CHAPTER 5. CONSERVATION ELEMENT DATA AND ANALYSIS

INTRODUCTION

This Element addresses the conservation, use, and protection of natural resources in the City, including air, water, water recharge areas, wetlands, waterwells, estuarine marshes, soils, beaches, shores, floodplains, rivers, bays, lakes, harbors, forests, fisheries, wildlife, marine habitat, minerals, and other natural and environmental resources to the extent they exist within the City, including factors that affect energy conservation.

NATURAL RESOURCES

The City is centrally located in the interior of Palm Beach County, almost equidistant from the Intracoastal Waterway and Atlantic Ocean to the east and Lake Okeechobee to the West. Thus, the City does not have any marine habitat, beaches, fisheries, estuarine marshes, harbors, bays or shorelines within its jurisdiction.

Lands within the City have been in active agriculture for over 50 years, which has resulted in the removal of most natural features and habitat within the City, including wildlife habitat and wetlands. Further, though silviculture has been conducted on the property, there is no naturally occurring forest habitat within the City.

The City's climate, soils and minerals, air, floodplains, water resources, ground water recharge areas, land cover, natural habitats including wetlands, wildlife, and other environmentally sensitive lands are analyzed in detail below.

Climate

The climate of an area affects the amount and type of development, including building practices and structural and design features. Use of climate-appropriate practices supports the efficient use of energy sources, greenhouse gas reduction, and overall resource conservation. The U.S. Department of Energy has designated Building America climate regions based on the International Energy Conservation Code (IECC 2021). Climate considerations affect energy demand, infrastructure resiliency, and long-term public safety.

According to updated data from the Florida Climate Center (2023) and the NOAA National Centers for Environmental Information, Palm Beach County has experienced increasing temperatures, extended warm seasons, and rising humidity indices. These changes affect energy consumption, building design, and local infrastructure.

Cooling Degree Days (CDD) have been consistently high in the region, exceeding 4,500 CDD annually at Palm Beach International Airport, a 7% increase compared to 1981–2010 baseline averages. This underscores the importance of resilient energy-efficient construction, shade landscaping, and community-wide adaptation.

Recent extreme weather events, including Hurricane Ian (2022), Hurricane Nicole (2022), and increased seasonal flooding, signal the growing importance of storm-resilient design. Westlake, though inland, may be affected indirectly by:

- Increased rainfall intensity
- Inland flooding from stormwater backup
- Disruption of regional evacuation routes

Sea Level Rise & Resiliency

While the City is not directly adjacent to coastal areas, it lies within the Southeast Florida Regional Climate Compact Planning Boundary. Projections by NOAA (2022) and the Compact's Unified Sea Level Rise Projection (2023) estimate 10–17 inches of rise by 2040, impacting regional drainage and flood risk.

The City is encouraged to consider designation of Adaptation Action Areas (AAAs) in future planning efforts per F.S. 163.3177(6)(g) to guide infrastructure investments and policy for long-term resilience.

The National Climate Data Center provides the normal weather variables for temperature and precipitation for Palm Beach County International Airport. These normal variable are shown in Table 5.1 and Figures 5.1 and 5.2 below.

Table 5.1: Temperature (°F) and Precipitation (Inches) by Month at Palm Beach County International Airport

Month	Avg Max Temp (°F)	Avg Min Temp (°F)	Avg Mean Temp (°F)	Precipitation (inches)
January	74.7	57.9	66.3	3.47
February	76.7	60.1	68.4	2.63
March	79.2	63.0	71.1	3.31
April	82.2	67.5	74.9	3.68
May	85.7	71.7	78.7	4.91
June	88.3	75.0	81.7	8.48
July	90.0	76.1	83.1	5.63
August	89.9	76.5	83.2	8.68
September	88.0	75.8	81.9	7.96
October	84.7	72.6	78.7	5.90
November	80.0	66.1	73.0	3.62
December	76.5	61.5	69.0	3.48
Annual Average	83.0	68.6	75.8	61.75

