
NATURAL RESOURCES DATA AND ANALYSIS

INTRODUCTION

The Natural Resources Data and Analysis provides an inventory and analysis of the current condition of the County's natural resources, and discusses potential opportunities and threats posed to these resources by existing and future land use activities. Included in this inventory are air, soils, commercially valuable mineral deposits, ground and surface waters, native habitats, and listed flora and fauna. This element is done in fulfillment of Section 9J-5.013 of the *Florida Administrative Code (F.A.C.)*, and Chapter 163, *Florida Statutes (F.S.)*.

The Goals, Objectives and Policies (GOPs) of the Natural Resources element provide guidelines, principles and rules regarding the use and protection of the County's natural resources. Its purpose is to plan for, promote, and manage the conservation and protection of Charlotte County's natural resources; to plan for and, when appropriate, restrict development activities where such activities would damage or destroy natural resources. The Goals of this element are to 1) control pollution, 2) protect natural resources (listed flora and fauna and imperiled communities) and 3) protect wetlands. Objectives and Policies of the Natural Resources element provide direction for the County to address these goals through:

- Promoting the efficient utilization of resources, promoting alternative modes of transportation, reducing waste, and reducing green house gases;
- Promoting utilization of local food resources;
- Creating protection guidelines for surface and groundwater quality;
- Promoting the establishment of wildlife corridors and land acquisition;
- Creating protection guidelines for listed flora and fauna, imperiled and rare communities, and existing preserves and reserves;
- Promoting soil conservation;
- Prohibiting the planting of invasive exotics;
- Creating protection guidelines for wetlands.

RELATIONSHIP TO 2050 PLAN

Within the Future Land Use element, the Smart Growth Planning Framework promotes the preservation and protection of natural resources. Identifying and protecting Natural Resources is one of the four cornerstone components of the Smart Charlotte Concept Plan, along with Agricultural and Rural, Neighborhoods, and Economic Development. The underlying purpose of the Smart Charlotte Concept Plan is to guide growth to areas where it is appropriate and economical to build; these underlying concepts are built into all goals, objectives and policies of the Future Land Use element. The specific Goals, Objectives and Policies that describe the County's overall structure for protecting the County's natural resources are set forth in FLU Goal

2 and its associated objectives and policies. The Natural Resource Goals, Objectives and Policies complement these items and provide further clarification and detail. Other elements, such as Coastal Planning, Infrastructure, and Recreation and Open Space, provide further support for protection and utilization of natural resources.

LEGISLATION

FEDERAL

- [Clean Air Act](#)
- [Clean Water Act](#)
- [National Environmental Policy Act \(NEPA\)](#)
- [Safe Drinking Water Act](#)
- [Endangered Species Act \(ESA\)](#)
- [Energy Policy Act](#)
- [Resource Conservation and Recovery Act](#)
- [Fish and Wildlife Conservation Act](#)
- [Federal Aid in Wildlife Restoration Act](#)
- [Federal Environmental Pesticide Control Act](#)
- [Soil Conservation and Domestic Allotment Act](#)

STATE

- **Florida Endangered and Threatened Species Act:** This Act, adopted in 1977, provides for research and management to conserve and protect threatened and endangered species as a natural resource. Responsibility for the research and management of upland, freshwater and marine species is given to the Florida Fish and Wildlife Conservation Commission (FWC). The act also encourages FWC to develop a public education program dealing with endangered and threatened species.
- [The Florida Water Resources Act](#)
- [Outdoor Recreation and Conservation Act](#)
- [The Florida Environmental Land and Water Management Act of 1972](#)
- [Preservation of Native Flora of Florida Act.](#)

LOCAL

- **Soil Conservation code:** This code ensures that land development activities are conducted in a manner which minimizes the loss of topsoil, controls windblown dust, and reduces pollution (primarily siltation) of Charlotte County's surface waters.

- **Excavation and Earthmoving code:** This code continues to regulate excavation activities in order to minimize the detrimental effects of such activities on groundwater, surface water, wildlife, and surrounding land use and property values.
- **Special Surface Water Protection Overlay District code** (renamed the **Watershed Overlay District** in *ENV Policy 1.4.9*): This code supports a special overlay designation that was applied to Shell Creek and Prairie Creek in the 1988 Comprehensive Plan. The creeks have been deemed as having special significance because these waters are utilized as a potable drinking water sources when they enter the Hendrickson Dam Reservoir. The intent was to establish a level of development control in order to minimize the disruption of natural hydroperiods, flows and water quality.
- **Surface Water and Wetland Protection code:** This code provides guidelines and standards for development within or adjacent to wetlands and surface water areas within unincorporated Charlotte County. The ordinance requires the creation of an upland buffer with a minimum average width of fifteen feet adjacent to all natural water bodies and wetlands which must be maintained in natural vegetation.
- **Open Space/Habitat Preservation code:** This code requires that a percentage of land undergoing development review, and which contain habitat suitable for use by endangered or potentially endangered species, be preserved in a natural state in perpetuity. In lieu of setting aside the land, developers may fulfill the requirements of the ordinance by contributing \$300 per acre or fraction thereof (of the subject property) to the County's Open Space/Habitat Reservation Trust Fund. This fund continues to accrue monies that are then used to acquire environmentally sensitive lands.
- **Tree code:** This code provides for enhanced tree preservation and replacement within unincorporated Charlotte County. Trees are assigned values ("tree points") based on their characteristics and desirability. Only bona fide agricultural activities are exempt from the ordinance.
- **Environmentally Sensitive Lands Protection code:** The purposes of this code are to establish an efficient, fair, scientifically valid, voluntary and economically-sound procedure for the protection of environmentally sensitive lands not currently in public ownership, and to limit protection to those lands which satisfy the ecological criteria set forth herein. This ordinance is non-regulatory and in no way encumbers the development rights of the landowner(s) or presumes to affect the fair market value of any property identified as environmentally sensitive.
- **Tower code:** This code established setbacks from the mean high water line of the Gulf of Mexico, Lemon Bay, Gasparilla Sound, Placida Harbor, Red Fish Cove, the Myakka River, and the Peace River, and protected nesting birds. The ordinance also prohibits towers from being placed on preservation and conservation lands, or within several rare vegetation communities.
- **Flood Damage Prevention code:** It is the purpose of this code to promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- a. Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, which result in damaging increases in erosion or in flood heights and velocities;
 - b. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage throughout their intended life span;
 - c. Control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of floodwaters;
 - d. Control filling, grading, dredging and other development which may increase erosion or flood damage; and
 - e. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.
- ***Stormwater, Floodplains, Wetlands code:*** This code details the procedures and plans required by development for stormwater attenuation.
 - ***Transfer of Density Units code:*** This code allows for the application, review and approval of transfers of density units while providing for a procedure for measuring and granting density units. It establishes criteria for appropriate Sending and Receiving Zones and the process, rules, and procedures to sever density from a Sending Zone and transfer density to a Receiving Zone.
 - ***Conservation Easement Program:*** This program encourages property owners who meet specific criteria set forth in the ordinance to grant the County an easement over a portion or all of their land; thereby qualifying for a reduction in the Equivalent Residential Unit count assigned to the subject property for street and drainage, stormwater utilities, waterways, and fire municipal service benefit unit assessment purposes. This promotes green space within the urban areas.
 - ***Wellhead Protection Area code:*** The purpose of this code is to provide standards to control development in and adjacent to designated wellheads to protect water supplies from potential contamination.

