INTRODUCTION

The purpose of the Conservation component of the Conservation and Coastal Management Element is to promote the conservation and protection of natural resources and appropriate uses in and around these resources. The Element identifies and analyzes natural resources in Fernandina Beach. "Natural resources" includes environmentally sensitive land, rivers, lakes, wetlands, floodplains, groundwater, fish and wildlife including endangered and threatened species, vegetation and trees, and air quality.

The data and analysis addresses natural resources in the City and in Nassau County, including surface water resources (lakes, rivers, etc.) and their quality, groundwater resources (aquifers, water use, recharge areas, cones of influence, etc), wetlands, floodplains, wildlife, vegetation and trees, environmentally sensitive lands, and air quality, as well as hazardous waste management. Each section is followed by an analysis of any issues related to the preservation, management, and use of these natural resources. The goals, objectives, and policies in the Conservation and Coastal Management Element are the means by which any needs identified in the data and analysis are implemented, with the overall goal being to conserve and protect the natural resources of the City and to maintain an acceptable quality of life for its citizens and visitors.

The purpose of the Coastal Management component of the Conservation and Coastal Management Element is to provide for the responsible use and management of coastal resources related to development activities, protection of human life, the limitation of public expenditures in areas subject to natural disaster and protection of wildlife and natural habitat. Policies focus on the proper use and management of the City's coastal resources such as beaches, estuarine marshes and coastal waters, which are key to major components of the City's economy, especially tourism and commercial fishing.

Coastal Management policies were developed from an analysis of various factors and conditions affecting the coastal areas of the City. The evaluation included review and analysis of conditions related to existing land uses, the economic base of the coastal area, the effects of future land use on coastal resources, estuarine pollution, beach and dune systems, public access, hurricane evacuation, coastal high-hazard areas, post-disaster redevelopment, and the City's working waterfront heritage.

It is the intent of the City to promote the responsible management of its coastal area, and to balance the provision of water-related recreational activities and the protection of working commercial waterfronts with the preservation of coastal and natural resources. The proper management and use of this area is necessary for the protection of life and property from natural disasters as well as the conservation of natural resources.

EXISTING REGULATORY FRAMEWORK

Federal

The Federal Coastal Management Program is based on the Coastal Zone Management Act (CZMA) of 1972 that authorizes a Federal Grant-in-Aid program to be administered by the National Oceanic and Atmospheric Administration (NOAA) through its Office of Coastal Zone Management (OCZM). The CZMA affirms a national interest in the effective protection and careful development of the coastal zone by providing assistance and encouragement to coastal states to develop and implement management programs for their coastal areas.

The CZMA provides broad guidelines and basic requirements to direct the development of state and local coastal management programs. Financial assistance grants under Section 305, program development, and Section 306, program implementation, are authorized by the CZMA to provide coastal states with the means for achieving these objectives.

The U.S. Army Corps of Engineers (USACE) has traditionally permitted and regulated dredge and fill activities in navigable waters of the United States. Section 404 of the Federal Water Pollution Control Act (1972 amendments) extended the jurisdiction to not only include navigable waters, but also artificially-created channels and tributaries connected to navigable waters. This amended act also includes dredge and fill operations in wetlands and areas adjacent to navigable waters.

Other federal environmental laws that may be applicable to conservation and coastal management are the Endangered Species Act (ESA), the National Environmental Policy Act (NEPA), the Clean Air Act (CAA), the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the National Forest Management Act (NFMA), and the National Marine Sanctuaries Act.

State and Regional

The Florida Coastal Management Program is based on existing statutes and regulations as required by the Florida Coastal Management Act of 1978 (Chapter 380, F.S., Part II). The laws and statutes apply statewide; therefore, the boundary of the Florida Coastal Management Program is the entire state, including the territorial sea. Based on the authority of the Florida Coastal Management Act of 1978, the Department of Environmental Protection (DEP) has compiled a program of policies codified under the Florida Statutes.

The Coastal Zone Protection Act of 1985 established a statewide coastal building zone within which certain construction requirements are to be applied. Modifications to make the law more functional were accomplished by the 1986 revision to the Coastal Zone

Protection Act of 1985. The 1986 Legislature also provided the means for a coastal construction education program. The program is to include the development of a coastal construction training manual and an inspection manual for coastal building inspectors. A Model Coastal Construction Code has been prepared by a special working group of construction industry professionals and government representatives in order to help local governments implement the Coastal Zone Protection Act.

In 1986, the Florida Legislature adopted a position of protecting and restoring the state's beaches through a comprehensive beach management planning program. Under the program, DEP's Bureau of Beaches and Coastal Systems evaluates beach erosion problems throughout the state seeking viable solutions. The primary vehicle for implementing the beach management planning recommendations is the Florida Beach Erosion Control Program, which is a program established for the purpose of working in concert with local, state and federal governmental entities to achieve the protection, preservation and restoration of the coastal sandy beach resources of the state. Under the program, financial assistance in an amount up to 50 percent of project costs is available to Florida's City and municipal governments, community development districts, or special taxing districts for shore protection and preservation activities located on the Gulf of Mexico, Atlantic Ocean, or Straits of Florida.

State regulatory agencies such as the Department of Environmental Protection (DEP) and the Florida Fish and Wildlife Conservation Commission (FWCC) have authority over various state resources such as wetlands, air quality, water quality, ocean policy, aquatic preserves, energy conservation, and wildlife. The state coordinates state-wide environmental permitting, in addition to offering educational programming and technical assistance. The Florida Division of Emergency Management coordinates state-wide disaster preparedness, disaster mitigation, and post-disaster assistance.

The St. Johns River Water Management District (SJRWMD) is primarily responsible for controlling stormwater runoff on a regional basis with independent drainage districts managing runoff on a sub-regional basis. The Water Management District also educates the public about water conservation, sets rules for water use, conducts research, collects data, buys and manages land, restores and protects water above and below the ground, and preserves natural areas.

The Florida Inland Navigation District (FIND) is a special state taxing district for the continued management and maintenance of the Atlantic Intracoastal Waterway. In this capacity, the District provides all lands required for the navigation project, including rights of way and lands for the management of dredged materials removed from the waterway channel during dredging activities. Funding assistance is provided to other governments within the District to develop waterway improvement projects such as access channels, boat ramps, public marinas, fishing piers, boardwalks, waterfront parks, environmental enhancement/restoration, environmental education and boating safety. FIND is responsible for and provides dredge material sites pursuant to 9J-5.006(1)(f)3.

Local

The City works with the DEP regarding regulations and requirements concerning coastal construction. Through the Coastal Upland Protection Zone, which is established in the City's Land Development Code, the City regulates construction within 1000 feet of the Coastal Construction Control Line (CCCL) in order to protect coastal uplands and dune systems.

The City continues to coordinate with other agencies to ensure compliance with National Pollution Discharge Elimination System (NPDES) regulations, and particularly with DEP and the SJRWMD regarding its role in complying with state water quality regulations (Chapter 62-43, F.S.). The City also coordinates with DEP and the FWCC regarding wildlife and listed species. The City partners with the County regarding disaster planning and evacuation, through the Comprehensive Emergency Management Plan (CEMP), the Local Mitigation Strategy (LMS), and the Post-Disaster Redevelopment Plan (PDRP).

Currently, the City's Land Development Code addresses conservation issues including wetlands, natural resources, coastal uplands, endangered or threatened wildlife, and the siting of marina projects and projects involving hazardous waste.

ASSESSMENT OF COASTAL PLANNING

Inventory of Coastal Natural Resources

Barrier Islands

Fernandina Beach is located on the north end of Amelia Island, a barrier island formation within a wide, relatively flat drainage basin. Much of the area consists of low lying transitional lands between high and dry uplands or sand ridges and the estuarine waters. Barrier Islands are vital to lessening the impact of storm surge from hurricanes to adjacent inland areas and can potentially reduce property damage in such inland areas by millions of dollars. The beach dune systems found there are also important to the proper functioning of barrier islands in protecting the inland and coastal residents from such storm surges. As sea turtle nesting grounds, shore bird habitat and foraging areas, and as habitat for a large variety of migratory birds along a renowned migration route, Amelia Island is a critical ecosystem.

Amelia Island is widely recognized as one of the most important and beautiful barrier islands in northeast Florida. The island is the historical center of urban development in Nassau County. It affords enormous recreational, tourism and residential/commercial opportunities, many of which have already been realized. Amelia Island is critical to the economy of Nassau County and its natural resources have undoubtedly contributed enormously to the success of Amelia Island as a tourist destination and desirable community in

which to live. Natural communities found on or in association with Amelia Island include Maritime Hammock, Beach Dune, Coastal Interdunal Swale, Mesic Flatwoods and Estuarine Tidal Marsh.

Beaches and Dunes

The beach/dune and near-shore ecosystem is an integral feature of Fernandina Beach and Amelia Island and is invaluable in providing important recreational, commercial, environmental and storm protection functions. Sand dunes and beaches exist in a constant state of flux due to the forces of wind, waves, and currents. Areas surrounding inlets are particularly susceptible to drastic changes and variable conditions. The City is located along the Cumberland Sound inlet, which separates Amelia Island from Cumberland Island, Georgia.

The shoreline of Georgia and Northeast Florida has experienced significant changes in position and volume over the past 150 years. Dramatic changes occurred as the result of the building of the St. Mary's River and St. Johns River jetties in the late 1800s. While the construction of the jetties at the mouth of the St. Johns and St. Mary's harbor was a localized event, the changes in erosion and accretion rates on islands to the south and north have been significant as a result.

Construction along much of the beach is regulated by DEP. Any construction seaward of the Coastal Construction Control Line (CCCL) must be permitted by DEP prior to initiating construction through the City permitting process. The City protects land 1,000 feet west of the CCCL through the Coastal Upland Protection Zone (CUPZ). Regulations for this zone are designed to prohibit certain activities that may adversely impact the contours, topography, flora and fauna of this coastal area. It is recommended that in order to further protect the area, the City consider requirements to elevate structures on piers or pilings to further reduce impacts to the natural topography and eliminate the use of filling or grading lots in this area. The City also does not currently have a local protective mechanism for the land eastward of the CCCL, but defers to DEP's permitting system. It is recommended that the City evaluate protective strategies similar to the CUPZ for this region as well.

Estuarine Tidal Marsh/Wetlands

The Estuarine Tidal Marsh ecosystem dominates a very large proportion of the area lying west of Amelia Island, and formed by the confluence of the combined St. Mary's, Nassau and Amelia rivers. These ecosystems are not only extensive, but are very well-developed and exhibit characteristics indicative of very high quality examples of this system type. This vast estuarine system is one of the most ecologically and economically significant along Florida's northeastern coast. Areas along Egans Creek and the Egans Creek Greenway within the City are also estuarine tidal marsh. The Creek has an increasing amount of salination, due to increased infiltration of salt water from the ocean. The City has been coordinating with the Florida Department of Transportation (FDOT) to work on strategies to reduce this salination, which is impacting the ecosystem. The City shall continue this coordination to restore the balance to the Creek.

Dominant species in the Estuarine Tidal Marsh ecosystem include smooth cordgrass (Spartina alterniflora) in what are often termed "low marsh" areas and black needle rush (Juncus roemerianus) and sawgrass (Cladium jamaicense) in what are often termed "high marsh" areas. Interspersed among these brackish water marsh systems are various small islands of what might be termed "Coastal Flatwoods" – a variant of Wet Flatwoods with some maritime influence and a conspicuous understory of cabbage palms and southern red cedar (Juniperus silicicola).

This ecosystem is highly significant as a nursery for many game and commercial fish species, important and economically valuable for hundreds of invertebrate species and as prime feeding grounds for a variety of birds, some of them rare and endangered. Although somewhat protected through regulatory means, the long-term conservation of this ecosystem is not strictly assured.

Tidal marshes have many recreational and economic benefits, both direct and indirect in terms of the ecosystem services they provide. Ecosystem services reference the quantifiable value of natural system functions. Marshes provide tremendous economic benefits in terms of natural flood control, a vast commercial and sport fisheries nursery ground (including shell fish), a migratory bird route and birdwatching location, barriers against hurricane and other storm surges, protection of land from erosion, a carbon dioxide sink, wildlife habitat, and canoe and kayak trails.

Wetland protection was identified as a Major Issue in the City's 2009 Evaluation and Appraisal Report. The 2006 City Comprehensive Plan states that no development shall be permitted in wetlands and that the City shall protect wetlands from physical or hydrologic alterations. Language in the LDC enforces these policies, but property owners may apply for a variance to these requirements and may receive a variance which would allow alteration of, and permit development in wetlands. The Plan sets forth objectives and policies regarding the protection and regulation of wetlands, but it does not address mitigation of impacts other than to say that the impacts shall be mitigated according to the rules and regulations of the Florida Department of Environmental Protection (FDEP) and the St. Johns River Water Management District (SJRWMD). The SJRWMD and the FDEP jointly administer the Environmental Resource Permitting (ERP) program regulating activities that alter the landscape and disrupt water flow to wetlands and surface waters. Mitigation is typically encouraged to occur on-site or in close proximity to the impacted wetland; however, the mitigation of wetlands impacted within the City limits can be completed outside of the City limits, and may even occur in a different county. In the past five (5) years, the City has received four (4) applications requesting a variance to fill wetlands. Of these, two (2) were denied based on their natural function as a jurisdictional wetland and two (2) were approved because it was determined that they were isolated artificial wetlands that did not operate as part of an overall wetlands system.

Today, the City of Fernandina Beach contains a limited amount of vacant developable land, roughly 6% of its total land area. Of the remaining vacant developable lands, 444 acres contain wetlands and only 16 of these acres hold a Conservation land use category. With nearly 10% of the available vacant lands containing wetlands, it has become even more important that the City evaluate its wetland protection measures and decide if strengthened regulations are needed.

In previous decades the City has faced heightened development pressures. In order to protect its wetlands during this period of growth, the City implemented strategies that directed development away from its native wetland systems by purchasing its most environmentally sensitive properties. The community demonstrated its commitment in 2001 when it voted to support a bond referendum that included funding to finance purchases of environmentally sensitive properties along Egans Creek to create a greenway.

The City has further preserved and prevented impacts to existing wetlands through regulations contained in both the City's Plan and LDC. The Plan's Coastal and Conservation Element sets forth policies that outline how the City can preserve environmentally sensitive properties. Alternatives to land purchases, like transfer of development rights, conservation dedications, conservation easements and land donations, are all options that the City is encouraged to evaluate in order to determine their feasibility.

The City obtains its wetlands mapping overlay through the National Wetlands Inventory (NWI). NWI data was published in 2002. It is maintained by the SJRWMD and serves as the City's "best available data" for purposes of identifying wetland areas. Wetlands and vegetation data mapping projects for this region started in 1984 and were completed for roughly 70% of the SJRWMD's area. The remaining areas were mapped and published in 2002. The NWI dataset is for general reference only and not for legal purposes. Accurate information related to on-site wetlands can only be obtained through wetland delineation as provided by a property owner on a survey.

In its GIS mapping of wetlands, the City also uses information obtained from the SJRWMD. The attribute data contained in the associated database requires field level site surveying to determine the accuracy of the data and extent of on-site wetlands. An option to strengthen the City's existing wetlands regulations may include the assignment of the Conservation Future Land Use category to them. There are potential consequences of incorporating this as a strategy that must be taken into consideration. One consequence is that this approach may significantly alter development potential on individual properties containing wetlands. Another mapping option is using a floating designation to represent wetlands on the Future land Use Map. When field level site surveying isn't available to represent the exact location of wetlands, a floating wetlands designation would represent the general area in which wetlands are located.

ASSESSMENT OF COASTAL HIGH HAZARD AREA

Hurricane events have a high probability of occurrence in this region and can have a major impact on the City. As a coastal community located on a barrier island, the entire City is highly susceptible to wind and surge damage from hurricanes. Prior hurricanes in 1898 and 1964 did significant damage to the community.

Coastal High Hazard Area (CHHA)

The Coastal High Hazard Area (CHHA), which is contained in ***Appendix A*** mapping series, is defined in Sec. 163.3178(2) (h), Florida Statutes as the area below the elevation of the category 1 storm surge line as established by a Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computerized storm surge model as established in the Northeast Florida regional hurricane evacuation study (HES).