Source: National Climate Data Center

Figure 5.1: Temperature (°F) by Month at Palm Beach County International Airport

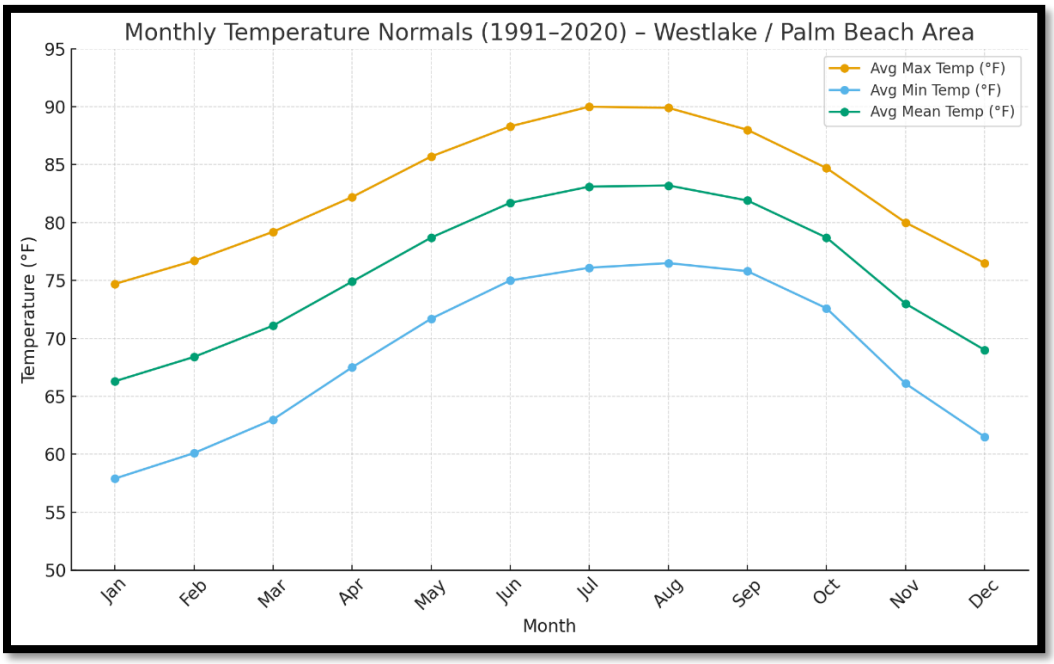
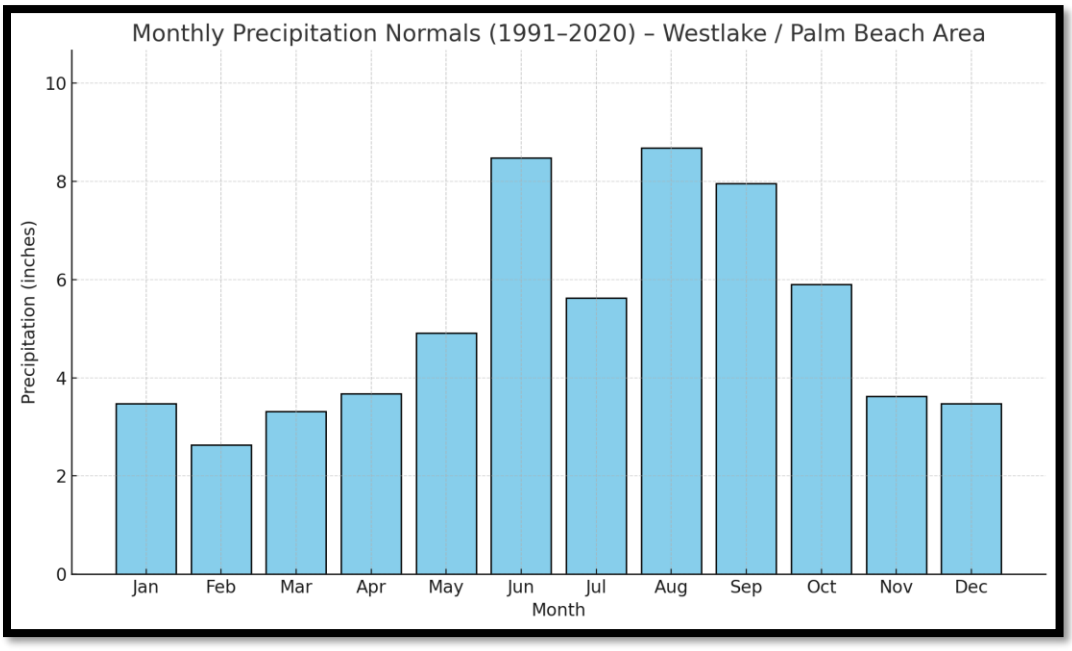