EXISTING CONDITIONS

GEOGRAPHY AND CLIMATE

The topography of Charlotte County ranges from sea level at the coast to a maximum elevation of 75 feet in the northeastern corner of the County. Charlotte County is composed of portions of the following four physiographic provinces:

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

- *Gulf Coastal Lowlands.* This is a low lying area which covers most of Charlotte County. It is a broad, gently sloping marine plain that is characterized by karst flatlands with many swamps and sloughs. Elevations range from near sea level to about 35 feet at its eastward limit. The area is mainly covered with unconsolidated sand that becomes clayey with depth, except for wetland areas which are typified by organic soils.
- *Caloosahatchee Incline.* This is a transition zone that marks a steeper incline with elevations from near 35 feet at the toe to 60 feet at the crest.
- *DeSoto Plain.* Portions of this plain are found in northeastern and eastern Charlotte County. It is characterized by wet prairie, cypress swamps, and flatwoods. Elevations range from 60 to 74 feet.

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

AIR QUALITY

Description

Air quality is generally good in Charlotte County and well within the standards set by State and Federal regulatory agencies. Within the Natural Resources GOPs, policies related to air quality control are found under ENV Objective 1.3.

Florida's air quality is monitored by the Florida Department of Environmental Protection (FDEP) for carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulfur dioxide. The closest monitoring site to Charlotte County is located in Sarasota County. Charlotte County, and indeed most of Southwest Florida, is listed as an attainment area by the US Environmental Protection Agency (EPA), which means that air quality is well within the limits of various parameters established by the Clean Air Act.

Issues and Concerns

Charlotte County's air quality remains good primarily due to the predominantly residential nature of the County's development and lack of sources of major emissions. There are a variety of [permitted point sources](#) that are monitored through FDEP. These projects include concrete and asphalt plants, yard waste incinerators, and landfills. Though the FDEP does not routinely monitor or inspect these facilities, it does require monitoring reports and will respond to complaints from neighboring property owners. To provide further assurance to its citizens, Charlotte County has in place a policy, ENV Policy 1.3.4, to prohibit the placement of new land uses requiring air quality permits from the EPA or FDEP within one-half mile of any area designated by the Future Land Use Map (FLUM) as being primarily for residential development; this does not apply to incinerators or crematoria located within hospitals or funeral homes. Areas prohibited to uses requiring air quality permits are illustrated on SPAM Series Map #48.

Also, within the County's Code of Laws and Ordinances, there are regulations such as the Industrial Performance Standards and the Soil Conservation Ordinance to help safeguard the health and safety of the general public.

Open burning, in the form of either prescribed fire or wildfire, is a common occurrence in Charlotte County, and also represents a source of air emissions. In Florida, open burning is regulated by the State Division of Forestry and FDEP. The major pollutants that result from open burning are suspended particulates and carbon monoxide; however, the emissions produced from controlled, open burning are short-term and localized in nature. Controlled, open burning is conducted for a variety of reasons, including wildfire control, prescriptive burns for land management purposes, for waste reduction related to land clearing, and for cold and frost protection for agriculture. One of the major benefits of prescriptive burning is the reduction of fuel loads (dry leaf litter and other dead plant matter) which prevents the occurrence of highly destructive wildfires. This is important for protecting not only large public preserve areas, such as the Webb/Babcock Wildlife Management Area, but also for houses and properties in areas which, though developing, still retain significant levels of canopy and brush. To reduce this risk, the Florida Division of Forestry undertakes a series of controlled, fuel load reduction burns in Charlotte County. Not only does this reduce the threat to developed and undeveloped properties, it is taken into consideration for the County's insurance rating. Thus, prescriptive fire provides direct, tangible economic benefits in addition to its ecological values. ENV Policy 1.3.5 supports the use of prescriptive burning.

SOILS

Description

The Natural Resource Conservation Service (NRCS), a division of the United States Department of Agriculture, provides expertise in soil science and leadership for soil surveys. The *Soil Survey of Charlotte County*, originally issued in 1984, was updated in 2006. The survey identifies 62 different soil types in Charlotte County. The soils are divided into 16 groups, with soils in each group having similar characteristics. FLUM Series Map #19 is a general representation of the soils throughout Charlotte County. The following information is derived from the *Soil Survey of Charlotte County*, Florida, Soil Conservation Service, 1984. The acreage figures are from the 2006 update.

Fine Sand: These soils are nearly level and somewhat poorly drained. Permeability is rapid in the uppermost layers and moderate to slow in lower ones. These soils are not well suited for cultivating crops; however, crops can be produced with intensive management practices. The suitability for citrus ranges from poor to good - proper water control renders them suitable for citrus. These soils have severe limitations for urban uses and sanitary facilities due to wetness and a high water table. There are approximately 144,300 acres of this soil grouping.

Fine Sand, Tidal: These soils are nearly level, poorly drained, and are subject to tidal flooding. These soils are not suitable for crop or citrus production because of high salt content. They have severe limitations for urban development and require mounding when septic tanks are used. There are approximately 2,000 acres of this soil grouping.

Fine Sand, Slough: These soils are nearly level, drain poorly, and are located in sloughs. Slopes are smooth to slightly concave and range from 0 to 1 percent. During periods of heavy rainfall, the soil is covered by slowly moving shallow water. Permeability is rapid. These soils are not suitable for crop or citrus farming, and have severe limitations for urban uses; they are well suited for pastures if using water control structures. There are approximately 3,800 acres of this soil grouping.

Fine Sand, Depressional: These soils are nearly level and poorly drained and are generally not well suited for crop or citrus cultivation, urban uses, or recreation because of ponding. These soils may be appropriate for pasture land. They have severe limitations for septic tanks. There are approximately 27,900 acres of this soil grouping.

Fine Sand, Limestone Substratum: These soils are nearly level and poorly drained. Permeability is rapid in the surface and subsurface layers and moderately slow in subsoils. These soils are suitable for crop and citrus cultivation when water control structures are employed. Though they have high potential for range uses, fine sand, limestone substratum soils have severe limitations for urban development because of a high water table. There are approximately 1,350 acres of this soil grouping.

Fine Sand, High: These are nearly level, poorly drained, and located in flatwoods. Slopes are smooth to slightly convex and range from 0 to 2 percent. Permeability is rapid in the surface and subsurface layers and the sandy part of the subsoil; permeability is moderately slow in the lower, loamy part of the subsoil. With good water control practices, this soil is well-suited for some vegetable crops and citrus. It is well-suited for pasture land, but has severe limitations for urban development because of a high water table. There are approximately 26,500 acres of this soil grouping.

Mucky Fine Sand: These are nearly level, very poorly drained, and located in broad tidal swamp areas. The water table fluctuates with the tide and the soil is subject to flooding. The soil is not suited for crop or citrus cultivation, pasture grasses, or woodlands. It has severe limitations for urban and recreational uses because of flooding, the high water table, and sandy texture. There are approximately 8,750 acres of this soil grouping.

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

urban development because of a high water table. There are approximately 147,500 acres of this soil grouping.

Sand, Limestone Substratum: These are nearly level, poorly drained, and located in broad flatwoods areas. Permeability is rapid in the upper layers, but slow in the lower parts of the subsoil. The soil is suitable for many vegetables, flower crops, oranges, and grapefruit if water control systems are used. The soil is well suited for pastures and hay crops. It has severe limitations for urban development because of a high water table. There are approximately 12,600 acres of this soil grouping.

Sand, Depressional: These soils are nearly level, very poorly drained, and located in depressions. The water table is above the surface for 3 to 6 months of the year. These soils have moderate ratings for range plant production, but are poorly-suited for crop and citrus production and have severe limitations for urban development. There are approximately 18,300 acres of this soil grouping.

Sandy Loam, Depressional: These are low, nearly level, very poorly drained, and located in depressions. Slopes are concave and less than 1 percent. Permeability is rapid in the surface layer and moderate in the subsoil. In its natural state, the soil is not suitable for crops, trees, or improved pasture because of the lack of drainage outlets. It has moderate potential for range plant production. This soil has severe limitations for urban development because of the high water table. There are approximately 1,200 acres of this soil grouping.