There are several characteristics which may, either individually or collectively, make an area considered a high hazard area for tropical cyclones. These include: proximity to large bodies of water; the location of the property in relation to shifting channels; and, the height of land in comparison to adjacent water bodies and tracts of land.

Future Land Uses in Coastal Hazard Areas

A GIS analysis was performed to identify the acreage by future land use classifications in coastal hazard areas, as indicated in Table CCM-1.

Table CCM-1 Acreage of 2011 Future Land Use Categories in Coastal Hazard Areas

Future Land Use Category	Total Category Acreage	Acreage within CHHA	% LU Area within CHHA
Conservation	1121.223	863.81	77%
General Commercial	271.839	0.69	0%
High Density Residential	130.428	1.66	1%
Industrial	1308.79	87.86	7%
Industrial Waterfront	86.1227	50.51	59%
Low Density Residential	1096.129	67.24	6%
Medium Density Residential	633.215	0.95	0%
Recreation	1634.205	116.13	7%
Waterfront Mixed Use	6.70183	3.57	53%
Mixed Use	97.4503	0	0%

Central Business District	42.2034	0	0%
Total Acres within CCHA	6428.30723	1,192.41	19%

Source: Fernandina Beach GIS and SLOSH

Density within the CHHA is limited in the City, except for within the Community Redevelopment Area (CRA). The CRA is primarily made up of the Industrial Waterfront and Waterfront Mixed Use land uses, of which the focus is to encourage development of water-dependent and water-related land uses that reflect the City's working waterfront heritage. The acreage under Low Density Residential includes beachfront property to the mean high water mark.

Existing Infrastructure in Coastal Hazard Areas

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

The entire City's population and urban development in the City are a coastal area, due to the location on a barrier island. Thus, the City's infrastructure occurs within areas vulnerable to hurricane damage from Category 1-3 storms.

Hurricane Evacuation

The current program for planning, managing, and enforcing hurricane evacuations in Fernandina Beach is administered by the Nassau County Department of Emergency Management. The roles and responsibilities of each County department are defined in the Nassau County Comprehensive Emergency Management Plan (CEMP), pursuant to Ch. 252 Florida Statutes. It addresses natural or man-made disasters, emergencies, designation of authority and succession, and empowers the designation of a local state of emergency. Authority for implementation of emergency management procedures is provided in an ordinance adopted by the Board of County Commissioners.

The information in this section is taken largely from the CEMP and the associated Hurricane Evacuation Study (2010) prepared by the Northeast Florida Regional Council.

Hurricane Hazards

Two analytical tools are used to predict potential hazards from hurricanes: SLOSH and TAOS. SLOSH (Sea, Lake, and Overland Surges from Hurricanes) is a computerized model used to predict storm surges, hurricane categories, and depth of flooding. The TAOS (The Arbiter of Storms) model uses a variety of input data to create rainfall predictions and expected damage to structures for various storm events. Additional technical information on the hurricane analysis models can be found in the Hurricane Evacuation Study (2010) prepared by the Northeast Florida Regional Council. The regional report also provides a description of the various hazards from hurricanes including high wind speeds, storm surge on the coastline, and freshwater flooding.

The intensity of a storm is measured by the Saffir-Simpson scale of hurricane intensities, which range from a Category 1 to a Category 5, with Category 5 being the most severe. Tropical storm winds range from 39 to 73 mph. A tropical storm becomes a hurricane when the one-minute average wind speed of 74 mph is reached. Damage from high wind increases exponentially for each storm category. Any hurricane force wind can create a significant amount of structural, agricultural, or projectile damage. Tornadoes are another hazard spawned by high wind conditions.

Storm surge is considered the most destructive of the forces related to hurricanes. The surge is caused by low atmospheric pressure which, when over a large body of water such as the Atlantic Ocean, results in a high dome of wind driven water. This surge of water contains immense, destructive power. At times, the effects of the moving water can be likened to a bulldozer clearing everything in its path. Debris propelled by the storm surge can act as a battering ram destroying objects in its way. The high dome of wind-driven water can be 50 to 100 miles wide, and moves across the coastline generally north of the "eye" as a hurricane makes landfall. Worst-case storm surge heights for Category 1 through Category 5 hurricanes are those approaching 90 degrees relative to the coastline.

Based on past history, beach erosion, usually the result of the stress placed on the shore from the storm surge, is a problem in the Northeast region. In the event of a hurricane either striking or passing near this coast, the potential of beach erosion which can undermine both houses and roads must be seriously considered. It is advisable for all beachfront areas to evacuate in the event of a threat of a hurricane affecting the coast. Effects of beach erosion on coastal roads should also be considered in relation to late evacuations, recovery from storms and in planning future roadways.

Wind is the second ranked of the lethal components of a hurricane's destructive force. Strong winds can be a very dangerous element of a hurricane due to wind-borne debris, from improperly constructed houses or from loose objects, which can result in injury or death. Gale force winds and tornadoes associated with hurricanes are very hazardous to mobile homes. High winds often down power lines and trees thus inhibiting mobility during and after the storm.

Unlike the effects of the storm surge, the high winds associated with a hurricane will have an impact on inland as well as coastal areas. Therefore, inland areas must plan for the impacts of high winds (fallen trees and power lines) on their road system and, perhaps more

importantly, on the health and welfare of their citizens living in mobile homes or in substandard homes which may not be resistant to these high winds.

Rain ranks third in the order of a hurricane's destructive force. During the average 24-hour period that it normally takes a hurricane to pass over an area, an average rainfall of between five and ten inches may occur. Normally, this happens concurrently with the arrival of gale force winds. In Florida, however, there have been hurricane-related rainfalls ranging from 12 to 20 inches. These excessive rains which accompany hurricanes can cause excessive flooding in low lying areas requiring their evacuation. It is very important to consider roads which are rendered impassable during heavy rains and which may affect the evacuation of the vulnerable population.

Hurricane Evacuation Zones
A storm surge model, SLOSH (Sea, Lake and Overland Surges from Hurricanes), was used to predict the magnitude of storm surge for various scenarios of storm strengths and directions. Data from the SLOSH model was used to map storm surge inundation areas. Based on these areas of inundation, evacuation zones were established, the population at risk was determined for various hurricane intensities, and the facilities vulnerable to hurricane related flooding were identified. All of Amelia Island, including the entire City limits, is subject to evacuation as part of Evacuation Zone A.

Hurricane Evacuation Routes
The County Department of Emergency Management has identified several roadways as hurricane evacuation routes. A roadway designated a Hurricane Evacuation Routes has met specific criteria either by design or location. These roadways are protected under F.S. 163.3180(6). ***Appendix A*** contains the City's mapping series and includes the Nassau City hurricane evacuation route network.

With the onset of a storm, there is danger from both surge and freshwater flooding. The City's extensive coastal lowlands create a large area for surge inundation and for a large number of roads that could be affected by surge flooding. Because roadways are the primary method of access for residential evacuation, the elevation of the roads along with the depth of water that can possibly occur is important. This information can provide the emergency manager with a tool to order evacuations in a timely manner. Evacuation routes that will easily deteriorate due to surge or freshwater flooding may be subject to early closures and rerouting.

Fernandina Beach will work with Nassau County and the State of Florida Department of Transportation to maintain the adopted level of service standards for all Strategic Intermodal System (SIS) road facilities that are designated as Hurricane Evacuation Routes. Maintaining road connectivity and traffic flow on Hurricane Evacuation Routes is essential for ensuring evacuation continues as quickly as possible prior a major storm event.

Population Requiring Evacuation
In the Hurricane Evacuation Study (2010), census data on population and housing were used in conjunction with Geographic Information Systems (GIS) to map the location of the population at risk. Table CCM-2 shows a summary the data used in the study's calculations.

Table CCM-2 Key Population / Dwelling Unit Summary, Nassau County

Data	City Totals
Year 2010 Estimated Household Population	73,724 people
Occupied site-built homes	27, 862 units
Population in site-built homes	66,184
Occupied mobile homes	4,699 units
Population in mobile homes	7,540
Hotel/motel units	1,699 units
People per permanent unit (2006)	2.83
Vehicles per permanent unit (2006)	1.93

Source: Northeast Florida Hurricane Evacuation Study, 2010.

Using the storm surge model, residents who should evacuate were identified. It is assumed that persons living in areas flooded by storm surge should be evacuated. This includes permanent residents, in single family, multifamily, and mobile home units, as well as, tourists staying in hotels/motels, condominiums, and rental units in storm surge vulnerable areas. In addition, mobile home units living outside the hurricane flooded areas of the City were assumed to evacuate due to high wind vulnerability.

Table CCM-3 shows the vulnerable population estimated to leave for each evacuation area in the Hurricane Evacuation Study (2010). The vulnerable population, or population-at-risk, is defined as the total population living within the county designated evacuation zones for each evacuation level. This population is living in an area that is at risk for severe flooding during a storm event. The number of people involved in an actual evacuation will likely total less than these figures due to the assumed 100 percent participation rate of people from units in storm surge vulnerable areas and mobile homes for each evacuation scenario. Even with door-to-door evacuation notification, it will be difficult to convince all who should leave to do so, even for the most intense storm threats. Participation rates in tropical storm/weak Category 1-2 hurricanes can be quite low even in potential surge areas. Conversely, for higher category storms, continual coverage on local and national television broadcast stations will tend to cause high participation rates from residents that local officials would rather have stay in City, or shelter in place.

Table CCM-3 2010 Vulnerable Population in Evacuation Zone A, Nassau County

	Evacuation Zone A (includes all of Amelia Island)
Site-Built Homes	27,074
Mobile Homes	930

Source: Northeast Florida Hurricane Evacuation Study, 2010.

Table CCM-4 2010 Vulnerable Population by Destination, Nassau County

	Evacuation Zone A (includes all of Amelia Island)
To Friends and Family	16,849
To Hotel/Motel	6,908
To Public Shelter	1,428
To Other Destination	2,819

Source: Northeast Florida Hurricane Evacuation Study, 2010.

Special Needs Population

For purposes of the Comprehensive Plan, the City defines special needs populations as people who feel they cannot comfortably or safely access and use the standard resources offered in disaster preparedness, relief and recovery, and may require assistance before, during, and/or after a disaster or emergency. These people include but are not limited to those who have physical or mental care needs (blind, deaf, hard-of-hearing, cognitive disorders, mobility limitations), limited or non-English speaking, geographically or culturally isolated, medically dependent, chemically dependent, homeless, frail/elderly, and children. Transients or tourists, those without access to vehicles, and people with pets or service animals may also be considered special needs populations.

The Nassau County Department of Emergency Management is responsible for overall direction and control of evacuation procedures and for an orderly, coordinated evacuation for persons with special needs. Specifically, this office provides for the identification, public information, warning, evacuation, sheltering, and recovery operation for people with special needs. To facilitate the evacuation process, a roster of such persons is maintained and assistance is provided with transportation. The City will continue to coordinate with the County regarding special needs population assistance before, during, and after emergencies.

The City has included people with pets and service animals in the definition of special needs population, based on the Pets Evacuation and Transportation Standards Act (PETS) of 2006. This federal law was introduced after Hurricane Katrina to address the needs of those who must evacuate with pets. The PETS Act authorizes the Federal Emergency Management Agency (FEMA) to provide rescue, care, shelter, and essential needs for individuals with household pets and service animals, and to the household pets and animals themselves following a major disaster or emergency. State and local governments are required to take the needs of those with pets or service animals into account before, during, and after a disaster. The City should coordinate with the County's Emergency Management Department to ensure the needs of pet owners are addressed adequately, including providing a shelter that permits pets to accompany owners. The City's animal shelter should also coordinate with the County's animal shelter, or animal shelters outside the County, to transfer animals off the island during an emergency.

Public Shelter Capacity

One crucial aspect of hurricane evacuation planning involves the coordination of public shelter locations and capacity to meet the shelter demand of evacuees in any given storm plan. Table CCM-4 above shows potential public shelter demands and reported capacities at each shelter. Public shelters are not permitted on Amelia Island, because of the requirements for evacuation. City residents needing shelter must evacuate off-island. All public shelters in Nassau County are on the mainland.

Normally, public shelter demand generally increases slightly from low to high tourist occupancy for lesser category storms. This demand between low and high tourist occupancy usually remains the same for more intense storms. However, in this region, the level of tourist occupancy is reasonably stable throughout the entire year so the figures provided in this study do not factor in variations in tourist vacancies. Since mobile home residents typically have a higher propensity to use local public shelter space more than other residents, the high mobile home population may increase shelter demand. Growth in special needs and elderly populations could also add to the increased demand in this region.

The emergency shelter inventory for Nassau City is comprised of public schools and other public buildings. Table CCM-5 lists the Nassau County general and special needs shelters. ***Appendix A*** contains a map depicting the location of these shelters.

Table CCM-5 Nassau County Public Shelters 2011.

Name	Address	City	Retro fit (R) or New Const. (N)	ARC 4496 Capacity (persons)	Non- ARC 4496 Capacity (persons)
Callahan Intermediate School	34586 Ball Park Rd	Callahan	R	326	0
Hillard Middle School*	1 Flashes Ave	Hilliard	N	123	0
Hilliard Elementary School	275568 Ohio St	Hilliard	R	326	0
West Nassau High School	1 Warrior Drive	Callahan	N	561	0
Yulee Elementary School**	86063 Felmore Rd	Yulee	N	370	0
Yulee Middle School	85439 Miner Rd	Yulee	N	965	0
Yulee High School	85375 Miner Rd	Yulee	N	1,028	0
Totals				**4,448**	**455**

*Special Needs Shelter
**Pet-Friendly Shelter
Source: Nassau County Emergency Management Department (2011).

Clearance Times
Clearance time is the time required to clear the roadway of all vehicles evacuating in response to a hurricane situation. Clearance time begins when the first evacuating vehicle enters the road network (as defined by a hurricane evacuation behavioral response curve established as part of the Northeast Florida Regional Council study) and ends when the last evacuating vehicle reaches an assumed point of safety.

Clearance time includes:
- Mobilization Time - the time required by evacuees to prepare for evacuation and enter the road network;
- Travel Time - the time needed to travel along the road network; and
- Queuing Delay Time – the cumulative times for all stops caused by traffic congestion.

Clearance time does not relate to the time any one vehicle spends traveling on the road network and does not include time needed for local officials to assemble and make a decision to evacuate.

Establishing the arrival time of tropical storm force winds within a community determines when an evacuation must be completed. The clearance time added to the tropical storm force arrival time establishes the latest time that local officials must issue an order initiating an evacuation. The general time of day in which the evacuation order must be issued will determine the response curve to be used in choosing a clearance time and whether extra time will be needed in order to complete an evacuation. For instance, if the decision time for issuing an evacuation order generally coincides with the middle of the night or the middle of a working day, a clearance time with a slow response curve may be used in order to allow extra mobilization time (to allow people to wake up, or return from work and school), or travel time (to account for the effects of darkness on driving). Conversely, a clearance time with a fast response may be considered if an evacuation order will occur during a weekend day or before residents have left their households for normal workday activities.

Tables CCM-6 and CCM-7 present the projected hurricane evacuation clearance times and the maximum evacuating population by time interval developed for Nassau for 2010 and 2015 in the Northeast Florida Hurricane Evacuation Study (2010). Clearance time shown was generated on a base scenario. The base scenarios were developed to estimate a series of worst case scenarios and are identical for all eleven Regional Planning Councils (RPC) across the State. These scenarios assume 100 percent of the vulnerable population evacuates and includes impacts from counties outside of the RPC area. These scenarios are generally designed for growth management purposes, in order to ensure that all residents that choose to evacuate during an event are able to do so.

Table CCM-6 Nassau County Clearance Times, Evacuation Zone A, 2010 + 2015

Evacuation Zone A Base Scenario	2010	2015
Clearance Time to Shelter	13.0	14.5
In-County Clearance Time	14.0	14.5
Out of County Clearance Time	16.5	19.5
Regional Clearance Time	17.0	22.5

Source: Northeast Florida Hurricane Evacuation Study (NEFRC) 2010.