Figure 5.1: Precipitation (Inches) by Month at Palm Beach County International Airport



Useful measures for considering the impact of the climate, as well as month-to-month weather conditions, on energy cost and conservation are “heating degree days” and “cooling degree days.” The National Weather Service of the National Oceanic and Atmospheric Administration provides the following explanation.

A "degree day" is a unit of measure for recording how hot or how cold it has been over a 24-hour period. The number of degree days applied to any particular day of the week is determined by calculating the mean temperature for the day and then comparing the mean temperature to a base value of 65 degrees F. (The "mean" temperature is calculated by adding together the high for the day and the low for the day, and then dividing the result by 2.)

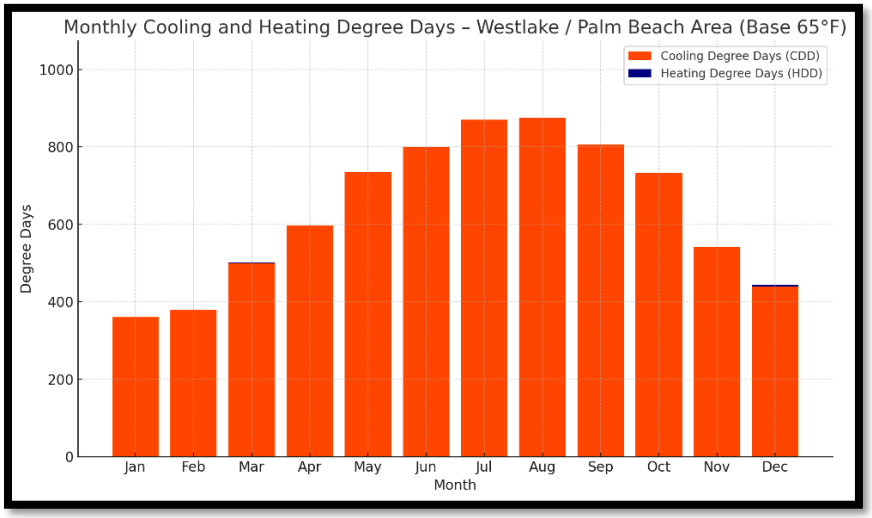
If the mean temperature for the day is, say, 5 degrees higher than 65, then there have been 5 cooling degree days. On the other hand, if the weather has been cool, and the mean temperature is, say, 55 degrees, then there have 10 heating degree days (65 minus 55 equals 10).

Why do we want or need to know the number of "degree days?" It is a good way to generally keep track of how much demand there has been for energy needed for either heating or cooling buildings. The cooler (warmer) the weather, the larger the number of "heating (cooling) degree days"... and the larger the number of heating (cooling) degree days, the heavier the demand for energy needed to heat (cool) buildings.
https://www.weather.gov/ffc/degdays

Palm Beach County has a high number of cooling degree days – days for which air conditioners must be running and where improved building insulation, materials, design, orientation, and vegetation can reduce energy use and costs.

The Florida Climate Center, within the Office of the State Climatologist at Florida State University, maintains up-to-date climate normals and degree day calculations for the region. Relevant data for West Palm Beach International Airport, the closest climate monitoring station to the City of Westlake, is provided in Table 5.3 below, illustrating the monthly distribution of cooling and heating degree days based on the most recent 1991–2020 climate normals.