Gravelly Fine Sand: These are nearly level, somewhat poorly drained, and were formed by fill and earthmoving operations. Permeability is estimated to be rapid in the fill and underlying surfaces. It is poorly suited for plants unless topsoil is spread over the area to provide a suitable root zone. The soil has severe limitations for septic tanks and recreational uses and moderate limitations for building sites. There are approximately 14,350 acres of this soil grouping.

Muck: These soils are nearly level, very poorly drained, and located in marsh areas. Slopes range from 0 to 1 percent. These soils are generally not suitable for cultivated crops or citrus, but Gator muck is well-suited for vegetable crops or sugar cane, if drained. These soils are vulnerable to flooding and have severe limitations for urban development. There are approximately 25,000 acres of this soil grouping.

Beaches: These are narrow strips of nearly level, mixed sand and shell fragments along the Gulf of Mexico. These areas are covered with daily saltwater tides and are subject to movement by wind and tides. Salt-tolerant plants are the only vegetation. Beaches are suitable for recreation. There are approximately 190 acres of this soil grouping.

Urban Land: These consist of areas that are covered by buildings, parking lots, roads, and other man-made structures. Unoccupied areas are mostly lawns, vacant lots, and playgrounds. This soil is unsuitable for crop and citrus cultivation because of current land uses. There are approximately 700 acres of this soil grouping in Charlotte County.

Urban Land Complex: These soils have generally been modified by grading and the construction of impervious surfaces. These soils accommodate buildings, roads, parking lots, and drainage facilities. Current land uses preclude the use of these soils for crop and citrus cultivation. These soils have severe limitations for septic tanks due to wetness. There are approximately 7,000 acres of this soil grouping.

Issues and Concerns

It is apparent from the descriptions that the majority of soils within the County are not suitable for development, either urban or agricultural, without amending the base soil and providing drainage and stormwater infrastructure. For structural development, amending the soil occurs in the form of fill, which is required to provide a stable base for the structure and bring the structure up to the required flood elevation level. During this process, the conservation of native topsoils is required by the Code of Laws and Ordinances of the County. Topsoil must be stockpiled on-site and not buried by the fill. Once the fill is placed, the topsoil must be redistributed over the fill.

The practice of placing fill alters traditional drainage and sheet flow patterns and may lead to flooding of neighboring properties that were developed prior to existing flood elevation requirements and may also impact the hydrology of wetlands and other surface waters. The only areas where minimal filling is a requirement are within the velocity flood zone, within the Charlotte Harbor Community Redevelopment Area, and on Manasota and Sandpiper Keys. The County may choose to explore expanding minimal fill requirements and stem wall construction into other areas to lessen the impacts of filling.

The type of soils within the County is also a concern when it comes to proper infiltration of septic drain fields. Poor drainage of existing soils inhibits the efficient working of septic systems, which are utilized by a large portion of the County, and leads to groundwater and surface water contamination. Septic systems are more fully discussed in the Potable Water and Sanitary Sewer section of the Infrastructure Data and Analysis.

Due to Charlotte's County's generally level topography and soil types, the NRCS does not classify any areas in Charlotte County as being subject to severe erosion. Soil erosion is hastened by natural disasters and human activities. Clearing large areas of land for agriculture or urban development exposes the soil to wind and water and thus accelerates erosion. Soil erosion not only represents the loss of an irreplaceable natural resource, but also threatens the quality of surface waters.

While there do not appear to be any serious problems associated with agricultural land uses in the County with respect to physical erosion, the loss of peat or muck soils by chemical oxidation, a problem experienced in the Everglades Agricultural Areas, may pose a potential problem. Fortunately, the only portions of the County that may be subject to such a threat are the peat and muck soils of Long Island Marsh in the northeastern corner of the County.

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

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

VALUABLE MINERAL RESOURCES

Description

Charlotte County's commercially-valuable mineral deposits are sand, shell, aggregate and marl. Several commercial lime rock quarries are located on Cook Brown Road, just south of the Babcock/Webb Wildlife Management Area. Likewise, sand and shell quarries, located on the Cape Haze Peninsula and in the eastern portion of the County, are used to supply sand and shell for the production of asphalt. Much of the material mined from excavation pits is used for building pads, roads, parking lots and golf courses.

No significant phosphate deposits have been found in Charlotte County. Florida's main phosphate mining operations are centered around the extensive deposits in and around Polk County, many of which are concentrated along the Peace River, which flows directly into Charlotte Harbor.

Issues and Concerns

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

When excavation activities in flowways are unavoidable, the hydrologic function of the flowway and connected wetlands must be maintained through the construction of channel and water control structures such as weirs, dikes, or other structures to route surface flow around the excavation and maintain appropriate hydroperiods. When pumping and offsite disposal of groundwater is proposed to facilitate the mining operation, the impact of water table drawdown on nearby wells, water bodies and wetlands is evaluated and monitored. Through the Environmental Resource Permitting program, the setbacks established by the Water Management Districts from surface waters are calculated to minimize drawdown. The Charlotte County Excavation and Earthmoving code helps minimize the detrimental effects of mining and excavation activities by establishing standards for the location and operation of excavations and requiring reclamation plans. Charlotte County now also requires a Future Land Use Map amendment (large scale) and a rezoning prior to any new commercial excavation being permitted through the process required by the Excavation and Earthmoving code.

State mining regulations for phosphate mines have been developed and strengthened over the years and have resulted in decreased overall impacts, although dangers to the environment remain. Charlotte County is sensitive to the following impacts from phosphate mining:

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

WATER RESOURCES

The Natural Resources element must provide protection of surface and ground potable water supply sources and protect the general water quality of surface waters. Within the Natural Resources GOPs, ENV Objective 1.4 and the associated policies specifically refer to water quality protection. The policies within the Natural Resources element are supplemented and supported by objectives and policies within the Future Land Use element, Coastal Planning element, and Infrastructure subelements. SPAM Series Map #49 shows the locations of potential point pollution sources in Charlotte County

Supporting data and analysis is also distributed between the elements. The quality and quantity of groundwater and the aquifer system is discussed in detail in the Groundwater and Aquifer Recharge section of the Infrastructure Data and Analysis. Flooding and floodplain issues are discussed in detail in the Stormwater Management section of the Infrastructure Data and Analysis. The inventory of and issues surrounding major open surface waters are discussed in the Coastal Planning Data and Analysis. The Natural Resources Data and Analysis will review a surface potable water source and potable wellheads. Wetlands are discussed in a later section of this document.

Prairie and Shell Creeks

Description: 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. Though they follow separate channels until their confluence just east of the Peace River, Shell and Prairie Creeks together have supplied potable water for the City of Punta Gorda since 1965, following the construction of the Hendrickson Dam across Shell Creek. Shell and Prairie Creeks, shown on FLUM Series Map #4, are both classified as Class I Outstanding Florida Waters from the reservoir to their headwaters. In June of 1965, in recognition of the creeks as a potable water source, the Florida Legislature enacted House Bill No. 2537 to protect the creek systems against pollution from their headwaters to the dam against pollution. It prohibits the dumping, depositing and discharge of sewage and industrial waste in the creeks and the construction of any septic tank system within 200 feet of the mean high water mark.

Issues and Concerns: The City of Punta Gorda monitors a number of stations both up and downstream of the dam. Data collected at these stations indicates that water quality in the system was generally good and met all the requirements of its classifications. However, as a result of a prolonged drought in 1999-2000, monitoring identified elevated amounts of total dissolved solids. In 2001, a stakeholders' group was created to address these water quality issues under the guidance of the FDEP. Supervision was transferred to the Southwest Florida Water Management District after it was decided that the group would pursue a watersheds management plan to address the water quality concerns. The final product is called the Shell Creek and Prairie Creek Watersheds Management Plan Reasonable Assurance Documentation. This document was finalized in December of 2004. There are proposed management activities listed within this document that, if implemented, are expected to improve the water quality of the creek system. Should this program succeed, the state will not need to develop Total Maximum Daily Load (TMDL) limits for the creeks and impose regulations to reduce pollutants and clean up the water bodies. The program in place now is voluntary, although all of the signatories to the document have pledged to follow the proposed management activities.