Table CCM-7 Nassau County Maximum Evacuating Population by Time Interval, Evacuation Zone A, 2010 + 2015

Evacuation Level A Base Scenario	2010	2015
12-Hour	31,548	29,935
18-Hour	43,378	44,093
24-Hour	N/A	47,767

Source: Northeast Florida Hurricane Evacuation Study (NEFRC) 2010.

SEA LEVEL RISE

The United Nations' Intergovernmental Panel on Climate Change has indicated that climate change, regardless of source, is a reality. According to this Panel, cilmate change is "a change in the state of the climate that can be identified (e.g., using statistical tests) by changes in the mean and/or the variability of tis properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variabiltiy or as a result of human activity." The major aspects of climate change that will potentially affect Florida are increasing greenhouse gases, increasing air temperature and water vapor, increasing ocean temperature, and increasing sea level. Results of these aspects include increased ocean acidification, altered rainfall patterns, increased frequency and intensity of tropical storms and hurricanes, loss of marine life, changes in species and nutrient supply, and increased algal blooms. Potential strategies to addressing climate change include accepting some effects of climate change impacts, mitigating against change, or adapting to the changes.

Increasing sea level can lead to increased stresses on or losses of tidal wetlands, changes to the landforms of estuaries, tidal wetlands, and tidal rivers, increased instability of beaches, barrier islands, and inlets, and increased threats to coastal fresh water supplies. As a community located on a barrier island, the City must take sea-level rise seriously. A rise in sea-level will have impacts on infrastructure, development, community health, and the economy. In the report, *The Effects of Climate Change on Florida's Ocean and Coastal Resources* (2009), the following is stated regarding impacts on barrier islands:

Effect: Changes in Beaches, Barrier Islands, and Inlets

What We Know: Shoreline retreat due to erosion and overwash is occurring now. There is an increase in the formation of barrier island inlets and in island dissection events, in which islands are eroded by wind and waves.
What is Probable: Continued sea-level rise will exacerbate erosion. Barrier islands will continue to erode, migrate landward, and be reduced in elevation. Coastal transportation infrastructure will be affected.
What is Possible: Increased overwash, breaching of coastal roads, and dissection of barrier islands will occur. Low barrier islands will vanish, exposing marshes and estuaries to open coast conditions.

Although estimates of sea-level rise vary greatly, and the most certain aspect is the uncertainty, the reality is that the sea-level is increasing. How much remains to be seen, but the City should begin proactively planning for rising sea-levels. Coordination with the County, state and federal governments should occur to help address how to begin planning for a long-term strategy to accept, mitigate, or adapt to rising sea levels. The City should also prepare for other climate change-related impacts, such as the potential for increased storm activity and intensity, and the impacts on estuarine systems.

POST DISASTER REDEVELOPMENT PLANNING

Local Mitigation Strategy (LMS)

Local mitigation planning forms the foundation for short-term and long-term post-disaster recovery and mitigation activities. In 1998, the State of Florida contracted with and provided funding to each of the counties within Florida to develop a Local Mitigation Strategy (LMS). The LMS represents Nassau County's blueprint for how it intends to reduce the impact of natural hazards on people and the built environment. Fernandina Beach does not have its own LMS, but operates under the County's LMS. The purpose of the LMS is to provide guidance in developing pre- and post-disaster mitigation plans, identifying priority projects and programs for funding, and increasing the likelihood of State and Federal funding for hazard mitigation projects. The essential elements of the LMS include goals and guiding principles, hazard identification and vulnerability assessment, vulnerable properties and estimated losses, mitigation initiatives, projects and potential funding sources.

The Nassau County LMS establishes the following goals:
- Goal 1 – Protect the lives of the citizens of Nassau County
- Goal 2 – Minimize or eliminate damages to personal residences in Nassau County
- Goal 3 – Insure protection of existing infrastructure of Nassau County
- Goal 4 – Protect values and associated economic value of property in Nassau County.

The LMS guiding principles section includes natural hazards mitigation policies from Nassau County's comprehensive plan and local ordinances, which provides for purposeful integration among local planning initiatives to guide post-disaster redevelopment risk reduction and long-term community sustainability.

The LMS provides information needed by the managers and leaders of local government, business and industry, community associations, and other key institutions and organizations to take actions to address vulnerabilities to future disasters. It also provides proposals for specific projects and programs that are needed to eliminate or minimize those vulnerabilities.

These proposals, called "mitigation initiatives" in the LMS, have been justified on the basis of their economic benefits using a uniform technical analysis and prioritized for implementation using objective criteria. This approach is intended to provide a decision tool for the management of participating organizations and agencies regarding why the proposed mitigation initiatives should be implemented, which should be implemented first, and the economic and public welfare benefits of doing so.

There are a number of state and federal grant programs, policies, and regulations that encourage or even mandate local governments to develop and maintain a comprehensive mitigation strategy. This LMS is specifically intended to assist the participating local governments in complying with these requirements, and to enable them to more fully and quickly respond to state and federal funding opportunities for mitigation-related projects. Because the LMS defines, justifies, and prioritizes mitigation initiatives that have been formulated through a technically valid hazard analysis and vulnerability assessment process, the participating organizations are better prepared to more quickly and easily develop the necessary grant application materials for seeking state and federal funding. Programs requiring documentation of an approved local mitigation plan include the following:

Federal Programs:
- Flood Mitigation Assistance Grant
- Pre-Disaster Mitigation Grant
- Hazard Mitigation Grant Program
- Repetitive Flood Claims Grant

State Programs:
- Emergency Management Preparedness and Assistance Trust Fund Competitive Grant
- Florida Communities Trust
- Community Development Block Grant Program
- Residential Construction Mitigation Program

Post-Disaster Redevelopment Plan (PDRP)

All Florida coastal communities are required to develop a Post-Disaster Redevelopment Plan (PDRP) as part of the Local Comprehensive Plan or as a separate document. The PDRP is likened to an umbrella plan that unites growth management and emergency management planning efforts to develop a comprehensive and collaborative PDRP with community stakeholders. The PDRP addresses issues such as: government operations and citizen response, housing and structural repairs, infrastructure and public facility recovery, economic resumption, land use planning and quality of life resiliency.

The Nassau County PDRP was developed as part of a statewide pilot project initiative that was sponsored by the Florida Department of Community Affairs' Division of Community Planning and Division of Emergency Management. The PDRP was developed to provide Nassau County and its jurisdictions with an overarching strategic, interdisciplinary plan for guiding action and decision making during the disaster recovery (1-90 days after the disaster occurs) and redevelopment (90 days or more after the disaster occurs) periods, as well as identifying actions that can be implemented prior to a disaster to expedite the recovery process.

The Nassau County PDRP was developed during May 2008 through June 2009 by the Nassau County PDRP Executive Technical Committee, which was comprised of various County departments, municipalities, businesses, non-governmental organization, regional organizations, and citizens. The PDRP positions Nassau County and its jurisdictions to recover more expeditiously from a disaster, while taking into account opportunities for hazards vulnerability reduction.

Despite commonalities in Nassau County communities, it is recognized that each jurisdiction has its unique features and recovery strategies may slightly vary. The PDRP is intended for use on a County-wide basis. However, local jurisdictions are encouraged to modify the contents as deemed appropriate prior to adoption. Currently, the City of Fernandina Beach has not adopted its own PDRP. The City sent representatives from the Planning Department to be a part of the County's PDRP process and represent City concerns regarding post-disaster redevelopment planning. It is recommended that the City adopt its own plan or implement the County's plan.

Nassau County is vulnerable to various hazards, as it is a coastal community located on the Atlantic Ocean with many rivers, streams, creeks, and marshes spanning from the coast to the inland areas. The highest risk hazards for Nassau County as identified in the County's 2003-2004 Local Mitigation Strategy (LMS) and the 2007 County Comprehensive Emergency Management Plan (CEMP) are hurricane-generated storm surge and high winds, flooding, wildfires, and hazardous materials spills. An assessment of hazardous materials release is not included in the vulnerability assessment for the PDRP, as it would not likely warrant redevelopment.

The purpose of the Post-Disaster Redevelopment Plan (PDRP) is to provide Nassau County and its jurisdictions with an overarching strategic, interdisciplinary plan for guiding action and decision making during the disaster recovery and redevelopment period, as well as identifying actions that can be implemented prior to a disaster to expedite the recovery process. This PDRP establishes a strategy for Nassau County to leverage coordination amongst County departments, municipalities, businesses, non-governmental organizations, and regional organizations to assist in redeveloping after a catastrophic disaster in a proactive and effective manner. The PDRP seeks to utilize redevelopment as an opportunity to build a more sustainable community and maintain or enhance "quality of life," which is often cited by residents as a benefit of living in Nassau County.

This PDRP was developed with the intent to provide cohesive, consistent treatment of redevelopment issues throughout the County. Establishing redevelopment guidelines provides equitable considerations of impact throughout the City, in an objective, rational, and consistent manner. The PDRP serves to facilitate returning Nassau County to pre-disaster conditions when this makes sense or to better position itself to maximize post-disaster opportunities to reduce hazard vulnerability and increase long-term viability of the community.

Implementation of the PDRP

The PDRP provides strategic planning guidance for many aspects of disaster redevelopment in both pre-disaster and post-disaster phases.

The pre-disaster phase includes the development and implementation of policies and procedures to reduce hazard vulnerability and collaborative processes to enhance redevelopment efficiency and effectiveness following a disaster. The pre-disaster actions focus on assessing vulnerability, institutional capacity, intergovernmental and intercommunity coordination; and examining and implementing hazard vulnerability reduction policies and procedures.

The PDRP will be implemented for short-term recovery (1-90 days after the disaster occurs) and long-term redevelopment (90 days or more after the disaster occurs). Short-term recovery includes damage assessment, temporary housing, debris operations; all measures that can impact long-term redevelopment. Long-term redevelopment actions focus on land use planning, infrastructure reconstruction, structural and facility repair, environmental restoration, historic preservation and hazard mitigation.

The decision to activate the PDRP will be made by the Executive Policy Group. The request for activation of the PDRP will be made by the Nassau County Emergency Management Director. This will occur after a declaration of a Local State of Emergency has been made, the Emergency Operation Center (EOC) is activated, and the community has suffered major or catastrophic damages that warrant redevelopment.

Once the PDRP is implemented, members of the Redevelopment Task Force (formerly known as the Executive Technical Committee), will be notified of the PDRP activation. Community stabilization and sustainable development will be a major concern during the shift from emergency response to recovery. The Task Force will serve as an advisory committee to the Nassau City personnel and stakeholders that are responsible for redevelopment activities. The Task Force will brief elected officials and provide recommendations to decision makers based on the PDRP and available resources and opportunities. The Task Force will also coordinate with various local organizations for economic recovery and faith-based organizations for recovery support.

PDRP Recovery and Redevelopment Strategy

The recovery and redevelopment strategy is comprised of a list of the post-disaster redevelopment goals and issues that were identified by the Executive Technical Committee (ETC). The issues were grouped into seven major topics:

1. Damage and Recovery Assessment
2. Government Operations and Citizen Report
3. Housing and Structural repairs
4. Infrastructure and Public Facility Recovery
5. Economic Resumption
6. Land Use and Redevelopment
7. Quality of Life Resiliency

Goal 1: Damage and Recovery Assessment

The County and participating jurisdictions, agencies and organizations shall coordinate with each other to prepare a comprehensive damage assessment. The damage assessment will include an assessment of damage to publicly owned buildings, critical facilities and infrastructure; damage and economic impact to local businesses; damage to historic properties, which are primarily concentrated in Fernandina Beach; repetitive flood losses; and impacts to the natural environment.

During the damage assessment, there will be opportunities to identify hazard mitigation measures to employ in the development period to reduce hazard vulnerabilities. The Nassau County LMS includes a prioritized list of hazard mitigation projects that will be reviewed during the damage assessment to determine which projects to implement. After a disaster, it is important to conduct outreach and education on hazard mitigation measures with local contractors and homeowners to encourage hazard vulnerability reduction. The damage assessment will also be helpful for understanding the disaster impacts on the natural environment to determine ecological, recreational and tourism based losses.

Goal 2: Government Operations and Citizen Response

The County and participating jurisdictions, agencies and organizations shall effectively coordinate with each other to restore and sustain government operations and services that expedites the communities' ability to recover from a disaster. Collaboration will hinge on proactive strategies that incorporate reasonable expectations and actual capabilities of the local government, agencies, businesses, non-governmental organizations and private citizens to procure and disperse all available private, federal and state disaster recovery funding, services and donated supplies.

Government operations and citizen response issues were categorized as 1) organization and authority, 2) government / local capacity, or 3) communications / disaster information dissemination. After a disaster, it is important to maintain government services and communication throughout the community. High priority issues include: sustaining local government functions per the Continuity of Government (COG) and Continuity of Operations (COOP) plans, maintaining local oversight of the recovery strategy, retaining or hiring additional staff to work on essential functions, setting up an accounting system to manage recovery funding, explaining the applicability of the PDRP and other emergency management plans, coordinating with faith based organizations to provide assistance, and communicating redevelopment information to citizens.

Goal 3: Housing and Structural Repairs

The County and participating jurisdictions, agencies and organizations shall collaboratively work together to provide temporary housing for its residents and incoming disaster workforce to support expedient repair of homes and businesses. This will include expedited repair procedures (e.g., permitting) and incorporating hazard vulnerability reduction measures for permanent structures. Each unit of local government will endeavor to enter into mutual aid agreements to provide adequate permitting and inspections to accommodate post-disaster volume.

Housing and structural repairs were categorized into 1) temporary housing, 2) long-term housing, and 3) structural repairs. The decisions made at the onset of recovery can greatly impact long-term redevelopment and should be weighed carefully. High priority issues include: establishing criteria for on-site and group-site temporary housing to ensure that there is proper zoning to allow for temporary structures, identifying site suitability and infrastructure availability for group sites, ensuring that there is enough workforce housing, using hazard mitigation measure to reduce structural vulnerability, and creating an expedited permitting process for structural repairs.

Goal 4: Infrastructure and Public Facility Recovery

The County and participating jurisdictions, and local utility providers will work together to restore infrastructure, critical facilities and public facilities in support of community recovery based on established priorities and hazard vulnerability reduction measures.

Infrastructure and public facility recovery was categorized as 1) debris management and 2) infrastructure repairs. The repair and restoration of infrastructure and public facilities affects the community's ability to recover at large. The restoration of transportation networks is essential to recovery and redevelopment. High priority issues include: evaluating whether to replace infrastructure or facilities to pre-disaster condition or to rebuild them stronger or in a different location to avoid future damage, identifying critical transportation routes for prioritized emergency and long-term repairs, coordinating with utility providers to ensure that utilities are being restored in areas with critical facilities and businesses, and identifying alternate transit if the Intercoastal bridge is damaged or destroyed.

Goal 5: Economic Resumption

Based upon priorities in the PDRP, the County and participating jurisdictions will support the local business community through the disaster impact assessment, needs identification, infrastructure restoration, employee assistance and disaster recovery funding that fosters economic resumption.

Economic resumption is extremely important as it affects the entire community's recovery efforts and is a major indication of how long it takes the community to redevelop. The return of jobs, tourism, and other indicators of economic health is interdependent with housing recovery, infrastructure restoration, and public service provision. High priority issues include: determining and prioritizing business recovery resources, identifying funding sources for business recovery, establishing a business recovery center, assessing damage and economic impacts, and tracking business recovery data.

Goal 6: Land Use and Development

The County and participating jurisdictions shall enforce compliance with applicable regulations for construction and reconstruction and use the post-disaster environment to reduce hazard vulnerability. Hazard vulnerability reduction will be focused within the Coastal High Hazard Area, Special Flood Hazard Areas, and Repetitive Loss Areas.

Land use and zoning decisions pertaining to redevelopment can have long-term effects on the community's hazard vulnerability. After a disaster, there will likely be opportunities to rebuild infrastructure and structures back in a less vulnerable manner. Although there is often pressure to build back as quickly as possible, it is important to assess how and where the community will rebuild to reduce hazard vulnerability through hazard mitigation measures. High priority issues include: mapping land use in high hazard areas to understand how to reduce future vulnerability, identifying non-conforming land use and structures and considering how to address restoration, providing the opportunity for citizens to provide feedback on how to redevelop through the use of facilitated charrette workshops, and ensuring that proper restoration techniques are being employed for historic properties.

