their related emissions, and by adopting standards for industrial development.

Policy 2A.1.1.1: Punta Gorda will enable the reduction of automobile vehicle miles traveled by controlling the pattern of land uses and maintaining a compact urban form (through the FLUM and utility extension policies) to potentially shorten and consolidate trips, and by construction of sidewalks and bicycle facilities to facilitate non-polluting modes.

Measurement: Building permits issued for existing platted lots served by water and sewer as of July 1, 1997 and number of miles of sidewalk and bike path constructed.

Policy 2A.1.1.2: Punta Gorda will adopt and maintain Land Development Regulations in accordance with the Future Land Use Element which will enable mixed use development, including residential uses.

Measurement: Review and revision of LDR's and permits issued for mixed use development pursuant thereto.

Policy 2A.1.1.3: By concentrating major trip attractors (e.g., shopping, government services, health care) in distinct nodes, Punta Gorda will facilitate the feasibility of alternative modes of transportation which may reduce pollutants.

Measurement: Proportion of permits for new non-residential development located adjacent to existing development of a like land use classification and proportion of development permits requiring a FLUM amendment.

Policy 2A.1.1.4: Punta Gorda will continue to evaluate and revise its standards for industrial development affecting air quality through emissions from industrial processes and related activities (e.g., warehousing, transportation). Such standards will seek to mitigate smoke, dust, gases, particulate matter, vapors, fumes, etc.

Measurement: Review and modification of Land Development Standards for air emissions.

Policy 2A.1.1.5: Punta Gorda will require landscaping of parking lots and heavily traveled roadways, in order to reduce airborne pollutants.

Measurement: Number of DRC approvals for parking lot and roadway landscaping.

Objective 2A.1.2: Punta Gorda will cooperate in the strategic protection of natural resources in and around the City, including coastal and estuarine resources, with such protection strategy including the relationships of resources to larger environmental systems including fisheries, wildlife habitat, native vegetative communities and soils; and including environmentally sensitive land use and development practices.

Policy 2A.1.2.1: Punta Gorda will protect existing publicly owned environmentally sensitive land in the City through the "Preservation" FLUM classification described in Policy 1.14.8 in the Future Land Use Element.

Measurement: Acreage of environmentally sensitive lands preserved.

Policy 2A.1.2.2: Punta Gorda will pursue the acquisition of coastal wetlands and/or other environmentally sensitive lands within its jurisdiction through federal, state, local and nonprofit environmental land acquisition and other appropriate funding sources.

Measurement: Acreage of environmentally sensitive lands acquired.

Policy 2A.1.2.3: Punta Gorda will protect privately owned environmentally sensitive areas through the "Conservation" FLUM classification described in Policy 1.1.14.9 in the Future Land Use Element (includes one unit per ten acres density limit).

Measurement: Acreage of environmentally sensitive lands protected.

Policy 2A.1.2.4: Punta Gorda will enact regulations that guide development in conservation areas that mitigate impacts of environmentally sensitive lands.

Measurement: Existence of "Conservation" areas on the FLUM. Existence of restrictive land development regulations. Number of development permits issued with environmental protections accomplished through Transfer of Density Rights (TDR's), Planned Development's (PD's), or other techniques.

Policy 2A.1.2.5: Punta Gorda will undertake public education activities involving a variety of environmental issues where alteration of public behavior can have important environmental benefits (e.g., judicious use of fertilizers, operation of boats in appropriate channels at appropriate speeds, use of native plants and other water conservation measures, etc.).

Measurement: Number of environmental education activities completed annually.

Policy 2A.1.2.6: Punta Gorda will support the implementation of the 1993 *Charlotte Harbor Surface Water Improvement and Management (SWIM) Plan* by assisting in the collection of environmental data concerning Charlotte Harbor and its environs in Punta Gorda, by undertaking activities to maintain or improve the quality of stormwater runoff, and by adopting and maintaining Land Development Regulations (LDR's) which protect environmentally sensitive lands.

Measurement: Record of activities implemented.

Policy 2A.1.2.7: Punta Gorda will support the recommendations of the Charlotte Harbor National Estuary Program's Comprehensive Conservation and Management Plan (CCMP)

Measurement: Report evaluating CCMP and making recommendations for City implementation.

Policy 2A.1.2.8: Punta Gorda will protect wetlands and their natural functions by educating citizens concerning stormwater quality and by carrying out stormwater quality actions described in Policies 3.7.1.1 through 3.7.3.3.

Measurement: Public education activities concerning stormwater quality (presentations given, messages or brochures distributed), and measures for other policies specifically cited.

Policy 2A.1.2.9: Punta Gorda will protect the natural functions of creeks, rivers, and estuaries in its jurisdiction through the protections referenced in Policies 2.1.2.8 and 2.1.3.4 in the *Conservation Element*.

Measurement: Measurements for policies specifically cited.