For detailed information on the Reasonable Assurance Plan please visit the following website:
http://www.swfwmd.state.fl.us/documents/plans/spjc_wmp.pdf

Notwithstanding the current efforts by the State, the generally good water quality of these creeks will be impacted by increased development if not managed properly. In 1988, when the County adopted the first comprehensive plan, a Potable Water Protection Overlay District was instituted. This was followed by an implementing land development regulation first adopted in 1989, with subsequent updates. Both the Overlay district and the code instituted greater land use control within a buffer area around the creeks; these applied to agriculture as well as residential development. For this comprehensive plan update, the Overlay has been renamed the Watershed Overlay District. The Overlay district's boundary was broadened to include the watershed study areas of Shell and Prairie Creeks as well as Long Island Marsh and Tippen Bay, both of which are important headwaters of Prairie Creek. Also, the creeks and the creek tributaries were better delineated as allowed by enhanced technologies. The Overlay is delineated on FLUM Series Map #4. ENV Policy 1.4.9 specifies the intent of the Overlay district. The Land Development Regulations will be updated to correspond to the intent of the policy.

Potable Water Wellheads

Description: Many of the County's public potable water suppliers pump water from underground aquifers. These suppliers generally use reverse osmosis treatment facilities. Public potable water wellheads are mainly located in the West and South County areas, although one supplier is located in the Mid-County area. FLUM Series Map #7 depicts the locations in which wellheads are located in Charlotte County.

Policies within the Future Land Use element and the Natural Resources element require protection of potable water wellheads, and potable Aquifer and Storage Recovery (ASR) wellheads should they be permitted. The Wellhead Protection code of the Land Development Regulations details special restrictions and prohibited uses in the area around a wellhead. Commercial and industrial development applications that are located within 1,500 feet of a wellhead are reviewed in order to ensure that contamination of wellfields does not occur. The applicant must submit a pollution prevention plan to the utility operator, which must approve it. The last step in the process is staff review and a decision by the Board of County Commissioners prior to building permit issuance.

Issues and Concerns: Although the land development regulation has been in place since 1998, it has not always been applied to development within the wellhead protection areas. This oversight was brought to the County's attention by the Gasparilla Island Water Authority, which owns wellheads in an industrially zoned area adjacent to County Road 771. This prompted the County to initiate a stakeholder working group to revise the existing code. A revised code, with more specific protections, will be adopted with the County's update of all the Land Development Regulations; this will be done subsequent to the adoption of this plan. The County has also installed a new permitting system which makes it much easier to identify properties with development restrictions.

NATURAL COMMUNITIES

The Florida Natural Areas Inventory's Guide to Natural Communities of Florida (FNAI) lists the natural communities found within Florida. FNAI also uses several criteria to determine the relative rarity and threat to each community type; these are translated or summarized into a global and a state rank, the G and S ranks, respectively. Rare and imperiled communities, G (Global) 1, 2, 3 and S (State) 1, 2 and 3 are found within Charlotte County. These communities are depicted on SPAM Series Map #50. This map was derived by corresponding Florida Land Use Cover and Forms, Classification System (FLUCCS) categories to FNAI categories using a conversion table issued by the FFWCC.

FLUCCS information is also referenced by Charlotte County when reviewing potential developments. These habitat types are depicted in SPAM Series Map #51. The descriptions below are FLUCCS habitats.

Pine Flatwoods

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

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

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

Because of their relative abundance and the fact that one variety (hydric pine flatwoods) is only now coming into wide recognition as a wetland or wetland/transitional habitat, pine flatwoods have not received the protection extended to other habitats during the regulatory agencies' review of land clearing operations. Much of the acreage cleared for urban development and agricultural operations in the County was originally pine flatwoods. Fortunately, the County's loss of pine flatwoods is somewhat offset by historic and ongoing purchases of environmentally sensitive lands by the State, including the Webb, Charlotte Harbor Buffer Preserve, the Charlotte Harbor Flatwoods, and the Babcock Ranch. The County must continue to take advantage of Federal, State, and local land acquisition programs in an attempt to preserve these vital upland habitats.

Palmetto Prairies/Dry Prairies

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

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

Issues and Concerns: Large areas of dry prairie have been converted to improved pasture or residential developments. Overgrazing generally leads to trampling of the forested inclusions, reduction of habitat diversity, and deterioration of the range as pasturage. Fire is important to

prairie ecology, but either too frequent fires or their exclusion can seriously alter the vegetative composition of this association.

Scrub Communities

Sand Pine Scrub

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

Scrubby Flatwoods

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

Xeric Oak Scrub

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

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

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

Issues and Concerns for Scrub: Scrub is among Charlotte County's most threatened natural communities. As they are typically dry and well drained, they are well suited to urban development as well as a number of agricultural activities, notably citriculture. The conversion

of land for urban development or agriculture is the greatest threat to scrub habitat. Although the Endangered Species Act - which is geared toward preventing the taking of (killing, harming, or harassing) individual animals - does afford some protection, scrub communities continue to be lost as this and other regulations are difficult to enforce and do not specifically address the loss of habitat.

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

Upland Hammocks

Live Oak Hammocks

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

Cabbage Palm Hammocks

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

Mesic Hammock

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

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

Issues and Concerns for Scrub: Hammocks are vulnerable to the same development pressures threatening other upland communities throughout Florida. Residential, industrial, and agricultural interests often eliminate hammocks entirely, infringe upon their ecological integrity

through development of adjacent uplands, or cause dramatic changes in the water table. Although their relatively rich soils permit more rapid recovery than most other upland habitats found in Florida, the mature forest canopy may take many years to recover from selective clearing or other disturbances.

Freshwater Aquatic Communities

Open freshwater systems

Description: This category includes lakes, ponds, rivers, creeks, drainage or navigation canals, and any other permanently-open freshwater habitat. FLUM Series Map #5 and Map #16 depict the majority of the freshwater systems in the County.

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

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

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

Freshwater Wetlands

Description: The general descriptions of freshwater wetland habitats provided below is based on general vegetative characteristics and does not differentiate between contiguous and isolated systems. The hydrological functions of freshwater wetlands vary depending upon whether the wetlands constitute, or are contiguous with, a drainage feature, or whether the wetlands are isolated from a major flowway or drainage feature. Contiguous wetlands, including riverine marshes, major slough systems, cypress strands, riverine swamps, and hydric

hammocks along creeks and rivers, constitute flowways and flood plains. Isolated wetlands, including wet prairies, cypress and bay heads and isolated hydric hammocks, usually have poorly defined or seasonal hydrologic connections with flowways or drainage features. FLUM Series Map #18 depicts the general location of wetland systems, both freshwater and estuarine, throughout Charlotte County.

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

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

Wet Prairies and Marshes

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

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

Wet prairies and isolated marshes usually have concentric bands of vegetation marking zones of differing hydroperiods (amount of time under water). The character of the plant community can vary widely from one isolated wetland to another. The outermost band is composed of species adapted to shorter periods of inundation (for example various grasses and St. John's

Wort), while the innermost bands are dominated by taller grasses and flags, and bladderworts grow in a central pond. Generally the central portion of these wetlands has a longer hydroperiod and a greater organic content to its soil than do the outer portions.