Goal 7: Quality of Life Resiliency

The County and participating jurisdictions, agencies and organizations shall attempt to prevent degradation during post-disaster restoration of social, cultural, historic, faith-based, health care and educational amenities, and the environment. Quality of life was

categorized as 1) cultural resources / historic preservation, 2) environmental resources, 3) health and social services. Quality of life is highly valued in Nassau County, as it attracts and maintains residents and tourists. High priority issues include: providing historic restoration guidelines to private property owners, prioritizing resources for making temporary and long-term repairs, conducting a post-impact assessment for historic properties to help guide appropriate repair, restoring aquatic areas, educating the public on asbestos abatement and mold remediation, providing mental and physical health care, and providing continued public education on disaster preparedness and redevelopment requirements.

The goals and issues were assessed and formulated into action items in the PDRP. The PDRP also includes a Communications Plan and a Financing Plan.

It is anticipated that population growth within the coastal area will continue and will have significant impact on the coastal natural resources of the City. Intergovernmental coordination among federal, state, and local entities is needed to regulate coastal development in order to limit or minimize impacts on the natural environment.

Maintaining the Quality of Beach And Dune Systems

Most of the beach and dune protection activities in Fernandina Beach are handled by a combination of state and local government programs. The Department of Environmental Protection (DEP) Beach Erosion Control Program is a program established for the purpose of working in concert with local, state and federal governmental entities to achieve the protection, preservation and restoration of the coastal sandy beach resources of the state. The program provides project managers for coastal projects proposed for funding or funded by the state in partnership with local governments and the U.S. Army Corps of Engineers (USACE). They assist in management activities which facilitate the preservation and enhancement of coastal beach habitat.
The St. Mary's River Entrance is part of the federally authorized Fernandina Harbor Navigation Project and is the entrance to the Port of Fernandina and Kings Bay Naval Base. Maintenance dredging generally occurs on an annual basis with beach quality sand placed on the inlet shoreline at Fort Clinch State Park, on the ocean shoreline of Fernandina Beach, or in a near-shore disposal area. DEP adopted an inlet management plan in May 1998 that established an annual objective to bypass suitable sediment to the downdrift beaches. Improvements to the groin field at Fort Clinch as recommended in the plan were completed in 2000. Sand placement from maintenance dredging occurred in the groin field and at the south jetty in 2007.

The Nassau City Federal Shore Protection Project was constructed along Fernandina Beach in the summer of 2008. The purpose of the project was to widen and restore the sandy beach along approximately four miles of shoreline from Fort Clinch State Park to just south of Sadler Road. The project will be maintained through monitoring and periodic nourishment in coordination with the County, DEP, and the USACE.

DEP also administers the Coastal Construction Control Line (CCCL) program. DEP regulates all development seaward of the CCCL to ensure the development has minimal impact on the beach and dune system and can survive a major storm. As part of the coastal construction permitting process, 30 years of erosion must be considered, and Florida law prohibits, with limited exceptions, construction of buildings that would in the water in 30 years. FDEP jurisdiction is limited to areas seaward of the CCCL. State law also prohibits driving on dunes and picking sea oats, vegetation that is crucial to supporting the structure of the dune system. Driving on the beach is prohibited within City limits, except for in a small area adjacent to Seaside Park. Driving in this area requires permitting and registration every year. The beach renourishment agreement requires that this parking be phased out.

The City protects beaches and dunes primarily through its building code and by coordinating with developers and the state of Florida during the development review process. The City's Coastal Upland Protection Zone (CUPZ) requires buildings to be sited so as to protect the unique features of the coastal upland system. There is a need for local protections eastward of the CCCL, however. Currently, this area is only regulated under the CCCL program and local zoning and building requirements. The City should incorporate land development regulations that specifically address this area, similar to how the CUPZ regulations protect the land westward of the CCCL. The 2006 City Comprehensive Plan further references a dune management plan, which has yet to be implemented. The City must create this plan.

Maintaining the Quality of Estuarine Systems/Wetlands

The City needs to properly identify wetlands within the City's jurisdiction. Wetlands identification issues include the definition of wetlands as well as the mapping of wetlands. The existing Comprehensive Plan definition of wetlands is an abbreviated version of the definition of wetlands contained in the Florida Statutes (F.S. 373.019(25)). Some property owners have requested that the City consider creating a new definition of wetlands that distinguishes between natural and artificial wetlands with the intent that artificial wetlands would not be considered wetlands at all, or that they would have different and less rigorous regulations than natural wetlands. Neither the State of Florida nor the SJRWMD distinguishes between natural and artificial wetlands when implementing regulations associated with wetland impacts. It is recommended that the City investigate options related to the creation of a tiered wetlands definition to distinguish between natural and artificial wetlands or wetlands which demonstrate greater or lesser significance as part of the overall system.

The City's Future Land Use and Zoning Maps continue to direct higher intensity/density development away from its environmentally sensitive lands, where possible. Other incentives, such as clustering development should be considered when working to minimize wetlands impacts on developing sites. Further, protection of wetlands is facilitated through ongoing coordination with federal and state

regulatory agencies. This heightened level of coordination ensures that proper permits have been filed and that their provisions are upheld.

The City should make an effort to create an inventory of environmentally sensitive properties for future conservation acquisition. Wetlands and other environmentally sensitive lands that are adjacent to or that overlap the City/County boundary should also be identified in an effort to coordinate with Nassau County to protect these natural resources. If this policy is implemented, the City should include specifics for coordination between the City and the County regarding wetlands regulation and protection for the wetlands that are adjacent to or that overlap the City/County boundary.

As with all wetlands, the City restricts development in the estuarine tidal marshes that form these important natural communities. Continuing to evaluate the Land Development Code for the effectiveness of its wetland protections is necessary, and strengthening the regulations should occur where needed. For example, establishing an overlay adjacent to Egans Creek that functions in a similar manner to the Coastal Upland Protection Zone may be useful in further protecting wetlands. The City should also take into account the potential effects of climate change on the quality of estuarine systems.

Continuing Disaster Planning/Hazard Mitigation Efforts
The City should continue to coordinate with the County regarding all disaster planning initiatives and planning efforts, including sea-level rise. In particular, the City should work with the County to identify and maintain information on special needs populations within City limits. Lastly, the City should consider implementation of a City Post-Disaster Redevelopment Plan that would address the specific needs and goals of the City itself.

WATERFRONTS PLANNING

Waterfront planning within the City of Fernandina Beach is focused on the Amelia River waterfront that is part of the City's designated Waterfronts Florida planning boundary, and is distinguished from general coastal planning that includes the beaches.

Seaport Facilities

The Port of Fernandina is a natural deep water port situated in Fernandina Beach about 2.2 miles from the mouth of the Amelia River. It provides terminal service to over ten pulp and paper producers located throughout Florida and the Southeast. The Port has also expanded in providing steel export services to several steel mills in the Southeast. The Port also supports a number of independent container lines serving Latin America and the Caribbean.

The berth consists of one 1,200 linear foot marginal wharf. Draft alongside the berth is maintained at a depth of 36 feet mean low water (MLW). All berths can handle container or conventional cargo working vessels. The adjoining marshaling area can accommodate 3,200 TEU including fifty electrical hookups for refrigerated containers. A chassis depot is located near the port with parking for 500 chassis.

The Ocean Highway and Port Authority of Nassau City serves as the governing body for the Port of Fernandina, and is responsible for preparing the Port Facilities Element and a Port Master Plan for the City's Comprehensive Plan. The primary purpose of this element is to clearly define a direction for the Port's future by providing a guide for long and short-term planning and development opportunities.

Recreational and Commercial Working Waterfronts

Recreational and commercial working waterfronts are defined by Sec. 342.201(b), Florida Statutes as properties that provide access for water-dependent commercial activities or provide access for the public to the navigable waters of the state. Recreational and commercial working waterfronts require direct access to or a location on, over, or adjacent to a navigable body of water. The term includes water-dependent facilities that are open to the public and offer public access by vessels to the waters of the state or that are support facilities for recreational, commercial, research, or governmental vessels. These facilities include docks, wharfs, lifts, wet and dry marinas, boat ramps, boat hauling and repair facilities, commercial fishing facilities, boat construction facilities, and other support structures over the water.

Fernandina Beach has historically been a center of commercial fishing, most notably for shrimp, as the birthplace of the modern shrimping industry, and it remains the home port for several commercial fishing vessels. Commercial shrimp production has declined significantly, however, due in large part to overseas competition. According to the Florida Marine Research Institute, in 2008, about 1.2 million pounds of seafood were harvested in Nassau County, ranking the county 25th out of the 36 Florida counties that are tracked. Today, recreational boaters accessing the water from single docks, boat ramps or marinas account for the majority of on-water traffic in the City.

Fernandina Beach remains a popular locale for recreational fishing. Fishing opportunities in the City's estuarine waters include shrimp, blue crab, flounder, sea trout, red fish (red drum), blue fish, king mackerel, pompano, striped bass, tarpon, and many others. Oysters are not currently able to be harvested due to Class III water designation, but there has been some discussion in the community in recent years about working with the state to reclassify waters as Class II in order to harvest oysters once again, as was historically done in this area. The most common argument heard in support of this redesignation is that oysters can be harvested across the same river along the Georgia coast, and that the water quality has greatly improved.

Marinas are public or licensed commercial facilities which provide secured public moorings or dry storage for vessels on a leased basis including accessory facilities for purposes such as refueling, minor repairs and launching. The City owns the Fernandina Harbor Marina, which offers slips and a mooring field, and is operated by Westrec Marinas. The marinas listed on Table CCM-8, including the City's Fernandina Harbor marina, are within or close to City limits:

Table CCM-8 Existing Public and Commercial Marinas in Fernandina Beach (2011).

Facility	Address	Largest Vessel	Transient Slips
Amelia Island Yacht Basin	251 Creekside Drive, FB 32034	110	50
Egans Creek Marina	1620 N. 14th St, FB 32034	--	--
Fernandina Harbor Marina + Mooring Field	1 Front Street, FB 32034	150	30
Tiger Point Marina	997 Egans Creek Ln, FB 32034	55	6
Florida Petroleum	231 N. Front Street, FB 32034	285	2

Source: Dozier's Waterway Guide (2008).

Since most single-family docks and marinas are built over state submerged lands, the Florida Department of Environmental Protection (DEP) regulates construction of docks and marinas, and usually requires a permit prior to construction for new facilities as well as written authorization from DEP to use the submerged lands. Currently, the City leases state submerged lands at the Marina and mooring field, and is seeking title to some of those leased lands from the State pursuant to the federal Butler Act. The City already owns some of the lands at the Marina and under Brett's by virtue of disclaimers issued by the State of Florida in the 1960's.

Public Boat Facilities

Historically, boat facilities constructed and maintained in Nassau County have been boat ramps. New boat facilities must comply with all state and/or federal regulations for the siting of marine facilities. Adequate parking facilities for both vehicles and trailers are necessary as well as access for multi-modal traffic. The City owns and maintains one public boat ramp at the foot of Ash Street, and a County-owned public boat ramp is adjacent to City limits.

Table CCM-9 Public Boat Ramps in or adjacent to City limits.

Facility	Address	Lanes	Acres
City of Fernandina Beach Public Boat Ramp	Foot of Ash Street and S. Front Street FB 32034	1	0.10
Dee Dee Bartel (North End) Boat Ramp	97177 Pogey Place FB 32034	3	11.95

Sources: City of Fernandina Beach Planning Department (2011).

Public Access

Public access as defined for purposes of this plan is the ability of the public to physically reach, enter or use recreation sites, including beaches, shores, and waterways. Historically, the City evaluated access in terms of beach access, but the City recognizes the ability of the public to access other waterways in the community is also important. Ensuring access to the Amelia River and Egans Creek shorelines is a City goal as well.

Beach access parks include dune walkovers or other access for beach-related activities such as sunbathing, swimming, and surf fishing. They may also include picnicking areas, trails or areas of natural or ornamental quality for other resource-based outdoor recreation activities. The City currently maintains 48 beach access facilities along the unincorporated shoreline. Of these, 21 have parking facilities. They are listed in detail in the Recreation and Open Space Data and Analysis.

Ft. Clinch State Park, within City limits, is a premier destination for tourists and supports large areas of barrier island natural communities. Sunbathing swimming and surf fishing are popular activities at the beach areas of the park. Fishing is also available from the park's pier. Amelia Island State Park at the extreme southern end of Amelia Island encompasses some of the remaining barrier island natural communities that once covered the entire Atlantic Ocean coastal portion of the City. Sunbathing, swimming, and surf fishing are popular activities as well as guided, beachfront horseback riding. Fishing is also available at the adjacent George Crady Bridge Fishing Pier State Park. Nassau County also maintains five (5) beach access points south of City limits.

Preserving Recreational and Commercial Working Waterfronts

Across Florida, there is an important interest in facilitating boating and other recreational access to the state's navigable waters. This access is vital to tourists and recreational users and the marine industry in the state, to maintaining or enhancing the economic impact of tourism and the economic impact of boating in the state annually, and to ensuring continued access to all residents and visitors to the navigable waters of the state. A 2008 study by the Florida Inland Navigation District on the economic impact of Nassau County

waterways indicated that businesses and boaters dependent on waterways in Nassau County generate $55 million in annual sales, $16 million in personal income, 515 jobs, and $141 to $170 million in property values.

In Fernandina Beach, there are important state, regional and local interests in maintaining viable water-dependent support facilities, such as boat hauling and repairing and commercial fishing facilities, and in maintaining the availability of public access to navigable waters. These activities rely on access to the water through recreational and commercial working waterfronts. Statewide, public facilities providing boat ramps, parking, and dry storage slips are increasingly being redeveloped for other uses, often private development. While Fernandina Beach has largely escaped this trend up to now, this trend continues throughout the state, and could place additional pressure on public boat facilities and infrastructure in the near future.

In 2005, Fernandina Beach became a Designated Waterfronts Florida Community, part of a state program administered through the Department of Community Affairs. This program was created to address the physical and economic decline of traditional working waterfront areas by providing communities with technical assistance in working towards waterfront revitalization. The Fernandina Beach Waterfronts Partnership Committee is a cooperative effort between the City of Fernandina Beach, private citizens, private business, industry, and the CRA to revitalize the Fernandina Beach waterfront area. The Fernandina Beach Waterfronts planning area comprises an area from Rayonier north to Tiger Point Marina, all along the Amelia River waterfront into Egans Creek. The City should continue to support the Waterfronts Florida Partnership Program and participate as necessary to ensure the viability of the Fernandina Beach Waterfronts Partnership and assist in the protection and revitalization of local recreational and commercial working waterfronts.

Another way to encourage retention of working waterfronts is to prioritize the location of water-dependent uses. Water-dependent uses are activities which must be carried out in or adjacent to water areas because the use requires access to the water body for: waterborne transportation, recreation-access, electrical generating facilities, or water supply. These include, but are not limited to, commercial marinas, boat ramps/docks, electrical generation plants, and fishing piers. These are in contrast to water-related uses which are activities which are not directly dependent upon access to a water body, but which provide goods and services that are directly associated with water-dependent or waterway uses. These include, but are not limited to, commercial resorts, campgrounds, fish camps, seafood processing operations, dive ships, and bait and tackle stores. These uses can be encouraged and incentivized over water-enhanced uses, which are activities that benefit economically from being located on or near the water, but that are neither dependent on direct access to water nor provides goods or services directly related to water-dependent uses. Water-enhanced uses are specifically excluded from definitions of both water-dependent and water-related uses. While these may be valuable economically, they do not retain the working waterfront nature in the same way that water-dependent or water-related uses do.

In 2009, the University Of Florida Levin College Of Law Conservation Clinic reviewed the City of Fernandina Beach's existing comprehensive plan for compliance with working waterfronts legislation and made recommendations to strengthen the connection between the plan and the legislative requirements. It is recommended that the City evaluate their recommendations and include them in the plan amendments.