Table 5.3: 1991-2020 Degree Days for Palm Beach County International Airport



Source: Florida Climate Center

People, buildings, and infrastructure are also affected by severe weather conditions. Palm Beach County has been affected by several hurricanes, flooding events, and severe wind events in recent years. Hurricane events include Irma in 2017, Wilma in 2005, and Jeanne and Frances in 2004. Flooding conditions like those that occurred in January of 2014 are due to unusual convergences of rain producing conditions.(https://www.weather.gov/mfl/palm_beach_flood_010914). High wind events such as tornadoes are relatively rare but do occur (https://www.weather.gov/mfl/pb_tornado). In more recent years, notably 2024, the intensity and frequency of weather events affecting the region have increased. That year, three named storms passed near or through South Florida, generating strong winds, heavy rainfall, and tornado outbreaks. One of those storms, Hurricane Milton, spawned at least 15 confirmed tornadoes, including two EF-3 tornadoes across Palm Beach and Glades counties, with the Wellington / Palm Beach Gardens area hit by a 20-mile, 140 mph (EF-3) track. Earlier in the same event, multiple tornadoes were reported across Palm Beach County as the storm approached landfall.

Looking ahead, climate related events such as sea level rise may also affect Palm Beach County in the long-term future. All of Florida will be impacted directly or indirectly if high sea level rise forecasts are realized. According to the SFWMD, sea level rise may affect flood control, water supply, natural systems, and water quality. Key vulnerabilities include reduced flood discharge capacity, reduced flood capacity in secondary canal systems, saltwater intrusion, inundation of coastal wetlands and changes in ecology.

The City of Westlake, while part of the broader regional climate system, benefits from a relatively more favorable inland topography. Its location west of the Intracoastal Waterway and outside of immediate coastal surge zones reduces the risk of direct tidal inundation associated with sea level rise. However, the City remains indirectly impacted through shared infrastructure, downstream drainage connections, and regional ecological shifts. Multiple technical resources are available to support local planning, including:

- “Vulnerability Analysis for Southeast Florida to Sea Level Rise”
- SFWMD’s Climate Change and Sea Level Rise Adaptation Strategies
- NOAA Digital Coast and Sea Grant resources:
- www.flseagrant.org/climate-change/sea-level-rise/
- https://coast.noaa.gov/digitalcoast/stories/slr.html

As part of future planning efforts, the City should monitor regional guidance from the Southeast Florida Regional Climate Compact and consider designating Adaptation Action Areas pursuant to Section 163.3177(6)(g), Florida Statutes, to help prioritize resilience investments.

Soils and Minerals

The general distribution of soils within the City is shown on FLU Map 2.3, which is based on the soil survey of Palm Beach County conducted by the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service. (www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=FL).

The survey identifies the following soil series in the City: Arents-Urban Land Complex (0 To 5 % Slopes), Arents-Urban Land Complex (Organic Substratum), Boca Fine Sand, Chobee Fine Sandy Loam, Floridana Fine

Sand, Hallandale Fine Sand, Okeelanta Muck, Pineda Fine Sand, Pinellas Fine Sand, Riviera Fine Sand, Riviera Fine Sand (Depressional), Tequesta Muck, Wabasso Fine Sand and Water. The USDA describes these soils as follows:

Arents – Urban Land Complex – This complex consists of nearly level, somewhat poorly drained, sandy soils and urban land overlying organic soils. These areas were formerly organic marshes and swamps that were filled for urban use. This complex is primarily in the vicinity of Lake Mangonia and Clear Lake in the Palm Springs area, but it is also in a few places along the Intracoastal Waterway. Arents consist of lawns, vacant lots, undeveloped areas, and other open land. Urban land consists of areas covered by streets, side- walks, driveways, houses, and other structures.

Boca Fine Sand – The Boca series consists of moderately deep, poorly drained and very poorly drained, moderately permeable soils in low broad flats, poorly defined drainage-ways and depressions of the flatwoods and adjacent tidal flats. They formed in sandy and loamy marine sediments deposited over limestone bedrock.

Chobee Fine Sandy Loam –The Chobee series consists of very deep, very poorly drained, slowly to very slowly permeable soils in depressions, flats, and occasionally on river flood plains in the lower Coastal Plain. They formed in thick beds of loamy marine sediments.

Floridana Fine Sand – The Floridana series consists of very deep, very poorly drained, slowly to very slowly permeable soils on low broad flats, flood plains, and in depressional areas. They formed in thick beds of sandy and loamy marine sediments.