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

Sloughs

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

Swamps

Description: Swamps include several major habitat types, the common denominators being seasonal or permanent inundation and predominance of woody vegetation. Their species composition, ecology, and wildlife benefits vary tremendously with soil composition, hydrology, topography, and watershed characteristics. Hardwood swamps and cypress swamps are the major communities possessing standing water for a substantial portion of the year.

Hardwood Swamps

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

Cypress Swamps

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

Swamp Thickets

Description: These are dense strands of shrubs or low trees occupying standing water or periodically flooded sites. They occur in or around ponds, lake impoundments, and marshes or along rivers and streams. Thickets generally form a transition zone between more aquatic and terrestrial habitats, or represent marshes and wet prairies undergoing secondary succession due to fire exclusion or a lowered water table. Wax myrtle, coastal plain willow, red maple, buttonbush, and dahoon holly are characteristic shrubby species; various grasses, sedges, and other forbs comprise the ground cover. Many passerine birds (perching and song birds) reside in such thickets permanently or seasonally, or utilize this habitat during migration. The marsh rice rat, cotton rat, and marsh rabbit are also common.

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

Cypress swamps provide habitat for many of the same species as hardwood swamps, but often possess more aquatic habitat for fishes, amphibians, and reptiles. They are particularly important as seasonal refuges for deer and other animals occurring in adjacent flatwoods communities, and as feeding areas for wading birds during the dry season when forage animals are concentrated into depressions within the slough or dome.

Bay Forests

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

Although seldom extensive and providing little food for wildlife when compared to other wetland habitats, bay forests may contribute significantly to the habitat diversity of a given tract. The southeastern shrew prefers bay forests as its primary habitat, and the yellow-billed cuckoo, Carolina wren, blue-grey gnatcatcher, short-tailed shrew, and cotton mouse are also common in this community.

Hydric Hammock

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

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

Issues and Concerns for Freshwater Aquatic Systems: Freshwater wetlands are susceptible to trampling by livestock, overgrazing, disturbance by all-terrain vehicles, and conversion to agricultural and urban land uses. The degree of disturbance often depends on specific development plans. Wetlands can be seriously impacted by increased water depth due to stormwater retention systems, or by desiccation through drainage of adjacent lands and general lowering of the water table. Swamps have traditionally been labeled as worthless by agricultural, industrial, and residential interests, with the resultant destruction of large swamp

tracts via-filling, drainage, or alteration of natural water regimes. State and Federal laws now protect these habitats to a certain degree, but development of previously impacted wetlands, flood control or navigation projects, trampling by livestock and development of critically important adjacent uplands continue to adversely impact swamps.

WILDLIFE

The following sections briefly describe several listed wildlife species that are habitants within the County. Those species that are encountered more frequently in the coastal areas of the County are discussed in the Coastal Planning element.

Florida scrub-jay (*Aphelocoma coerulescens*)

Description: In Charlotte County, scrub-jays occur in sand pine/oak scrub, xeric oak scrub, scrubby flatwoods and scrubby coastal strands. An endemic inhabitant of Florida's scrub habitats, the scrub-jay is listed as a threatened species by the Florida Fish and Wildlife Conservation Commission (FFWCC) and United States Fish and Wildlife Service (USFWS). Scrub-jays are social birds, living in well organized family units known as clans. A clan typically consists of a breeding pair and their offspring, including both newly hatched and young from previous breeding seasons.

Issues and Concerns: The scrub habitats upon which this species depend must not only contain the proper species of oak for acorn foraging, they must be maintained in an early successional state with a relatively open canopy. In nature, this successional state is maintained by natural fires. If scrub becomes overgrown (a condition often caused by the suppression of natural, cyclic fires) the habitat becomes unusable to the jays which must either find new, habitable territory or perish. The suppression of natural, cyclic fires is not the only threat facing scrub jays. Scrub habitats are well suited for a variety of urban and agricultural land uses because they are typically high, dry, and well-drained. As more and more scrub is cleared for such purposes, the scrub-jay's existence becomes increasingly threatened.

Urban development has greatly affected Florida scrub-jays. Their habitat has been lost, degraded by fire suppression, and fragmented into small patches that are often divided by roadways. In addition to the many challenges to survival Florida scrub-jays face in these small habitat patches, they are often killed by automobile traffic as they fly low across roadways. A recent study published in the journal, Conservation Biology, found that these traffic-related deaths have such intense effects on Florida Scrub-Jays that populations living along roadways can only persist if enough individuals immigrate (move in) from other nearby populations. Because there are so many road mortalities, in populations of Florida scrub-jays near roads, the number of breeding adults that die each year is much greater than the number of offspring they produce each year. This creates what is known as a population "sink," where the population can't sustain itself without a constant influx of newcomers. To make matters worse, birds

immigrating from habitat patches without roads are naïve to the dangers of traffic, and are much more likely to be killed by vehicles.

Urban development can also have other harmful effects on Florida Scrub-Jay populations. Introduced predators, such as feral cats, are common in the human-modified landscapes, and may prey on Florida scrub-jays. In addition, the few remaining patches of suitable habitat are often separated by great stretches of inhospitable land, and it is extremely difficult for Florida Scrub-Jays to move between them. As a result, the genetic diversity of jays in these isolated populations deteriorates, reducing their ability to adapt, resist disease, and persist. Without a landscape-level effort to preserve Florida scrub-jay habitats, maintain connectivity between patches, and minimize the impacts of urbanization, many of these populations have little chance of long-term survival.

Even if scrub habitats are preserved during development activities (the FFWCC recommends 25 acres per clan), jay populations may still be imperiled due to improper habitat management and secondary impacts such as the introduction of predators (domestic cats and dogs) and other anthropogenic problems. Finally, the preservation of isolated fragments of scrub habitat within developed areas may not be adequate to prevent the local extirpation of the species. In order to ensure long term viability, a system of ecologically significant stands of scrub, linked by flyways which include smaller stands, must be developed as part of an overall Habitat Conservation Plan for the species. Without such a plan, which is authorized by the Endangered Species Act, Charlotte County's scrub-jay population may face slow but certain extinction.

Gopher Tortoise (*Gopherus polyphemus*)

Description, Issues and Concerns: Once abundant throughout the southeastern United States, the gopher tortoise is now principally found in southern Alabama, Georgia, and all of Florida. It is listed as a threatened species by the FFWCC. Gopher tortoises prefer dry, well drained soils for their burrows, such as are found in xeric habitats including beach scrub, sand pine, longleaf pine-turkey oak, live oak hammock, scrubby flatwoods, mesic flatwoods, and old field successional stages leading to any of these. 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. The gopher tortoise is considered a keystone species on which the survival of many other animals depend. In fact, beyond sheltering the tortoise, a gopher tortoise burrow may provide shelter for any of more than 360 different animal species, including the listed indigo snake, gopher frog, and burrowing owl.

Gopher Frog (*Rana capito*)

Description, Issues and Concerns: The gopher frog is listed as a species of special concern by the FFWCC. The gopher frog utilizes gopher tortoise burrows, mouse burrows, stump holes, and post holes in the habitats where the gopher tortoise is found. The gopher frog inhabits dry, sandy uplands, such as scrub, that include isolated wetlands or large ponds with one mile. The gopher frog breeds chiefly in seasonally-flooded and temporary ponds. The gopher frog

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

Eastern indigo snake (*Drymarchon corais couperi*)

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

Florida pine snake (*Pituophis melanoleucus mugitus*)

Description, Issues and Concerns: The Florida pine snake is listed as a species of special concern by the FFWCC. It inhabits areas with relatively open canopies and dry sandy soils, in which it burrows. The Florida pine snake often co-exists with gopher tortoises.