Ensuring Public Access to Coastal Resources

Although water-based recreational activities are an essential part of recreation in the City for both residents and visitors, the provision of such facilities must be weighed against their potential impacts on the environment and existing land uses, especially other existing water-dependent uses. The Recreation and Open Space Element provides maps which clearly illustrate the location of the City's park facilities as well as a thorough discussion of the City's park needs.

Public Boat Facilities

Currently the City owns and maintains only one public boat ramp. The Recreation and Open Space Element Data and Analysis indicates one boat ramp per an estimated 12,331 City population, which is within recommended state guidelines under the State Comprehensive Outdoor Recreation Plan (SCORP), but close to the maximum recommended population per boat ramp. It is recommended that the City consider adding an additional boat ramp or boat ramp lane, as well as evaluate the needs of non-motorized boating access. Nassau County owns and maintains a public boat ramp contiguous to City limits, which is utilized by City residents.

Boat launching facilities are an important water-dependent land use and are critical access points for public recreation in the City. While regional data collected by DEP indicates that an adequate number of boat ramps exist to serve the Northeast Florida population based on an average participation rate, there remains a need for new and improved boat launch facilities in certain high use areas. Also, any factors limit the usability of existing facilities: condition of ramps, water depths, currents, waves, location of ramp in relation to recreation area, and the condition and availability of parking facilities.

Recommended policies, which will be included in the Recreation and Open Space Element include conducting a boating needs assessment to determine what facilities are necessary. This effort should inventory of existing boat facilities, i.e. marinas and boat ramps, and evaluation of the need for additional facilities. These evaluations will be incorporate the findings into the Parks and Recreation Master Plan also required by the policies of the Recreation and Open Space Element.

Public Access

The City has approximately six (6) miles of sandy beach shoreline within City limits. The City has no freshwater shoreline available. This is one (1) sandy beach shoreline mile per 2,055 residents, which is much better than SCORP guideline population recommendations.

The City has zero (0) feet of pier, catwalk or jetty. This is zero feet per 12,331 residents, which is not within SCORP guidelines. It is recommended that the City evaluate locations and options for providing freshwater and saltwater fishing opportunities. Fort Clinch, with is owned by the state and operated as a state park open to the public with an admission fee, has jetties and a fishing pier available.

Waterfront property and recreational facilities are in high demand. Demands on coastal resources are continually increasing, while the supply of available resources continues to diminish. Water-dependent and water-related uses for shipping, port-related facilities, and other shoreline industrial and commercial use, provide a significant stimulus to the local economy. The City's waters also support a high degree of recreational use. However, those uses can conflict with other uses such as fish and wildlife habitat, wetland areas, residential uses, public access, commercial fishing, and the aesthetic value of the environment. Provision of additional commercial, recreational, industrial or port-related facilities must be weighed against their potential impacts on the environment and existing land uses, especially other existing water-dependent uses. The City should include policies that encourage retention of water-dependent and water-related uses, such as including a priority test for siting of uses along the waterfront, evaluating exemptions for buffering requirements that may not be feasible for water-dependent uses, encouraging waterfront property owners to offer the City right of first refusal when lands are proposed to be changed from working waterfront to other uses, and establishing no net loss for areas within the City that are zoned and/or included in the Industrial Waterfront or Waterfront Mixed-Use categories.

Recommendations regarding public access include creating an inventory of shoreline and access points, not just beach access points, requiring dedication of public access from private development where appropriate, not allowing private property owners to restrict use of public access points, and creating an access point wayfinding system.

WATER QUALITY AND CONSERVATION

Surface Waters

The ecological and economic importance of the varied creek and stream systems that form the Nassau-St. Mary's watershed is enormous. The St. Mary's watershed occupies approximately 1,585 square miles in southeastern Georgia and northeastern Florida, with about 942 square miles of the watershed in Florida. The Nassau watershed occupies approximately 464 square miles. Not only do the systems provide significant wildlife habitat, they flow into the larger riverine systems that feed and support the estuaries. Without the protection of the lands that encompass the watershed, including various types of pine flatwoods that provide slow release of groundwater into these creeks and streams, the sustainability of the City's estuarine-based systems and its associated and economic activities will be diminished. Land development and uses along these creek, stream and river systems upstream from the City can impact the water quality in waters adjacent to the City as a downstream community.

The City's surface water resources are, generally, in good condition. The enforcement of federal, state, and local regulations, coupled with the public's generally increased awareness of the need to conserve and protect water resources have combined to protect these waters from the types of point and non-point sources of pollution which have degraded surface waters in other parts of the state. The primary threats to the City's surface waters continue to include non-point source pollution generated by urban runoff that contains pollutants, leachate from septic tanks and package wastewater treatment plants, and erosion from improper land clearing activities.

Non-point source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution occurs when rainfall, snowmelt, or irrigation runs over land or through the ground, picks up pollutants throughout the watershed, and deposits them into rivers, lakes, and coastal waters. As the designation "non-point" implies, it is often difficult to isolate the source of these pollutants, and even more difficult to develop and successfully implement programs to reduce the amount of such pollutants which enter the surface water system because such programs usually rely on public education and voluntary compliance. The City will also address stormwater runoff issues through the development and implementation of a stormwater master plan, as outlined in the Public Facilities Element.

Coordinated local, state, and regional efforts in the Nassau–St. Mary's Basin are responsible for much of the progress that has been made in implementing watershed and water quality improvements in the area. Many plans share common goals, and their implementation is based on a combination of groups playing critical roles in planning, funding, managing, and executing projects. Local organizations and initiatives provide leadership in water body restoration and preservation efforts. The City continues to coordinate its efforts with local, regional, and other state agencies to obtain data, strengthen monitoring activities, and exchange information through periodic meetings.

Florida's water quality standards, the foundation of the state's program of water quality management, designate the "present and future most beneficial uses" of the waters of the state (Sec. 403.061(10), Florida Statutes). Water quality criteria for surface water and ground water, expressed as numeric or narrative limits for specific parameters, describe the water quality necessary to maintain these uses. Florida's surface water is classified using the following five designated use categories:

- Class I- Potable water supplies
- Class II- Shellfish propagation or harvesting
- Class III- Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife

- Class IV- Agricultural water supplies
- Class V- Navigation, utility, and industrial use (there are no state waters currently in this class)

All waters in the Nassau-St. Mary's Basin are Class III, except for the Class II waters listed below in Table CCM-10. Shellfishing is currently prohibited in all of the Class II waters in the basin. There is an interest in the community to explore the option of reopening shellfishing in Amelia River waters, due largely to the fact that shellfishing is permitted across the river along the Georgia border. Restoring these waters to Class II would be of benefit to the City economically and recreationally.

Table CCM-10 Class II Waters in Nassau County

Name	Description
Alligator Creek	Alligator Creek (in its entirety)
Nassau River /Creek	From the mouth of Nassau Sound (a line connecting the northeasternmost point of Little Talbot Island to the southeasternmost point of Amelia Island) westerly to Seymore Point.
South Amelia River	From Nassau River north to a line from the northern shore of the mouth of Alligator Creek to the northernmost shore of Harrison Creek; and
Waters between South Amelia River and Alligator Creek.	All waters in this vicinity.

Source: Rule 62-302, F.A.C. (2011).

Aquatic Preserves and Outstanding Florida Waters

The Ft. Clinch State Park Aquatic Preserve extends into the Atlantic Ocean as well as into surrounding estuarine systems. At 9,000 acres, this State of Florida Managed Area provide an enhanced degree of protection to the aquatic and fishery resources along the coastline of Nassau County. In Nassau County, waters located within the Ft. Clinch State Park Aquatic Preserve, the Amelia Island State Recreational Area, and the Nassau-St. Johns River Marshes Aquatic Preserve are designated Outstanding Florida Waters (OFWs). Outstanding Florida Waters (OFWs) are designated for "special protection due to their natural attributes" (Sec. 403.061, F.S.). These waters are listed in Section 62-302.700, Florida Administrative Code (F.A.C.). The intent of an OFW designation is to maintain ambient water quality, even if these designations are more protective than those required under the water body's surface water classification. Most OFWs are associated with managed areas in the state or federal park system, such as aquatic preserves, national seashores, or wildlife refuges. Other OFWs may also be designated as "Special Waters" based on a finding that the waters are of exceptional recreational or ecological significance, and are identified as such in Rule 62-302, F.A.C.

Dredged Material Management Areas (Spoil Sites)

There are currently no spoil sites within City limits, although with continual dredging efforts planned for the City's Fernandina Harbor Marina, this could change in the future.

Groundwater Resources

The three principal Florida aquifer systems—surficial, intermediate, and Floridan—are all present beneath the entire Nassau–St. Mary's Basin. These aquifer systems are defined and separated based primarily on variations in lithostratigraphy. The primary source of potable water in the basin is the Floridan aquifer, which is deep, confined, and under artesian pressure throughout the area. The intermediate system is mainly a confining unit that occurs in the Hawthorn Group, which in this area includes extensive clay layers. The surficial aquifer system is the "water table" aquifer in the basin. It is used as a potable water supply to a limited extent, but the surficial aquifer is significant to this evaluation because it is the ground water source that directly interacts with surface water bodies, providing base flow to streams, estuaries, and lakes in the basin.

The Nassau-St. Mary's Basin is not known for significant amounts of spring discharge because the limestone formations are so deeply buried by confining sediments. However, seepage from the surficial aquifer may constitute a significant percentage of water to the overall stream flow in the basin. In an analysis of base flow conducted in 2005 by the DEP Ground Water Protection Section for a study site on the St. Mary's River, the ground water component of flow at U.S. Geological Survey flow measurement stations on the St. Mary's River was approximately 50 percent of the total flow. Similar amounts of ground water seepage are expected for other streams in the basin. The only identified spring in the City, in fact, the only one in the entire basin, is Su-No-Wa Spring located near the head of Thomas Creek in the upper end of the coastal drainage area between the St. Mary's and St. Johns Rivers in Nassau City.

The western one third of Nassau County, and also a portion of northeastern Nassau County, within City limits, are identified as providing 0-4 inches of water recharge per year to the Floridan aquifer, the source of the public fresh water supply for most of Florida. Protection of these areas is therefore important to the future groundwater supplies and water quality of the City.

The City currently draws 2,400.45 million gallons per year of groundwater from the Floridan aquifer through six groundwater wells maintained by the City water utility. This is authorized through the SJRWMD by way of a Consumptive Use Permit (CUP) that expires in 2021. This permit sets stringent requirements for a variety of areas, including water quality testing and irrigation limitations. In addition,

it also requires, where feasible, that the City must use native or drought-tolerant vegetation within the service area. Additionally, as part of the permit, the City must include a water conservation plan.

Water Conservation

Due in large part to a continually growing population in the United States and increase water demands, water consumption is tripling, and at least 36 states will face water shortages by 2013, according to the EPA. Therefore, the need to conserve water is becoming more and more critical. The situation is deceptive in Florida – the state is surrounded on three sides by water, and has thousands of lakes, and many streams and rivers. There may not seem a need to conserve. However, most of this water is not fresh and readily available for drinking or other uses. In addition, the weather in Florida is erratic, with rainy seasons interspersed with periods of drought. Climate change may increase these patterns.

Water resources are already becoming scarce in Florida. Tampa Bay area cities and counties exhausted their section of the Floridan Aquifer. Southeast Florida's communities can no longer rely on their traditional supply, the Biscayne Aquifer. In Central Florida, withdrawals for mining and agriculture helped erase entire water bodies. In North Florida, communities are growing increasingly concerned that large metropolitan areas will divert water from the St. Johns and Suwannee Rivers. The Panhandle has already experienced this with the Apalachicola River, leading to a tri-state water war between Florida, Alabama, and Georgia.

The Water Resources Act was passed in 1972 in Florida, recognizing the need for a water management system. The Water Management Districts, created from this legislation, are charged with protecting the water of the state, which they do in part by emphasizing conservation. The District currently has active and ongoing water conservation programs, including requiring water conservation plans as part of consumptive use permits, irrigation limitations and watering restrictions, reclaimed water programs, encouraging use of water efficient fixtures, and use of drought-tolerant landscaping.

Water conservation is a key component to being a sustainable community. Implementing policies to reduce water usage, such as requiring a percentage of drought-tolerant or no-irrigation landscaping, helps reduce a significant source of water consumption. Florida-friendly yards, which emphasize native plants, are a good method of reducing irrigation use. The City should explore water conservation strategies such as these, particularly for City facilities. Pursuing a reclaimed water system would also be beneficial in reducing water consumption within the City and adjacent County areas, particularly in relation to the many golf courses in the vicinity.

Although the City is not currently facing an immediate water shortage, long-term planning is essential. The reality is that water is being depleted across the country and across the state. It is not unrealistic to assume larger jurisdiction will want to draw down from our section of the aquifer in the future, as it has already happened in other parts of Florida. The City should encourage conservation strategies now in an effort to preserve resources in the future. In *A Water Ethic for Florida*, Cynthia Barnett points out that in the 19th Century, Floridians were guided by how much water we could push off the land, in the 20th, we were guided by how much we could pump, and in the 21st Century, Floridians must finally be guided by our consciences.

Nonpoint Source (NPS) Pollution

Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution occurs when rainfall or irrigation runs over land or through the ground, picks up pollutants throughout the watershed, and deposits them into rivers, lakes, and coastal waters or introduces them into ground water. NPS pollution also includes adverse changes to the vegetation, shape, and flow of streams and other aquatic systems. Currently, non-point source pollution is directly diverted to the Amelia River, and is also runoff into Egans Creek. This pollution can have a serious effect on these waters, particularly along Egans Creek, where residential yards are adjacent to the Creek. Fertilizer and lawn chemicals can have a serious impact on water quality.

NPS pollution is widespread because it can occur any time activities disturb the land or water. Activities and uses in the City such as septic systems, urban runoff, landscaping and fertilizer, construction, recreational boating, physical changes to stream channels, and habitat degradation are all potential sources of NPS pollution. Careless or uninformed household management also contributes to NPS pollution problems. Non-point source pollution is currently not regulated in the same manner as point source pollution, largely because of the difficulty in regulating pollution that does not originate from one place. The SJRWMD has strategies in place to help increase awareness about non-point source pollution, and local strategies such as fertilizer ordinances can be adopted.

As the designation "non-point" implies, it is difficult to isolate the source of these pollutants, other than to identify their proximate causes as stated above. It is even more difficult to develop and successfully implement programs to reduce the amount of such pollutants which enter the surface water system because such programs (for example, the Florida Yards program administered by the City Extension Service) usually rely on public education and voluntary compliance. The challenge facing the City and all of Florida is to continue to provide water for all the various human needs (residential, commercial, agricultural, and industrial) without damaging the natural systems which supply the water and make Florida a desirable place in which to live.

Stormwater planning is critical to the City, as it is surrounded by water. Stormwater is a major cause of non-point source pollution. Historically, stormwater planning in the City has been done in a piecemeal fashion. In 2009, the City adopted the City of Fernandina Beach Stormwater Master Plan created by CPH. However, this plan is currently unfunded. Non-point source pollution and stormwater strategies such as low-impact development are further addressed in the Public Facilities Element.

WILDLIFE

Florida's rapid growth rate over the last fifty years has had a detrimental impact on wildlife in the state, and if growth projections materialize, further impacts will occur. Florida is a geologically and biologically distinct state, with high levels of biodiversity. Protecting this biodiversity, wildlife habitat, and ecosystems is very important in an increasingly urbanized world. Ideally, large tracts of connected and undisturbed landscapes are the best option for wildlife, but this is unlikely and increasingly impossible throughout Florida. Future planning efforts must include strategies that maximize habitat in and around developed areas and take into account the coexistence of humans and wildlife in these areas.

The City is already largely built out, much of it developed within the last thirty years. Planning for wildlife now will help new development be more sensitive to habitat needs and help existing development better fit into a wildlife planning framework, thereby helping ensure the sustainability of wildlife in the community. Nassau County has also recognized the need for wildlife planning in its most recent comprehensive plan update through creation of a Conservation and Habitat Network.

Wildlife planning by the City has been limited primarily to the current Comprehensive Plan and the Land Development Code addressing the presence of threatened or endangered species on land proposed for development or regarding activities at the beach. The City's Code Enforcement staff takes a proactive approach to monitoring lighting at the beach to ensure that it does not interfere with sea turtle nesting. The Parks and Recreation Department provides educational offerings regarding wildlife in the City. However, there is not currently a cohesive, broad approach to wildlife planning that takes into account City-wide habitat and overall wildlife issues.