Goal 2A.2: The City will protect animal and vegetative communities from destruction by development activities and seek opportunities to enhance or restore natural environments.

Objective 2A.2.1: The City of Punta Gorda shall review new developments and support monitoring activities occurring along these areas in efforts to prevent and reduce negative impacts on the animal and vegetative communities.

Policy 2A.2.1: Punta Gorda will protect endangered and threatened species by:

a) Requiring developers of projects proposed for undisturbed lands to provide an environmental survey, including identification of any endangered or threatened species present.
b) Requiring developers of projects proposed for undisturbed lands to obtain permits through FDEP's Environmental Resource Permit process, which may include conditions related to endangered or threatened species.
c) Maintaining a public contact point (Growth Management) for the public who have questions about endangered or threatened species, or who may observe an imminent threat to a member of such species. In the latter case, the City Staff will investigate and/or contact officials of the responsible agency (e.g., the Florida Game and Freshwater Fish Commission).

Measurement: Environmental surveys done, Environmental Resource Permits, and other contacts by Environmental Manager concerning threatened or endangered species.

Policy 2A.2.2: Punta Gorda will protect wetlands, habitat, native vegetative communities, and endangered and threatened species by maintaining or increasing the acreage in its "Conservation" or "Preservation" FLUM categories as described in Policies 1.1.14.8 and 1.1.14.9 7 of the Future Land Use Element.

Measurement: Acreage maintained or increased in "Conservation" or "Preservation."

Policy 2A.2.3: Punta Gorda will protect native vegetative communities by engaging in the removal of invasive exotic vegetation (e.g., Brazilian pepper), by including native species in the plants allowed under the landscaping ordinance, and by including native plants in public planting areas.

Measurement: Invasive exotic removal activities, landscape plant list, plantings of native plants in public areas.

Objective 2A.2.2: The City of Putna Gorda shall pursue opportunities to enhance or restore natural environments.

Policy 2A.2.2.1: Seek matching grant funding opportunities for exotic species removal and native species restoration stands citywide.

Measurement: Number of grants received.

Policy 2A.2.2.2: Implementation and enforcement of land development regulations which require exotic species removal and require native species plantings in conjunction with development projects.

Measurement: Number of Land Development Regulations (LDR) and Code Enforcement Violations.

Policy 2A.2.2.3: Seek grants and partnership opportunities for oyster reef restoration, mangrove planting, and other similar projects.

Measurement: Number of grants, partnerships, and projects.

***Policy 2.2.2.4**: The City shall continue to pursue acquisition of undeveloped land along the eastern waterfront area for preservation.*

Measurement: Number of acquisitions along the eastern waterfront area.

Goal 2A.3: The City shall conserve, appropriately use, and protect the quality and quantity of current and projected water sources and waters that flow into estuarine waters or the harbor and protect from activities and land uses known to affect adversely the quality and quantity of identified water sources, including natural groundwater recharge areas, wellhead protection areas, and surface waters used as a source of public water supply.

Objective 2A.3.1: Punta Gorda will protect and conserve its potable water source by protecting the Shell and Prairie Creek watershed, by limiting the level of water withdrawals, and by allocating water supply in ways that sustain quality of life and environmental quality.

Policy 2A.3.1.1: Punta Gorda will actively participate with Charlotte County and DeSoto County to encourage their adoption and in the enforcement of an appropriate Special Surface Water Protection Overlay District which controls land use and development practices within the Shell Creek and Prairie Creek watershed.

Measurement: Adoption of legislation protecting Shell and Prairie Creeks and number of development authorizations reviewed by City staff.

Policy 2A.3.1.2: Punta Gorda will actively enforce the provisions of Laws of Florida as they relate to the protection of the Shell Creek and Prairie Creek watershed.

Measurement: Number of development proposals reviewed by City staff.

Policy 2A.3.1.3: Punta Gorda will maintain surface water withdrawal within the parameters of its Water Use Permit conditions for Shell Creek as agreed upon by the City of Punta Gorda and the Southwest Florida Water Management District.

Measurement: Compliance reporting documents.

Policy 2A.3.1.4: Punta Gorda will manage water use and wastewater treatment as an integrated system; using appropriate technology and best management practices to achieve optimal feasible efficiencies in the use of potable water

Measurement: Water and wastewater operation monitoring documents.

Policy 2A.3.1.5: The City will continue to utilize Shell Creek as a water source and construct an off-line reservoir to incorporate elements to be considered an alternative water supply project.

Measurement: Construction of the off-line reservoir and implementation of the current SWFWMD Regional Water Supply Plan alternative water supply projects.

Policy 2A.3.1.6: The City will continue to promote conservation of individual potable water consumption through implementation of education and outreach programs encouraging water conservation and Florida friendly landscaping.

Measurement: The inclusion of the water conservation provisions and Florida friendly landscaping requirements into the Land Development Regulations.