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

Red-Cockaded Woodpecker (*Picoides borealis*)

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

Florida panther (*Puma concolor coryi*)

Description, Issues and Concerns: The Florida panther is listed as endangered by both the State and Federal governments. Panthers only inhabit southern Florida, including Charlotte

County. Pine flatwoods, in combination with other forested upland and seasonal wetland habitats, provide critical foraging, breeding, and wildlife corridor habitat for the Florida panther. The panther utilizes hydric, mesic, and xeric pine flatwoods, and savanna, hardwood hammocks, and mixed swamp forest. Ecotones are particularly important to the panther because they support an increased variety and density of species. Recently burned pine flatwoods provide more prey for panther, and panthers are documented to move toward fires and stay in areas of recent burns. The panther has large home range requirements and a low reproductive rate, making them vulnerable to habitat fragmentation and loss.

Florida black bear (*Ursus americanus floridanus*)

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

Sherman's fox squirrel (*Sciurus niger shermani*)

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

Florida mouse (*Podomys floridanus*)

Description, Issues and Concerns: The Florida mouse is listed as a species of special concern by the FFWCC. The Florida mouse inhabits xeric upland communities found in Charlotte County, including scrub and scrubby flatwoods. The Florida mouse frequently inhabits gopher tortoise's burrows. Because it is so specialized and exclusively occurs in drier natural plant communities, the Florida mouse is highly vulnerable to habitat losses or alterations. Its preferred habitat is highly suitable for development or for conversion to citrus culture. Recommended conservation actions for the Florida mouse include preserving upland areas, such as scrub and scrubby flatwoods, and managing for gopher tortoises.

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

Florida sandhill crane (*Grus canadensis pratensis*)

Wood Stork (*Mycteria americana*)

The burrowing owl (*Athene cunicularia*)

Southeastern America kestrel (*Falco sparverius paulus*)

Audubon's crested caracara (*Polyborus plancus*)

FEDERAL AND STATE OWNED NATURAL LANDS

Charlotte County owns some very significant tracts of land that serve as natural reserves. These are listed in the Parks, Recreation and Cultural Resources Data and Analysis and depicted on SPAM Series Map #90. Many of them are discussed on the County’s website at <http://www.charlottecountyfl.com/EnvironmentalServices/NaturalResources/EnvironmentalLands/>

There are also large expanses of land that have been purchased by various entities of the State of Florida and one property, an island, owned by the United States of America. These are listed below in Table ENV-1 and depicted on SPAM Series Map #52.

Table ENV-1: State and Federally Owned Natural Lands			
Park Name	Ownership/ Management	Location	Acreage
Fred C. Babcock/ Cecil M. Webb Wildlife Management Area (WMA)	State/ Department of Env. Protection (DEP)	South of SR 74, East of US 42, West of SR 31	65,785
Charlotte Harbor Flatwoods (Yucca Pen) <i>This area is managed as part of the Webb WMA</i>	State/ DEP	Burnt Store	5,350
Charlotte Harbor Preserve State Park	State/ DEP	Charlotte Harbor	28,600
Babcock Ranch Preserve	State/ DEP	South of SR 74, East of US 42, West of SR 31	73,239
Don Pedro Island State Park	State/ DEP	Don Pedro Island	252
Stump Pass Beach State Park	State/ DEP	Manasota Key	254
Prairie Shell Creek Recreation Area	State/ Southwest Florida Water Management District	West of Duncan Road, East of Charlotte Harbor	609
Island Bay National Wildlife Refuge	Federal/Fish and Wildlife Service	Cape Haze	20
TOTAL ACREAGE			174,109

Source: Charlotte County Growth Management Department with reference to State information

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

The bulk of this tract was purchased from the Babcock Florida Company in 1941 using Pittman-Robertson funds (Federal Aid Project) and later named in honor of Cecil M. Webb who served as Commissioner of the Florida Game and Fresh Water Fish Commission, the predecessor

agency of the Florida Fish and Wildlife Conservation Commission, from 1948 to 1953. In 1995, Fred C. Babcock's name was added to the management area in recognition of Mr. Babcock's long-standing, cooperative relationship with the FFWCC. Surrounded by residential development, citrus groves, and improved pasture, Babcock-Webb is among the last undeveloped expanses of hydric (wet) pine flatwoods in southwest Florida. The dominant mix of habitats is slash pine flatwood interspersed with wet prairies, marshes and sloughs. Improved pasture, dry prairie, mesic hammocks, and cabbage palm hammocks are also common habitats within the Webb area. A controlled burning program serves to maintain desirable habitat conditions and to support diverse plant and wildlife populations. The Webb provides critical habitat for several threatened and endangered species, including the red-cockaded woodpecker and the sandhill crane, and may one day be incorporated into the recovery plan for the Florida panther.

Charlotte Harbor Flatwoods (Yucca Pen Unit of the Webb)

In early 1995, the Division of State Lands acquired the first 3,500 acres at a cost of approximately \$8.25 million. Due to its size and location (situated between Punta Gorda and Cape Coral), the Charlotte Harbor Flatwoods serves as an urban sprawl stopper. The Flatwoods is managed by the FFWCC as an addition to the Fred C. Babcock-Cecil M. Webb Wildlife Management Area to which it is adjacent. In fact, the Flatwoods' "official" name is the "Yucca Pen Cypress Unit of the Fred C. Babcock-Cecil M. Webb Wildlife Management Area".

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

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

Charlotte Harbor Preserve State Park

The Charlotte Harbor Preserve State Park forms a protective ring of State-owned lands around Charlotte Harbor which extends from Matlacha Pass (in Lee County) along the eastern, western, and northern shore lines of the Harbor, down to the southern tip of the Cape Haze Peninsula. The lands included within the preserve were purchased by the State of Florida through the Environmentally Endangered Lands (EEL) and Conservation and Recreation Lands (CARL) programs. As its name implies, one of the Charlotte Harbor Preserve's main functions is to protect Charlotte Harbor against anthropogenic impacts, most particularly those associated with development activities.

The Charlotte Harbor Environmental Center (CHEC), Inc., a public/private, not-for-profit organization operates a 20-acre complex within the Preserve south of Punta Gorda and west of Burnt Store Road. Facilities at the CHEC site include an environmental museum, classrooms, activities shelter, meeting room, and offices. The park also has a lengthy trail system offering access to various habitat types. This excellent facility serves the residents of the County by promoting environmental awareness, providing education programs, bird watching and photography, as well as helping preserve a significant stand of native habitat.

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

Babcock Ranch Preserve

The Babcock Florida Company owned and managed the Crescent B Ranch (a.k.a. Babcock Ranch) up until 2006, when the state purchased 73,239 acres of the entire 91,361 acres. The remainder of the lands in Charlotte County (some occur in Lee County) have been granted development rights through the Development of Regional Impact process and amendments to the County's comprehensive plan and Land Development Regulations. This development is called the Babcock Ranch Community.

The preserve is not strictly managed as a preservation area; traditional agricultural and hunting activities continue. The ranch 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. The ranch contains Telegraph Cypress Swamp, over 7,000 acres of contiguous swamp and marsh habitats which drain generally southward, eventually into the Caloosahatchee River.

Don Pedro Island State Park

Acquired by the State of Florida through the Save Our Coast (SOC) program, Don Pedro Island State Park encompasses approximately 250 acres of the Don Pedro Island chain, just north of Little Gasparilla Island. Habitats within the state park include coastal strand, beach, tidal lagoon and fringing mangrove swamp habitats. Charlotte County acquired approximately 30 additional acres which lie immediately adjacent to the Park on its north side. The same floral and faunal species which utilize Stump Pass Beach Recreation Area are also known to occur on Don Pedro Island, including nesting sea turtles. Because the property is not subject to residential development, the problems of beachfront lighting effecting turtle nesting and hatching are substantially reduced.