While planning for wildlife holistically is important, continuing to provide for protections for threatened, endangered or rare species is also of great importance. Data provided by the Florida Natural Areas Inventory (FNAI) indicate there are nineteen animals and nine plant species considered rare by the FNAI that are documented to occur in Nassau County:

Reptiles and Amphibians

- The Gopher tortoise (Gopherus polyphemus) is a State Threatened Species. This species is typically present within the Sandhill communities of the City as well as in other habitats. It is well documented that the deep burrows that this fossorial reptile excavates provide habitat and refuge for numerous other rare and/or declining species.

The presence of gopher tortoises is well-documented in the City. The City should work with FWCC to craft regulations in the Land Development Code that ensure protection of these species and coordinate with the FWCC permitting program.

- The Eastern indigo snake (Drymarchon corais couperi) is found in Sandhills, Mesic Flatwoods, Maritime Hammocks and several other habitats.
- Loggerhead turtles (Caretta caretta) is listed as endangered by both state and federal authorities. They are frequently found nesting on the beaches of Amelia Island.
- American alligator (Alligator mississippiensis) is found in forested and herbaceous wetlands, creeks and other such habitats throughout the County.
- The Many-lined Salamander (Stereochilus marginatus) is found in specialized creek and swamp habitats in the City.
- Timber rattlesnake (Crotalus horridus) is an unusual species for Florida, but a population has been documented in Nassau City.

  It is also known that three species of sea turtle listed as endangered or threatened by state and federal authorities are occasionally found nesting on the beaches of Amelia Island. These include the Leatherback (endangered), Kemp's Ridley (endangered) and Green sea turtles (threatened). The Amelia Island Sea Turtle Watch, Inc., a very active volunteer group, is heavily involved in monitoring and protecting sea turtle nests on the island, and has worked with the Florida Fish and Wildlife Conservation Commission, the US Army Corps of Engineers, and the University of Florida regarding Amelia Island sea turtle populations. In 2010, a record year, the Amelia Island Sea Turtle Watch documented 178 Loggerhead nests, five Green turtle nests, and one Leatherback nest. In just two months of nesting season in 2011 to date, 64 nest total have been documented. As mentioned, the City works every year during nesting season to monitor lights in the beach area to limit light interference with turtle nesting activities. The City should continue and improve efforts to help sea turtles on the island.

Birds

- Woodstork (Mycteria Americana) is listed as endangered by both state and federal authorities It is found in a wide variety of coastal and inland freshwater sites throughout the County.
- Bachman's sparrow (Aimophila aestivalis) is found in several habitats in the County, but particularly various kinds of intact flatwoods.
- Black-crowned night-heron (Nycticorax nycticorax) prefers dense wetland forest types along rivers and creeks and coastal tidal marshes.
- Lest Tern (Sterna antillarum) is a species predominately found on the sandy beaches of Amelia Island and within estuarine tidal marsh habitats.
- Wilson's Plover (Charadrius wilsonia) also a coastal species found primarily on and around Amelia Island.
- American Oystercatcher (Haematopus palliatus) prefers both open sandy beaches and estuarine tidal marsh habitats.

- Red-Cockaded Woodpecker (Picoides borealis) is listed as federally endangered and occurs only in open, old-growth pine forests where suitably aged trees allow it to excavate nest cavities. It is the only North American woodpecker that builds is nest cavities in living pine trees.
- Little Blue Heron (Egretta caerulea) is a resident of both coastal and freshwater habitats throughout the County.
- Snowy Egret (Egretta thula) is a resident of both coastal and freshwater habitats throughout the County.
- Great Egret (Ardea alba) is a resident of both coastal and freshwater habitats throughout the County.

Although not documented by FNAI, FWC and other state agencies have documented observations of the following species in Nassau County:

- Southern bald eagle (Haliaeetus leucocephalus) is no longer protected under the Endangered Species Act, although the level of protection has not changed. The bald eagle will continue to be federally protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In Florida, the bald eagle is no longer a listed species, though it continues to be protected under the state's newly enacted bald eagle rule, 68A-16.002, F.A.C.
- Osprey (Pandion haliaetus) is found in many habitats, particularly those including open fresh and/or salt water resources. Although not listed in Nassau County, permits are required throughout the state to remove a nest.
- Southeastern American kestrel (Falco sparverius paulus) found in numerous, open agricultural and woodland habitats. It is currently listed as threatened in the state of Florida.

In addition to these rare species, there are at least 119 bird species documented as occurring during the breeding season (i.e., March-September) in the greater St. Mary's River basin. The variety of habitat provided by the St. Mary's makes a strong contribution to the continued existence of the majority of these species. Also important game bird species such as northern bobwhite (Colinus virginianus), wild turkey (Meleagris gallopavo) and wood duck (Aix sponsa) are well represented in Nassau County.

Mammals

- The North Atlantic Right Whale (Eubalaena glacialis) is listed as endangered by federal authorities and may be the most unusual, and rarest, species found in Nassau County's coastal waters. Calving occurs in the coastal waters off Georgia and northern Florida from December through March.
- Sherman's fox squirrel (Sciurus niger shermani) is a federal Category 2 candidate species for listing. Although it may still be found in the Sandhills, Flatwoods and hammocks of the County in good numbers, this subspecies has suffered from much habitat loss, habitat fragmentation, and its numbers have declined greatly in recent years throughout Florida.
- Southeastern Weasel (Mustela frenata olivacea) occurs sparingly in various terrestrial and palustrine habitats including pine flatwoods, floodplain forests and swamps and bottomland forests.

It is also known that at least two rare species occasionally inhabit the riverine and associated floodplain corridor of the St. Mary's River: the West Indian manatee (Trichechus manatus) and Florida black bear (Ursus americanus floridanus). Manatees are present in the Amelia River, and are commonly seen in the waters of the City's Fernandina Harbor Marina, which has a stormwater outfall, and near the City's wastewater plant outfall. The waters surrounding the Marina are in a no-wake zone, but the waters at the wastewater outfall are not. No-wake zones are a common method of protecting manatees, as they require slower boating speeds. There is no consistent data available on the manatee population in the waters adjacent to Fernandina Beach, due in large part to the fact that aerial sightings (how manatee data is collected) are ascertained in the winter, when the waters in this area are colder, and manatees may have migrated south. However, manatees are confirmed in the waters here. The City should work with FWCC to determine better manatee population numbers and how to best protect the manatees, including evaluating expanded no-wake zones. A black bear was sighted in various locations on the island, including at Fort Clinch, in 2009 before migrating across the river to Georgia, where he was tracked until being killed by a hunter.

Nassau County also supports numerous common species such as white-tailed deer (Odocoileus virginianus), beaver (Castor canadensis) and gray fox (Urocyon cinereoargenteus), among many others.

Plants

- Florida toothache grass (Ctenium floridanum) is found very rarely in Florida, but with several localities in Nassau County. This species inhabits various kinds of flatwoods communities including Mesic, Scrubby and Wet Flatwoods.
- Purple honeycomb-head (Balduina atropurpurea) is also an extremely rare plant species in Florida and Nassau County is, in fact, the only County in Florida where it is found. This species occurs only within intact, little disturbed Seepage Slope and Wet Prairie natural communities in the ecotone between Sandhills, Flatwoods and Baygalls.
- Hartwrightia (Hartwrightia floridana) is found in several counties in Central Florida but has several well-documented populations in Seepage Slope and adjacent habitats in Nassau County.
- Yellow sunnybell (Schoenolirion croceum) is found in Wet Flatwoods and Seepage Slope habitats and is considered rare in Florida. It is typically found only in the northern portions of the panhandle, but a small population is known in Nassau County.
- Silver buckthorn (Sideroxylon alachuense) typically inhabits calcareous hammocks (i.e., where limestone closely underlies the soil) – including areas of Bottomland Forest and Upland Hardwood/Slope Forest – and is known to occur in only a few counties in northeastern Florida.

- Ciliate-leaf tickseed (Coreopsis integrifolia) is considered rare in Florida and is known in only a few counties in the state where it may be found in Floodplain Forests along rivers.
- Heartleaf (Hexastylis arifolia) is a species found in deep Slope Forest habitats in northern Nassau County. It is also considered rare in Florida.
- Florida merrybells (Uvularia floridana) is found in Slope Forest, Bottomland Forest and Floodplain Forest communities in northern Nassau County. It is known in only five counties in Florida, with the remaining four in the panhandle.
- Southern milkweed (Asclepias viridula) is known in only eleven Florida counties where it may be found in Mesic/Wet Flatwoods, Wet Prairie and Seepage Slope habitats.

The City should plan for wildlife on a holistic and comprehensive level, as opposed to just planning for the presence of threatened and endangered species. Planning should take into account the importance of maintaining habitat, biodiversity, and ecosystems. Because the City only encompasses a portion of the island, the City should work with the County on their Conservation and Habitat Network for how it could be applied on an island-wide basis. More intergovernmental cooperation regarding wildlife should also take place with state and federal agencies that may be able to provide technical assistance and support in wildlife planning initiatives. Wildlife planning should also be part of the Parks and Recreation Master Plan recommended in the Recreation and Open Space Element, so that linkages on recreational lands can be utilized. The Land Development Code should be updated to incorporate wildlife planning strategies into development and redevelopment projects, while also continuing to maintain protections for endangered and threatened species. The City should continue to partner with nonprofit and volunteers groups such as the Amelia Island Sea Turtle Watch to help protect our local rare species, and should continue to provide education and outreach opportunities regarding the community's unique wildlife. The handbook, *Wildlife Habitat Planning Strategies, Design Features, and Best Management Practices for Florida Communities and Landowners*, published by the FWCC and 1000 Friends of Florida, should be a guide in developing policies and strategies.

TREES AND URBAN FORESTRY

Trees are an important component in planning for protection of a community's natural resources. Trees are a significant defining aspect of the City's character, particularly in the older areas of the City. Trees not only provide aesthetic benefits, they also provide significant ecosystem services, such as absorption of CO2 and release of oxygen, drainage assistance by absorbing water through their root systems, natural cooling systems by offering shade, weather protection, and wildlife habitat. Trees can play a major role in a community's sustainability planning by helping reduce CO2 levels, cutting down on energy costs, utilizing natural drainage options, and contributing to an overall increased quality of life for residents.

The City recognizes the value of trees to the community, and protects trees through tree preservation and protection regulations in the Land Development Code. These regulations are dedicated to:

- No net loss of trees.
- Placing structures and all impervious surfaces in such a way as to protect the survivability and substantial growth of the healthiest trees on a property.
- Maintaining the diversity of tree species native to Amelia Island.
- Protecting and maintaining the existing mature growth native trees important to the City's tree canopy.
- Preserving, enhancing and restoring the unique aesthetic character of the City.
- Preserving, enhancing and restoring the natural environment through the protection and establishment of native trees and existing natural systems for the enjoyment of present and future populations.

These requirements ensure that new development, redevelopment, and other building projects take into account the presence of trees during a project. If trees are to be removed, other trees must be preserved or the removed trees must be replaced. Trees are also protected independently of development projects, and cannot be removed unless demonstrated to be diseased or dying.

Street trees and public trees are also very valuable. For a planting cost of $250-600, including the first three years of maintenance, it is estimated that a single street tree returns over $90,000 of direct benefits (not including aesthetic, social and natural benefits) over the lifetime of the tree. Such benefits include reduced and more appropriate urban traffic speeds, safer walking environments, buffers between roadways and pedestrians, improved business and increased land value, less need for drainage infrastructure, weather protection, CO2 absorption, lower urban air temperatures, lower ozone, aesthetically pleasing spaces, screening of utilities, improved health, and connection to nature. (Florida Urban Forestry Council Newsletter June 2011)

In 2009, the City completed an inventory of a portion of the City's street and public space trees. This project was partially funded through a $15,000 grant from the Florida Department of Agriculture and Consumer Services. The following findings about the City's urban forest resulted from the completion of this project:

- The inventory contains 7,000 trees, and covers most of the City's streets and public open space north of Sadler Road. Of the 7,000 trees inventoried, 67% were street trees and 33% were public space trees.
- In general, the condition of the City's public trees is good (73.4%), but is not as diverse as it should be according to ISA (International Society of Arboriculture) standards.
- The ISA recommends that no more than 10% of the forest be composed of a single species. The tree inventory shows that 28% of the City's public trees are live oaks, 19% are sabal palms, and 12% are laurel oaks. It is recommended that future plantings be selected to increase diversity in order to lessen vulnerability to pests and diseases.

- The inventory does not contain trees on private property, which make up a majority of the City's trees. Using 2008 aerial photos of the City, it was estimated that the overall tree canopy coverage for the entire City is 37%.
- Trees are not just aesthetically pleasing, they also provide environmental benefits such as storm water management and increased air quality. The study used i-Tree software to quantify the dollar value of the annual environmental and aesthetic benefits of the 7,000 trees contained in the inventory, and that value is $56,637,455.
- The management plan is currently used by multiple departments, such as Streets and Parks & Recreation, to better care for the City's existing public space trees by helping to identify hazard trees and to identify and prioritize maintenance tasks, such as pruning. Better planning for the future urban forest is also possible through the plan's recommendations regarding better tree selection for planting spaces and for the replacement of trees that have been removed.

The City of Fernandina Beach has been named a Tree City USA® Community for 2011. This is the eighth year that the City has received this designation. The City's Tree City status, its tree preservation and protection ordinance, and the Street Tree Management Plan all demonstrate the City's commitment to maintaining the City's tree population.

The City should continue its strong commitment to maintaining the tree population in the community, particularly street trees. It is recommended that the street tree survey be completed throughout the remainder of the City limits, and that the recommendations of the Street Tree Management Plan be completed. A proactive street tree replacement program should be implemented in order to replace and diversify street trees. The City should continue to update and enforce tree protection and preservation requirements in the Land Development Code, including evaluating policies that address the City's overall tree canopy. Efforts should be made to continue to provide community outreach and education on the value of trees to the community.

AIR QUALITY

Air quality is generally good in Nassau County and well within the standards set by state and federal regulatory agencies. Florida's statewide air quality monitoring network is operated by both state and local environmental programs. The air is monitored by the Florida Department of Environmental Protection (DEP) for carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulfur dioxide. The Environmental Protection Agency (EPA) and DEP established the ambient air quality standards for these six pollutants. These pollutants are referred to as "criteria air pollutants." As a result of legislation and various control measures, carbon monoxide, lead, nitrogen and sulfur dioxide have come into acceptable levels or better. Although still monitored, these pollutants are not considered a major threat of air pollution.

Not all pollutants are monitored in all areas. The only air quality monitoring station in the City, which is located in Fernandina Beach, has monitored only particle matter (PM10) and sulfur dioxide. Table CCM-11 shows the Air Quality Index (AQI) for Nassau County as measured by DEP for 2005-2007, the most recent historical data available. The AQI indicates that air quality in the County is generally good year-round.

Table CCM-11 Air Quality Index (AQI), Nassau City 2005-2007

AQI Descriptor	**Number of Days/ Percent of Days**					
	2005	**%**	**2006**	**%**	**2007**	**%**
Good	355	97.3	362	99.2	365	100.0
Moderate	8	2.2	3	0.8	0	0.0
Unhealthy for Sensitive Groups	1	0.3	0	0.0	0	0.0
Unhealthy	1	0.3	0	0.0	0	0.0
Very Unhealthy	0	0.0	0	0.0	0	0.0

Monitored Pollutants: PM10 and Sulfur Dioxide
Source: DEP, Division of Air Resource Management (2011).

There are a variety of permitted point sources which are monitored through DEP for air quality. These projects include the Rayonier and Rock-Tenn mills in Fernandina Beach. DEP does not routinely monitor or inspect those facilities for which it has issued permits, though it does require monitoring reports and will respond to complaints from neighboring property owners, if needed.

Air quality is not currently measured for other events, such as wildfires. Wildfires in southern Georgia and in northeast Florida bring large amounts of smoke and ash into Fernandina Beach. While not monitored specifically, this has a significant impact on air quality in the region, which is included in the daily monitoring available on the DEP website. The City should promote a system of notification to residents and visitors when such events impact air quality.