Stump Pass Beach State Park

Commonly referred to as “Stump Pass Beach”, this 250 acre tract was acquired by the State in 1971 and encompasses the southern tip of Manasota Key, and includes Peterson and Whiddon Islands which lie immediately east of the recreation area within the Lemon Bay Aquatic Preserve. The State Park is bounded by Lemon Bay on the east, privately-owned, developed property on the north, the Gulf of Mexico to the west, and Stump Pass to the south. Though the dominant habitat found within the park may be described as coastal strand, a serious infestation of exotic species (notably Australian Pine) has somewhat degraded the natural value of the area. Other habitats found within the Recreation Area include a mangrove fringe which occurs along the Lemon Bay side of the property, and dune and beach areas on the Gulf side.

Stump Pass Beach State Park provides habitat for a number of listed species, including marine turtles which heavily utilize the area during nesting season. Because the property is in public ownership and not developed, the problem of beachfront lighting commonly associated with Gulf-front development (known to cause disorientation in turtle hatchlings and to discourage female turtles from nesting), is significantly reduced for this segment of Charlotte County’s barrier island chain. Other species which utilize the recreation area include migratory shorebirds, wading birds, raccoons, osprey, and a number of others. The waters of Lemon Bay, to which the park is adjacent, are utilized by West Indian manatees. The subject property’s public ownership helps reduce potential impacts to the manatee population by precluding development which results in loss of seagrass habitat (see discussion of seagrass habitats, below) as well as direct mortality due to boats and water craft.

Prairie Shell Creek Recreation Area

The Southwest Florida Water Management District purchased 609 acres of land adjacent to the Peace River through the Save Our Rivers program. There are remaining tracts of land that are targeted for acquisition should the funds become available and willing sellers be found. The corridor bordering Shell and Prairie Creeks is characterized by a variety of habitat types, including willow and cypress strands, cabbage palm and oak hammocks, and, in the Washington Loop Road area (C.R. 764), by scrub communities including sand pine scrub, and

oak/hickory scrub. In addition to this area's importance as wildlife habitat and potential function as a wildlife corridor, the Prairie Creek and Shell Creek drainage systems provides the primary source of potable water for the City of Punta Gorda as well as much of unincorporated Charlotte County south of the Peace River. Notwithstanding the Watershed Overlay District, this important water supply would be better protected by maintaining the upland and wetland habitats which surround these creeks in a natural condition.

Island Bay National Wildlife Refuge

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

Issues and Concerns: Management of the state parks, preserves and wildlife management areas is essentially outside the County's ability to direct, although the County can involve itself during updates to park management plans and County permits are still needed for any structures built on park lands. Conflicts between the County and State have not been an issue, although recently there has been a desire expressed by the commissioners for greater public access to be allowed to these areas.

Concerns for these areas are the anthropogenic impacts from development on adjacent properties. Such development can introduce exotic wildlife (snakes, lizards, parrots) and plants that migrate onto the natural preserves. Development can change drainage and flowways, either redirecting them or blocking them, so that the hydrology of these lands is changed. This has occurred in a large measure on the Webb where development along the Lee-Charlotte County line has created a barrier to sheet flow. Water backs up on the Webb in larger quantities than occurred in historic times. Also, management actions, most particularly prescribed burning is much more difficult to undertake when the consequences of any loss of control of the burn could result in loss of residential structures. Scheduling the burns so that smoke issues are minimized is also a challenge.

LAND USE DESIGNATIONS

The Resource Conservation and Preservation Future Land Use Map (FLUM) designations are used to indicate property set aside for the protection of natural resources. The Parks and Recreation FLUM is also used but these properties usually contain more active, facility based uses. These designations are defined in Appendix I: Land Use Guide. Except for Parks and Recreation, these designations each allow residential uses at very low densities, one unit per forty acres. The majority of lands that these designations are placed over are public lands, but

some private lands are also designated. In order to more clearly define what is already preserved for the public, a Public Conservation Overlay has been depicted on the Future Land Use Map. This overlay is strictly for illustrative purposes.

Within the Land Development Regulations, the Environmentally Sensitive Zoning district is used for preservation lands.

PRESERVATION OF NATURAL RESOURCES

NATURAL RESERVE DESIGN

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

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

A possible solution to this problem is to establish linkages between natural or semi-natural lands in order to provide greater rates of genetic exchange between populations. With proper

management, these linkages are likely to increase fitness and potential for long-term survivability; provide avenues for escape from fire or other catastrophic events; facilitates recolonization following local extinctions; and provides access to a greater variety of habitats. This ultimately increases native species diversity.

WILDLIFE CORRIDORS

The County has acknowledged the importance of creating inter- and intra-County wildlife corridors. The benefits of these corridors were discussed above. FLU Objective 2.2 and ENV Objective 2.2, and associated policies, direct the County's future course toward protecting critical linkages. The County has identified critical wildlife corridors in the County's east, rural area. This is adopted as FLUM Series Map #22. On the map, Critical Wildlife Corridor Linkages, properties that form linkages between existing preservation areas, are identified. These properties are given the opportunity to develop as Conservation Subdivisions and develop a gross density of one unit per five acres in return for preserving wildlife corridors. These preserved areas may be centered on linkages of convenience, such as abandoned railroad rights-of-way, public easements, or natural connections, such as forested riparian corridors. The creation of wildlife corridors will be further pursued to include the entire County in future years. Even within the Urban Service Area, it is important to provide corridors between riparian ways and existing parks and recreation and preserve lands.

Identification is a critical step in this protection. There are many useful resources available to help the County identify important natural resources. There is the [Century Commission's Critical Land and Waters Identification Project \(CLIP\)](#), the [Cooperative Conservation Blueprint](#) being created by Florida's Wildlife Legacy Initiative, FLUCCS and FNAI data, soils maps, topographic maps and others. The [Babcock Ranch Steering Committee](#), a group formed after Kitson and Partners (Babcock Ranch Community) settled a challenge to their development proposal by the Sierra Club, is undertaking the identification of critical corridors in East County. This will be the culmination of their efforts to find solutions to mitigate impacts that the Babcock Ranch Community may have on natural resources within the region.

Subsequent to the identification of these corridors, the County must seek the means to encourage property owners to place the land in a protected status. While acquisition programs do exist, fiscal restrictions encourage the use of methods other than the purchase of property.

Open Space Requirements

An open space set-aside is a requirement for some development forms described within the Future Land Use element. If these development forms are utilized, the requirements will help preserve larger tracts of habitat without the need for purchase of the property.

- Within the Burnt Store Overlay District, there is a 20 percent set-aside requirement for properties developing under the Village Residential or Limited Development FLUM

designations. Recent development proposals within this area have encompassed the spirit of the requirement, which is to provide unbroken expanses of natural habitat. With the increased emphasis on wildlife corridor development, the County will need to be more vigilant in requesting that preserved areas link up with those of adjacent developments and public park and wildlife management lands.

- Within the Babcock Ranch Overlay District, there is a 55 percent set-aside requirement.
- The Rural Settlement Area Overlay District requires a set-aside of 50 percent open space.
- Within the Agriculture FLUM designation a Conservation Subdivision is allowed as by-right development. This development form requires clustering of development and a set-aside of at least 70 percent open space.
- Within the Rural Community FLUM designation there is a 50 percent set-aside requirement.

Transfer of Density Units (TDU) Program

Since 2004, the County's TDU program has been used to place some significant tracts of land under conservation easement. A component of the program is that the landowner can retain title to the land and restrict public access, or they may donate it to the County or non-profit environmental agency. Lands that have been placed under a conservation easement or restrictive covenant contain scrub-jay habitat and wetlands.

With the adoption of this comprehensive plan, the County will initiate a review and revision of the TDU code. As has been indicated in policies within the Future Land Use element and the Natural Resources element, incentives in the form of density bonuses for the protection and management of important natural resources will be considered.

OBTAINING DEVELOPMENT APPROVALS

The County's review and approval is required for all development except agriculture. Policies within the Natural Resources element strengthen the County's role in the protection of natural resources during the process of permitting structures and analyzing new uses. Policies under ENV Objective 2.2 and ENV Objective 3.1 outline the manner in which the County will address development impacts on important natural resources. These policies require the following measures:

- New development adjacent to preserved lands must provide an analysis of how the development may impact the natural resources of the protected lands and how those impacts may be mitigated; the County can require site plan changes and other items to ensure protection of the adjacent lands.
- Land use changes may be denied if the change could be harmful to natural resources.

- Utilizing the requirements of the existing Open Space/Habitat Reservation Land Development code, imperiled or rare communities located on developing property must be preserved.

For wetlands in particular, the following measures are specified:

- New industrial and commercial intensive designations within 200 feet of Category I and II wetlands may be denied unless no adverse impacts can be proven.
- New lots and parcels must contain adequate buildable lands to support the least intensive use under the land use designation(s) or the creation of that lot or parcel will be denied.
- Development permits can be denied if the County disapproves of impacts to wetlands regardless of authorizations given by other permitting agencies.

HABITAT ACQUISITION AND PRESERVATION PROGRAMS

Essentially all of the publicly owned natural lands in Charlotte County have been acquired by State or federally funded programs such as Conservation and Recreational Lands, Save Our Rivers, or Florida Communities Trust. The Florida Forever Program (previously Preservation 2000), the State of Florida's land acquisition funding legislation, provides the majority of the funds for these programs. Charlotte County has and continues to actively pursue funding from these and other sources for the purchase of vital natural habitats ranging from barrier island beaches to pine flatwoods. The State also continues to purchase land within the County. With the purchase of the Babcock Ranch, thirty-eight percent of Charlotte County is conservation land. Charlotte County owns approximately one percent of the total conservation land, while the State owns the remainder.

County Preservation Programs

Beginning in fiscal year 1991, the Board of County Commissioners established the Land Acquisition Trust Fund to provide money for the acquisition of environmentally sensitive properties. This fund, which is based on an assessment of .05 mills, annually generated approximately \$600,000. Also in 1991, to aid staff in identifying properties suitable for acquisition and to help gain access to State and Federal funding sources, the Board of County Commissioners established the *Environmental Lands Acquisition Advisory Council* (ELAAC). The 17 member council consisted of representatives from civic and environmental organizations, the agricultural industry, and both Chambers of Commerce (Charlotte County and Englewood). ELAAC is responsible for proposing the purchase of Tippecanoe Environmental Park, Amberjack Environmental Park, Amberjack Scrub, Don Pedro Island, and the Fairway Woodlands. ELAAC met its original goal of identifying potential properties for acquisition and identified potential funding sources, and was disbanded in September 2006.

In November 2006, the voters approved the Charlotte Conservation Land Acquisition Program which imposes .20 mil ad valorem tax for 20 years. With the approval of the land acquisition referendum, the Conservation Charlotte program was created. Also created, through Board of County Commissioner's action, was the Environmentally Sensitive Oversight Committee (ESLOC), and the acquisition selection process criteria.

In 2007, Charlotte County bonded \$51,000,000 to begin acquiring environmentally sensitive lands. Staff worked diligently with ESLOC to identify key wildlife connection corridors using data collected by the former ELAAC, and various data layers from the Florida Fish and Wildlife Conservation Commission, South West Florida Water Management District, South West Florida Feasibility Study, and the Charlotte Harbor National Estuary Program. ESLOC reviewed many submitted properties from willing sellers through the established selection process and made several recommendations to the Board of County Commissioners to begin the appraisal and negotiation process. Although more properties were submitted to the Conservation Charlotte Land Acquisition Program than funding could acquire, ESLOC made key recommendations to the commissioners.

As of 2008, \$47,000,000 has been allocated to the purchase of five properties with outstanding environmental value in different geographical areas of the County. The properties that have been purchased include Buck Creek Preserve, Deep Creek Property, Prairie Creek Preserve, Shell Creek Preserve and Thornton Key Preserve. The Board of County Commissioners approved Ordinance 2009-029 that provides protection measures for the Conservation Charlotte properties. In 2008, the County received forty percent reimbursement from the Florida Communities Trust for the purchase of the Buck Creek Preserve. The County also submitted a Florida Communities Trust grant for forty percent reimbursement for Thornton Key Preserve. Unfortunately, the Florida Legislature did not fund the very successful Florida Forever Program in 2009, and it is not expected to be funded in 2010.

Due to the economic down turn since the last land purchase, reduced tax revenues have diminished our original bonding capacity of \$77,000,000. As the economy improves, Conservation Charlotte may receive the original projected revenues. As it stands with the Program's current bond, the Program may have an estimated \$5,000,000 for future land acquisitions.

MITIGATION BANKS

A mitigation bank is an operation in which wetlands, uplands and other aquatic resources are restored, created, enhanced, or preserved by a mitigation bank operator for the purpose of providing compensatory mitigation for disturbance to freshwater wetlands, uplands or State open waters.

Because the County does not contain any mitigation banks, developments mitigate for ecological impacts in other counties throughout Southwest Florida. The cumulative effects of

mitigating impacts to County resources in other areas in the region can be significant; this is especially apparent when wetland impacts are being mitigated down stream. The County is experiencing a net loss of wetland resources.

Although the Florida scrub-jay Habitat Conservation Plan, if approved, will also address other endemic species, it will not address all species on a County-wide basis. Local mitigation banks for other upland species should also be created. For example, gopher tortoise relocation property must be certified by the FFWCC. At this time, there is no certified property within the County and this natural resource is being relocated to other counties.

ENV Policy 2.3.7 states that the County will pursue the establishment of local mitigation banks. One means to do this is to identify appropriate County-owned lands and certify them as mitigation banks or relocation areas. As well as ensuring that the County's natural resources remain within the County, this would also provide a revenue stream that would be used to manage the properties and maintain them as prime habitats.

HABITAT CONSERVATION PLAN

Charlotte County is undertaking the process of creating a Florida Scrub-Jay Habitat Conservation Plan (Charlotte County HCP). It is a County-wide effort to resolve conflict between development and conservation of the federally and state listed threatened Florida Scrub-Jay (*Aphelocoma coerulescens*). The Charlotte County HCP will also help address many Smart Charlotte 2050 Goals, Policies, and Objectives by preserving, restoring and managing Florida scrub-jay habitat.

The BCC is seeking an Incidental Take Permit (ITP) from the USFWS pursuant to section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973, as amended. The BCC is requesting that the authorize, for a period of 60 years, the take of the threatened Florida Scrub-Jay incidental to development within Charlotte County, excluding the City of Punta Gorda. Further information on this process can be found at the following website.

<http://www.charlotteCountyfl.com/EnvironmentalServices/naturalresources/ScrubJays/>

ALTERNATIVE METHODS OF LAND PRESERVATION

Payment and Credit Programs

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

- cost-sharing for management activities;
- one-time, lump sum payments for habitat set-asides which are typically placed under some form of easement to a qualified entity;

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

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

Land Management Techniques

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

CONCLUSION

The County has and continues to take steps to protect certain species and their habitats. The state and many counties have realized that protection and proper management of large tracts of land not only protect rare species, but indirectly benefit the public interest in that they provide opportunities for recreation (hiking, biking, horseback riding, nature appreciation) and environmental education. These green spaces, when protected through a thoughtful process that balances acquisition and regulation, serve the interests of the community at large. Protection of habitats used by our most imperiled species also benefits the public by inserting green space into urbanized areas, providing access to larger tracts of land, increasing property values, (e.g., lots on preservation), and reducing the burden on County infrastructure by reducing densities in fringe locations. Finally, wildlife habitat protection compliments the County's commitment to wetland and water protection.