Greenhouse gases are also related to air quality. According to the EPA, gases that trap heat in the atmosphere are often called greenhouse gases. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are:

- Carbon Dioxide (CO2): Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- Methane (CH4): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- Nitrous Oxide (N2O): Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- Fluorinated Gases: Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

The Fifth U.S. Climate Action Report concluded that greenhouse gas emissions increased by 17 percent from 1990-2007, with the major factor affecting U.S. emissions being CO_2 emissions from fossil fuel combustion. Regulating greenhouse gases at the federal level has been a politically charged and litigious process, with no clear standards in place at this time. While the EPA has been granted the authority to regulate GHG's, there is much political pressure against this authority. Many human sources of greenhouse gas emissions are expected to rise in the future, but this growth may be reduced by ongoing efforts to increase the use of newer, cleaner technologies and other measures. Additionally, everyday choices about such things as commuting, housing, electricity use and recycling can influence the amount of greenhouse gases being emitted.

Florida House Bill 697 (2008) required that communities include planning strategies to reduce greenhouse gases. While this legislation was repealed in 2011, the City recognizes the need to reduce greenhouse gas emissions, in an effort to be a sustainable community, and the City should incorporate strategies into various elements in the comprehensive plan, such as the Future Land Use Element, Multi-modal Transportation Element, the Recreation and Open Space Element and the Public Facilities Element.

The City shall continue to monitor air quality, and cooperate with County, state, and federal authorities regarding air quality standards and testing. Creating an air quality notification system will help in aiding visitors and residents when air quality drops or becomes a hazard. The City should plan for greenhouse gas reduction strategies throughout the comprehensive plan.

ENERGY CONSERVATION + SUSTAINABILITY

The Florida Legislature enacted House Bill 697 in 2008, which directed that comprehensive plans include factors that affect energy conservation in the Conservation element. Energy conservation planning is a useful strategy in helping communities plan for reducing several things: dependence on fossil fuels, energy consumption, and greenhouse gas emissions. Unfortunately, this legislation was repealed in 2011. The City maintains that including a provision on energy conservation is a valuable objective, and contributes to the City's overall interest in sustainability planning.

In evaluating existing and future long-range planning goals, the City acknowledges the essential role sustainable development plays in protecting the health of both the environment and the community. As a local government, the City has the ability to impact the global community, as it is increasingly recognized that sustainability must be integrated at the local level in order to achieve sustainability globally. Currently, the City's Plan does not address sustainability and sustainable practices. The City recognizes the need to address community planning from a perspective that takes into account environmental, economic, and social sustainability.

While numerous definitions and interpretations of sustainability exist, the general precepts involve ensuring resources are available for future generations and protecting natural resources, social equity, and the economy for present generations. The most commonly accepted definition of sustainable development is from the World Commission on Environment and Development Report (1987), which states that sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." In the United States, under Executive Order 13423 (2007), President George Bush defined

sustainable as meaning "to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations of Americans."

Employing sustainable practices is relevant given examples of increasing planetary stress on natural resources and the global population. Carrying capacity, which refers to the maximum point at which the Earth is able to support natural resource consumption, is already estimated to have been exceeded by 20%.Awareness of the effects of climate change continues to grow, as more scientific data regarding the melting of ice caps, sea-level rise, and hazardous or unusual weather patterns is gathered. The incompatible situation of increased energy consumption and decreasing finite resources has made pursuing alternative energy strategies a necessity. Increased population, dwindling or changing biodiversity, and changes in global economies also are contributing to a need for a shift in the status quo.

Economically, there is a tremendous benefit to natural resource protection. Ecosystem services, which are the value of environmental functions translated economically, are estimated to equate to approximately $33 trillion dollars. Examples of ecosystem services include air quality enhancement, filtering and recharging groundwater, plant pollination, renewable energy resources, recreational tourism, grazing lands, noise barriers, natural fires, and carbon, energy and water storage. Sustainability policies will ensure these valuable functions are available in the future.

Various concepts and strategies have been developed to address sustainability. Concepts such as carrying capacity, ecological footprint, ecological rucksack, eco-efficiency, embodied energy, and the precautionary principle all help understand the underlying principles critical to understanding the necessity of sustainable strategies:

Sustainability is being integrated at all levels. On a global level, programs such as the International Organization for Standardization 14000 (ISO 14000) Series detail performance and auditing methods for commercial entities in the area of Environmental Management Systems, and the Social Accountability Standard 8000 (SA 8000) provides a verification system for the ethical production of goods. In the United States, environmental laws such as the Clean Water Act, the Clean Air Act, and the National Environmental Policy Act are in place to ensure natural resource protection. Additionally, however, the federal government has begun to recognize the need to integrate sustainable practices into governmental operations. Executive Order 13423, in addition to defining "sustainable," also mandated federal agencies to address sustainable design and high performance buildings, fleet management, recycling, green purchasing and procurement, solid waste management, pollution prevention, electronics stewardship, and energy and water management. At the state level, Florida also has environmental protection laws, but recent legislation recognizing the need for sustainability has introduced more stringent energy requirements for buildings, required sustainable construction for public projects, and established "green government" grant opportunities. While the City follows mandatory state legislation, the City would like to establish its own policies.

Rethinking traditional planning and development strategies in the United States is especially important relative to the global community. It would take approximately five planet Earths to support life if everyone in the world lived the lifestyle of North Americans. Another method of examining the impact a particular society has on planetary systems is through determining ecological footprints. An ecological footprint refers to the total land area needed to support a certain population or activity, and is another measure for evaluating resource consumption. North Americans have two times the ecological footprint of Europeans, and seven times the average ecological footprint of Asians and Africans.

Local issues facing Fernandina Beach dictate incorporating sustainability into City planning efforts. Due to the City's location on a barrier island, potential sea level rise as a result of climate change could impact the community. Predicted increases in hurricane activity, also due to climate change, makes disaster preparedness and sustainable redevelopment a necessity. The City is home to unique natural and cultural resources that warrant continued protection. Continued population increases, both seasonally and permanently, will require revisiting existing development patterns and transportation management in relation to energy efficiency. Through the comprehensive plan, the City will follow models of global, national, and state concepts and strategies and incorporate sustainable policies in an effort to reduce its impacts.

Sustainable Development Standards

In order for new development or redevelopment to be environmentally sustainable, developers and planners are increasingly looking to implement standards which address environmental and resource conservation concerns in innovative ways. There are many benefits of building sustainably, including lower operating costs for residents, increased comfort, higher perceived value, reduced sprawl, and protection of the natural environment.

The elements of sustainable development fall into three basic categories: environmental responsiveness, resource efficiency, and community and cultural sensitivity. Sustainable development projects consider siting and land-use issues; conservation of energy, water, and other precious resources; provisions for healthy and comfortable indoor spaces through the use of reused and recycled products, as well as energy- and resource-efficient products, lighting and mechanical systems; compatibility with the natural environment and protection of open space; increased sense of community; encouragement of walking, biking, and connectivity, and awareness of societal and cultural issues. The City's EAR report recommended incorporating sustainability into the overall plan, and all elements of the plan should address sustainable development issues where appropriate.

In the past developers have often equated sustainable development with reduced profits and delayed schedules. The reality, however, is that well-executed sustainable development projects often perform extremely well financially and often command a premium price in the marketplace. Some of the general benefits of green development are reduced capital costs, reduced operating costs, health and productivity benefits, higher perceived value, and quality.

The United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a third party certification program and the nationally accepted benchmark for the design, construction and operation of high performance sustainable buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. The USGBC has also developed a LEED-Neighborhood Development rating system to encourage sustainable development on a neighborhood-wide scale. In 2008, Ch. 252, Florida Statutes was amended to require that buildings constructed and financed by municipalities be designed to meet the LEED rating system or another nationally recognized green building rating system. The City should also encourage sustainable development by the private sector through the use of incentives and other options.

The City has not previously addressed energy conservation as a specific component or objective of the Comprehensive Plan. A separate objective should be included to address this component of the City's planning efforts. Despite being repealed by the Florida Legislature, providing for energy conservation measures in the Conservation element is a sound planning strategy and is relevant to the City's overall sustainable planning efforts.

In integrating sustainability into the City's Comprehensive Plan (Plan), the City must identify a working definition of sustainability from which to operate and include this definition in the Plan. This definition should include the general precepts of sustainability which include addressing the environment, economy, and equity, while taking into account the effect of the present generation's activities on future populations.

Potential strategies for integrating sustainability into the overall Comprehensive Plan include, but are not limited to:

- Establish land use policies to address sprawl, increase energy efficiency, and reduce automobile usage;
- Explore low-impact development and sustainable construction policies;
- Create a waste management plan integrating recycling and reuse;
- Conduct pedestrian and bicycle needs assessment;
- Create transportation management plan incorporating various mobility types;
- Explore green local government designation and green operational standards;
- Evaluate residential intensification/density increases;
- Implement healthy/livable communities initiatives;
- Identify alternative energy opportunities;
- Establish sustainable economic initiatives, such as sustainable tourism and small business incubators;
- Increase water-efficient use strategies;
- Implement energy efficiency strategies;
- Plan for disaster preparedness and sustainable redevelopment;
- Identify priority land areas for conservation; and
- Address climate change effects such as sea-level rise.

Identified policies for inclusion in the plan may direct a variety of policy strategies such as regulations, future planning activities, voluntary programs, financial incentives, or expenditures. Where appropriate, policies included in comprehensive plan updates should include quantifiable goals in order to provide a tangible measure of their effectiveness. Additionally, the City should identify grant opportunities for implementation of community sustainability initiatives. Lastly, where feasible, the City should attempt to estimate costs of implementing sustainability initiatives and evaluate potential obstacles in applying sustainability practices. It is reasonable that recommended policies and strategies will be found throughout all elements of the Comprehensive Plan, and not just in the Conservation and Coastal Management Element.

LAND

Physical and Geologic Setting

Nassau County lies within the Atlantic Coastal Plain province. Most of Nassau City is equally divided between two physiographic provinces: the western portion is situated within in the region known as the Duval Upland of northeastern Florida, and the St. Mary's Meander Plain to the east of the Duval Upland. A small portion of the high, sandy Trail Ridge physiographic province is found in the extreme southwestern portion of the County.

At the mouth of the St. Mary's River is the Sea Islands region, assignable to the Atlantic Beach Ridges physiographic province that is the prevailing formation along the extreme eastern portion of Nassau County.

The Duval Upland region is an extensive area extending from northern Putnam City, Florida, into southern Georgia. This upland system is generally characterized by rolling topography that ranges in elevation from 25 to 100 feet above mean sea level. Much of the Duval Upland province was once dominated by longleaf pine flatwoods interspersed with swamp forests of hardwoods and cypress. Most of these uplands have now been converted to commercial silviculture operation (i.e., pine plantations). Along the western slope of this upland where the St. Mary's River runs northward for some 40 miles, small tributary streams are numerous and drain much of this area.

The St. Mary's Meander Plain is generally low and flat with sandy soils and elevations ranging from 5 to 25 feet above MSL. The poorly drained upland areas were once vegetated with longleaf and slash pine flatwoods, which today also have been replaced mostly with commercial pine plantations. Scattered live oak hammocks also commonly occur within this region. The Trail Ridge is a barrier ridge that ranges from 100 to 150 feet above MSL and was historically dominated by longleaf pine flatwoods and xeric sandhills.

Soils

Soils in Nassau County are depicted as part of the mapping series contained in ***Appendix A***. This map depicts soil categories throughout the County. The Soils Map denotes land units that have a distinct pattern of soils, relief and drainage. Each land unit is a unique natural landscape and may consist of one or more major soils. Soils making up one unit can occur in other units, but in a different pattern or proportion to each other. The map provides a basis for comparing the land use soil capacity potential of large areas. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified.

Knowledge of soil conditions is necessary in planning for the use and management of soils for crops and pasture, woodland, woodland grazing, and as wildlife habitat. Also, knowledge of soil conditions and the ability of soil to absorb moisture is extremely important when planning for the use of septic tanks for sanitary wastewater disposal. Soil suitability is therefore a significant potential development indicator.

The Nassau County Soil and Water Conservation District (SWCD) is dedicated to encouraging productive use of land, water and air resources in the City. Organized under the provisions of Ch. 582, Florida Statutes, the five (5) supervisors of the district have the authority to conduct research and develop comprehensive plans for the conservation of soil and water resources and to construct, improve, operate and maintain such structures as may be necessary for the control and prevention of soil erosion and for flood prevention. The SWCD may also formulate regulations within the district in the interest of conserving soil and soil resources, and preventing and controlling soil erosion. The supervisors may also conduct demonstrational projects and make agricultural and engineering machinery and equipment, fertilizer, seeds and seedlings, and such other material or equipment available to landowners within the district to carry on operations for the conservation of soil and water resources.

Natural Communities

Amelia Island Amelia Island is widely recognized as one of the most important and beautiful barrier islands in the southeast United States. The island affords enormous recreational, tourism and residential/commercial opportunities, many of which have already been realized. Fernandina Beach and Amelia Island are critical to the economy of Nassau County and having sandy beaches has undoubtedly contributed enormously to the success of Fernandina Beach and Amelia Island as a destination and community.

Barrier islands are vital to lessening the impact of storm surge from hurricanes to adjacent inland areas and can potentially reduce property damage in such inland areas by millions of dollars. The beach dune systems found there are also important to the proper functioning of barrier islands in protecting the inland and coastal residents from such storm surges. As sea turtle nesting grounds, shore bird habitat and foraging areas, and as habitat for a large variety of migratory birds along a renowned migration route, this is one of the finest natural resources in Nassau County.

Natural communities found on or in association with Fernandina Beach and Amelia Island include Maritime Hammock, Beach Dune, Coastal Interdunal Swale, Mesic Flatwoods and Estuarine Tidal Marsh. The Maritime Hammock community represents a relatively small, but exceedingly important, prominent and characteristic feature of this region of Nassau County. Typically, Maritime Hammocks are found behind the Beach Dune community but between a zone of flatwoods and/or fringing Upland Mixed Forest community and the extensive Estuarine Tidal Marshes of the County.

Maritime Hammocks within Fernandina Beach and Amelia Island are dominated by a canopy of mixed hardwoods, including live oak (Quercus virginiana) - the branches often supporting a luxuriant growth of resurrection fern (Polypodium polypodioides) and Spanish moss (Tillandsia usneoides) - laurel oak (Q. hemispherica), southern magnolia (Magnolia grandiflora), hackberry (Celtis laevigata), black cherry (Prunus serotina), and loblolly pine (P. taeda) The subcanopy supports red bay, American holly (Ilex opaca), cabbage palm (Sabal palmetto) and sweetgum with an open, but shrubby, understory.

The Estuarine Tidal Marsh natural community dominates a very large proportion of the area lying west of Amelia Island, and is formed by the confluence of the combined St. Mary's, Nassau and Amelia rivers. This community is not only extensive, but is very well-developed and exhibits characteristics indicative of very high quality examples of this community type. This vast estuarine system is one of the most ecologically and economically significant along Florida's northeastern coast. Water quality is especially significant in these

three rivers. Development impacts affecting the water quality of these rivers have the potential to have an effect on the estuarine communities surrounding the Island.

Amelia River Dominant species in the Estuarine Tidal Marsh community include smooth cordgrass (Spartina alterniflora) in what are often termed "low marsh" areas and black needle rush (Juncus roemerianus) and sawgrass (Cladium jamaicense) in what are often termed "high marsh" areas. Interspersed among these brackish water marsh systems are various small islands of what might be termed "Coastal Flatwoods" – a variant of Wet Flatwoods with some maritime influence and a conspicuous understory of cabbage palms and southern red cedar (Juniperus silicicola).

This community is highly significant as a nursery for many game and commercial fish species, important and economically valuable for hundreds of invertebrate species and as prime feeding grounds for a variety of birds, some of them rare and endangered. Although somewhat protected through regulatory means, the long-term conservation of this community type is not strictly assured.

St. Mary's River The St. Mary's River flows through a region that has historically been relatively rural with a sparse population and less industrial or urban development than that found along many other regional rivers. This situation is rapidly changing, however, as more people move into Florida and Nassau County, particularly those seeking riverfront homes which are often serviced by septic tanks that have the capacity to degrade water quality if not properly installed and maintained. In 2003, the County adopted the St. Mary's River Overlay District as part of the County Land Development Code. The intent of the St. Mary's River Overlay District is to protect and preserve the water quality, natural habitats, diverse wildlife, and recreational value of the St. Mary's River. Protecting the water quality of the St. Mary's upstream is very important to the City as a downstream community.

Nassau River The Nassau River in south-central Nassau County is formed by the confluence of four prominent creek systems: Thomas Creek (with its headwaters near Cary State Forest), Alligator Creek (with headwaters near Callahan), Mills Creek and Snell Swamp (with headwaters forming east of Hilliard) and Plummer Swamp Creek (with headwaters south of City Road 108 and west of I-95). All of these creeks have their origins in north-central Nassau County. These creeks are the namesake of the relatively new Four Creeks State Forest. The ecological and economic importance of these varied creek and stream systems to Nassau County's natural resource base is enormous. Not only do they provide significant wildlife habitat, they flow into the larger riverine systems that feed and support the renowned estuaries of the Nassau, as well as St. Mary's and Amelia rivers. Without the protection of the lands that encompass the watersheds, usually various types of pine flatwoods that provide slow release of groundwater into these creeks and streams, the sustainability of Nassau County's timberlands and estuarine-based economic activities will be diminished.

Because the eastern portion of Nassau County has the Nassau River as its boundary line between Duval and Nassau counties, areas along this river have experienced more growth, development and population pressure than has the St. Mary's River. For example, the Jacksonville International Airport in Duval County is in close proximity to both the Nassau River and one of its major tributaries, Thomas Creek. Recent conservation efforts along the Nassau County side have sought to buffer this important natural and hydrological resource in part because of this growth pressure.

Watershed Management

Coordinated local, state, and regional efforts in the Nassau–St. Mary's Basin are responsible for much of the progress that has been made in implementing watershed and water quality improvements in the area. Many plans share common goals, and their implementation is based on a combination of groups playing critical roles in planning, funding, managing, and executing projects. Local organizations and initiatives provide leadership in water body restoration and preservation efforts. The City continues to coordinate its efforts with local, regional, and other state agencies to obtain data, strengthen monitoring activities, and exchange information through periodic meetings.

The St. Mary's River Management Committee (SMRMC) was formed in 1991 as an intergovernmental entity of elected and appointed members from four counties (Charlton, Camden, Nassau, and Baker) along the St. Mary's River in Florida and Georgia. Initially formed while the National Park Service was studying the river for inclusion in the federal Wild and Scenic Rivers Program (it was ultimately not included), the SMRMC has evolved into a group whose primary focus is to maintain local management and control of the St. Mary's River and develop and maintain a management plan to guide the river's future. While there are representatives from Nassau County, there is not a representative from the City specifically. The management plan was completed in 2002. The committee's goal is to promote and protect the long-term viability of both the environmental and economic resources of the St. Mary's River in a way that retains local control, protects property rights, and fosters cooperation among individuals, governments, and agencies at all levels. The SMRMC has been actively working on a septic tank setback ordinance that would be a standard requirement for all counties located along the St. Mary's River. The City should continue to cooperate and coordinate with the other local governments of the SMRMC to protect the St. Mary's River and the important lands surrounding it.

Conservation, Recreation, and Managed Areas

The City currently has a significant array of state, local and private conservation, recreation and other managed lands that demonstrate the importance of the natural, hydrological and archaeological resources of Amelia Island and the City. This system of protected and managed areas has contributed to the economy and quality of life of the City, particularly through tourism, as well as continuing forestry operations on public lands that are managed by the Florida Division of Forestry.

State Parks The 1,362-acre Ft. Clinch State Park at the northern tip of Amelia Island, within City limits, is a premier destination for tourists visiting this spectacular and ecological important barrier island. Established in 1935, Ft. Clinch State Park supports large areas of Maritime Hammock, Coastal Strand and large Beach Dunes. It also provides habitat for numerous migratory bird species and is the site of the United States champion myrtle oak. Fort Clinch also manages Plaza San Carlos in Old Town Fernandina.

Aquatic Preserves The Ft. Clinch State Park Aquatic Preserve extends into the Atlantic Ocean along part of the City's beach coastline as well as into surrounding estuarine systems. At 9,000 acres this State of Florida Managed Area provides an enhanced degree of protection to the aquatic and fishery resources along the coastline of the City. ***Appendix A*** contains a map of the aquatic preserves adjacent to the City.

Trails and Greenways

There are two major established trails and/or greenways that exist in the City - the Fort Clinch State Park Trail and the City's Greenway. The Fort Clinch trails are owned and operated by the Florida State Park System and available to the public for an entry fee. The trails can be used for hiking and biking.

The 316-acre Egans Creek Greenway is owned by the City, and the City Parks and Recreation Department operates and maintains the Greenway, which was funded by a general obligation bond and the Florida Communities Trust program. The Greenway, established in 2000, is a 300-acre undeveloped park open during daylight hours for passive recreational opportunities such as walking, jogging, bird watching, and bicycling. A pavilion with restrooms and picnic area is located at the northern entrance at Atlantic Avenue, and two bridges over Egans Creek and a raised boardwalk at the south entrance at Sadler Road offer enhanced opportunities for wildlife viewing. Benches, located throughout the park, offer peaceful resting places for park users. The Greenway is zoned as conservation land and is also designated as conservation in the Future Land Use Map (FLUM).

Prior to the Egans Creek Greenway land acquisition by the City, this area was owned by multiple private land owners and was largely managed and manipulated by Amelia Island Mosquito Control. Throughout the latter half of the 20th century, Egans Creek, for which the Greenway was named, was diked, ditched, and deprived of its tidal waters to support surrounding development and flood and mosquito control efforts. In 2003, the FDOT undertook a restoration project of the 70 acres in the northern Greenway. This mitigation project restored tidal flow to the area, bringing back the salt marsh habitat that had been absent for over 50 years. Unfortunately, the tidal flow unexpectedly extended beyond the established restoration site, adversely affecting fresh water habitat to the south. Many acres of a long-established monoculture forest of red maple were affected. In 2009, FDOT completed construction of a second water control device at Jasmine Street which stemmed the flow of salt water to the south but continues to allow excess fresh water to drain to the north. The fresh water vegetation in the south Greenway is currently undergoing a successful recovery process, and this project is still under monitoring.

The easy access to the northern Greenway makes it ideal for use as an outdoor classroom for local high school and middle school classes. Both schools are located on Citrona Drive, within walking distance of the Greenway. Community-based education is emphasized via the use of graphics and regular tours, as well as information available online and at the Nature Center. Educational opportunities are presented by City staff and local volunteers. The Greenway is a tool for educating the public about the values of natural spaces, wetlands, endangered and threatened species, invasive species, and human impacts on ecosystems.

Egans Creek Greenway is part of the Florida Department of Environmental Protection's Great Florida Birding Trail and Greenways and Trails network. Users may pick up an informational brochure and map at each entrance, and brochures containing a self-guided walking tour are available at the adjacent Parks and Recreation Department administrative office on Atlantic Avenue. Information is also available on the City's website.

Florida Forever Projects

Florida Forever is Florida's premier conservation and recreation lands acquisition program, a blueprint for conserving natural resources and renewing Florida's commitment to conserve the state's natural and cultural heritage. Florida Forever replaces Preservation 2000 (P2000), which was the largest public land acquisition program of its kind in the United States.

Between its inception in July 2001 to the present, the Florida Forever program has acquired more than 638,600 acres of land with $2.62 billion. Florida Forever funding is allocated by the legislature at $300 million per year. It is distributed by the Florida Department of Environmental Protection to a number of state agencies and programs to purchase public lands in the form of parks, trails, forests, wildlife management areas and more. All of these lands are held in trust for the citizens of Florida.

One Florida Forever project, Tiger Island/Little Tiger Island, is adjacent to the City. The Tiger Island/Little Tiger Island project represents a significant resource that should also become a Nassau County conservation priority. At 1,260 acres, this project will close a protection gap in a network of National and State Parks/Preserves stretching from St. Andrews Sound in Georgia to the St. Johns River in Florida. Approximately 75 percent of the project is Estuarine Tidal Marsh along the St. Mary's River, Amelia River, and a series of smaller connecting rivers and creeks. The remainder is comprised of Maritime Hammock on the elevated islands in the Tidal Marsh ecosystem. The U.S. Fish and Wildlife Service have proposed the Cumberland Sound side of Tiger and Little Tiger Islands as critical habitat for the wintering populations of the piping plover. Other rare, threatened or endangered species found there include Roseate spoonbill, Great egret, Piping plover, White ibis, Southern lip fern, Atlantic Coast Florida lantana and terrestrial peperomia.

Hazardous Waste

Hazardous waste is solid waste, or a combination of solid wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or the environment when improperly transported, disposed of, stored, treated or otherwise managed.

Hazardous waste (HW) exhibits one or more characteristics of ignitability, corrosivity, reactivity or toxicity which make it dangerous. Paint products, pool chemicals, household cleaners and pesticides are typical examples. When disposed of in the municipal solid waste stream or otherwise improperly managed, these materials have the potential of contaminating the groundwater, the sole source of the City's potable water supply. There are currently no hazardous waste disposal sites in the City. Currently, the City's Land Development Code addresses limitations on the placement of hazardous waste. Solid waste measures are addressed in the Public Facilities Element.

Brownfields

As defined by the EPA, brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off green spaces and working lands. The DEP oversees the Florida Brownfield Redevelopment Act. The goals of this Act are to reduce public health and environmental hazards on existing commercial and industrial sites that are abandoned or underused due to these hazards; create financial and regulatory incentives to encourage voluntary cleanup and redevelopment of sites; derive cleanup target levels and a process for obtaining a "No Further Action" letter using Risk-Based Corrective Action principles; and provide the opportunity for Environmental Equity and Justice.

The DEP's interactive mapping tool to locate brownfields does not include any sites in Nassau County or Fernandina Beach. It is likely, however, that there are brownfield sites in the City that have not been formally identified. Redevelopment of former industrial or light industrial sites should be evaluated for purposes of brownfield designation, and should be preliminarily identified by the City.

Environmentally Sensitive Lands, Open Space and Green Infrastructure

Environmentally sensitive lands are any land area and/or water resources that may be determined to contain naturally occurring and relatively unaltered flora, fauna, or geologic conditions. Environmentally sensitive lands may include historical and archaeological resources, wetlands, wetland transition areas, estuarine shoreline areas, 100 year floodplains, open space, dune systems, wildlife habitat, and aquifer recharge areas. While these resources are present in the City, they are not currently identified or mapped specifically as environmentally sensitive lands. These lands may be part of the City's open spaces already, or should be included as part of the City's open spaces. In urbanized areas such as Fernandina Beach, open space generally consists of patches of land, and is isolated and disconnected from other open space areas. Connecting these isolated spaces with corridors helps promote public access and environmental awareness, and improve wildlife habitat and environmental quality.

Growth pressures continue to increase annually. Along with population increases, come increased infrastructure needs, i.e. more roads, schools, sewer and utility lines, and emergency management needs like police and fire stations. Just as growing communities need to upgrade and expand their transportation and utilities infrastructure (or "gray" infrastructure), they also need to upgrade and expand their "green" infrastructure, the network of open space, woodlands, wildlife habitat, parks and other natural areas, which sustain clean air, water, and natural resources and enrich their citizens' quality of life.

The City's natural lands comprise its "green infrastructure," and provide the bulk of its natural support system. Ecosystem services, such as cleaning the air, filtering and cooling water, storing and cycling nutrients, conserving and generating soils, pollinating plants, regulating climate, sequestering carbon, protecting areas against storm and flood damage, and maintaining aquifers and streams, are all provided by the existing expanses of vegetation, wetlands, and other natural lands. These ecologically valuable lands also provide marketable goods and services, like fish and wildlife, tourism, and recreation. They serve as vital habitat for native species, provide scenery, and contribute in many ways to the health and quality of life for residents. Many Florida coastal counties rely heavily on the nature-based tourism that comes with being a 'destination' site, and the City's economy is intrinsically linked to its natural resources. The service industry that caters to nature- based tourism (including fishing, boating, golf, and bird watching) is a major employer of local residents.

In addition to their ecological and economic contributions, these lands provide a sense of place and a unique identity. Natural landscapes make communities more comfortable and appealing; they link current generations to their heritage and cultural past. Protecting green infrastructure helps to preserve our quality of life and safeguard it for future generations. Preserving the City's green infrastructure means preserving waterways, wetlands, woodlands, wildlife habitats, and other natural areas including greenways for recreational purposes, parks, working tree farms, forests, wilderness and other open spaces that support native species. By doing so, the City will be making a direct investment into its residents' current and future quality of life and strengthening its local economy which relies so heavily on tourism.

Over the past 20 years, state local and non-profit agencies have invested billions of dollars in the acquisition and protection of some of the state's most sensitive springs, riparian corridors, coastal areas, forests, and other natural habitats. Despite these extensive preservation efforts, fragmentation of habitat and functional ecosystems is, unfortunately, still common across the state. In 2006, the University of Florida's GeoPlan completed a special growth management report with predictive modeling that concluded the state's urban areas will double by the year 2060 unless new changes in growth management policies are enacted. The study recommended

balancing maintenance and redevelopment of existing urban areas with new land development and countering urbanized places with protected lands to protect natural functions and create healthy environments for people.

By understanding the "green infrastructure" of the City and the surrounding region, the Comprehensive Plan can provide conservation priorities that provide linkages and greenways that best support the natural environment and improve the quality of life for the community as a whole. With proper foresight and planning by the City, a vision for both conservation and growth can emerge and become a reality, one that could make the City an even more desirable place to work and live, but one that has numerous urban amenities and economic opportunities as well.

Options for Land Acquisition and Management

Nationwide, a range of public financing options has been utilized to fund parks and open space preservation. These include general obligation bonds, the local sales tax, the property tax, and less frequently used mechanisms such as special assessment districts, real estate transfer tax, impact fees, and income taxes. In Florida, local government funding options for land conservation have primarily taken the form of budget appropriations, general obligation bonds backed by property taxes or the infrastructure sales tax. Many communities also impose impact fees on new development to help fund additional parks infrastructure needs. Currently, in the City, funding for parks, recreation, and protection of environmentally sensitive lands largely comes from general City ad valorem taxes and impact fees. A general obligation bond and funds from the Florida Communities Trust were used to purchase Greenway lands.

The City should continue to consider the above-referenced land acquisition financing options in order to fund any future land acquisition program for conservation and recreation land to implement the "green infrastructure" concepts described above. However, while some areas may be protected for future generations through fee simple purchase and ownership, the City will have limited funds and resources available to buy, develop, and manage areas of land for conservation and/or recreational uses. Large areas of land are simply not available under current City limits, as the City is primarily built out. A more practical approach is for the City to explore conserving land through various less-than fee techniques, such as the establishment of conservation easements, through the land development process; and to seek close partnerships with private or non-profit conservation groups, funding agencies, and land owners. It should be a guiding principle of the City that any land conservation endeavors are based strictly upon a willing seller approach.

The City should ensure protection of unique ecosystems, state parks, aquatic preserves and other environmentally important land areas. Coordination with the County, State Park System, and state and federal agencies regarding protection of these resources is necessary. Additional coordination with County on land development activities that have potential to affect watershed is also needed to ensure that water quality is not affected downstream.

The City shall maintain and promote trail and greenway access, including addressing the Greenway specifically in the Recreation and Open Space Element. The City should continue LDC regulations that ensure hazardous waste is sited appropriately, and should take steps to identify potential brownfields. The City should also include strategies incorporating sustainability such as bicycle and pedestrian pathway linkages through natural areas.

The City should continue to strengthen and improve LDC regulations that protect preservation of environmentally sensitive lands, and should continue prohibiting through the LDC certain activities that could be detrimental to these lands. The City should evaluate lands to be designated environmentally sensitive lands in addition to the designated areas such as the Greenway or wetlands, and maintain an inventory of these lands for potential land acquisition projects. Funding options for acquisition should be continually evaluated.