Hallandale Fine Sand – The Hallandale series consists of shallow, poorly and very poorly drained, rapidly permeable soils formed in thin deposits of marine sandy materials over limestone. They occur on broad low flats, sloughs, shallow depressions, and adjacent tidal areas in Peninsular Florida. They are saturated during the summer rainy season and after periods of heavy rainfall in other seasons.

Okeelanta Muck – The Okeelanta series consists of very deep, very poorly drained, rapidly permeable soils in large fresh water marshes and small depressional areas. They formed in decomposed hydrophytic non-woody organic material overlying sand.

Pineda Fine Sand – The Pineda series consists of deep and very deep, poorly and very poorly drained, very slowly permeable soils in depressions, low hammocks, poorly defined drainageways, broad low flats, and flood plains. They formed in thick beds of sandy and loamy marine sediments on the lower Coastal Plain.

Pinellas Fine Sand – The Pinellas series consists of very deep, poorly drained, very rapid to rapidly permeable soils on flats that border sloughs and depressions. They formed in sandy marine sediments over loamy sediments.

Riviera Fine Sand – The Riviera series consists of nearly level, poorly drained soils that have a loamy subsoil. These soils are on broad, low areas and in depressions. They formed in beds of sandy and loamy marine sediment.

Tequesta Muck – The Tequesta series consists of nearly level, very poory drained soils that have a thin organic layer overlying a mineral soil that has a sandy surface layer, a sandy subsurface layer and a loamy subsoil. Tequesta Muck is on broad, low flats and in marshes and depressions.

Wabasso Fine Sand – The Wabasso series consists of nearly level, poorly drained, sandy soils that have a black, weakly cemented sandy layer over loamy material. These soils are in broad, flatwoods areas. They formed in thick beds of sandy marine sediment and the underlying loamy material. Wabasso fine sand is found in broad, flatwoods areas.

There are no areas within the City known to have experienced soil erosion problems. In addition, there are no known sources of commercially valuable minerals and there is no mining of mineral deposits within the City. Mining is not allowed by the Plan.

Air Quality

Air quality within the City of Westlake is generally considered to be good, reflecting regional compliance with federal and state air quality standards. Ambient air monitoring conducted by the Florida Department of Environmental Protection (FDEP) and the U.S. Environmental Protection Agency (EPA) confirms that Palm Beach County is designated as an attainment area for five of the six primary pollutants regulated under the National Ambient Air Quality Standards (NAAQS):

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Particulate matter ($PM_{2.5}$ and PM_{10})
- Sulfur dioxide (SO_2)

The attainment designation indicates that measured concentrations of these pollutants are consistently within limits deemed protective of public health and environmental quality by the EPA and FDEP.

Historically, ozone (O_3) presented a regional concern. Palm Beach County was previously classified as a maintenance area for ozone, reflecting a successful transition from non-attainment to compliance. However, the EPA has since revoked both the 1-hour (1979) and 8-hour (1997) ozone standards on June 15, 2005, and April 6, 2015, respectively, effectively rendering the previous maintenance classification obsolete.
(Source: EPA Green Book)

As of the latest available data, Palm Beach County is not designated as a non-attainment area for any criteria air pollutants, affirming its attainment status under all current federal standards.

Air quality monitoring and regulation at the local level are overseen by the Palm Beach County Health Department, which manages compliance for both mobile and stationary pollution sources. It also administers programs related to asbestos control, open burning, and Pollution Prevention (P2) initiatives.

As development continues in Westlake, maintaining air quality will require ongoing coordination with regional and state agencies. Policies that promote low-emission transportation, green building practices, and urban tree canopy expansion will support continued compliance and contribute to overall environmental health.

Water Resources

Floodplains are generally defined as low-lying areas adjacent to natural watercourses that become periodically inundated during high water events, supporting dynamic floodplain ecosystems. However, in the City of Westlake, such natural flow regimes have been replaced by an engineered drainage system managed by the Seminole Improvement District (SID), which regulates water levels and stormwater flows. As a result, there are no natural floodplains currently present within the City's boundaries.
(Source: USGS Water Glossary)

Although natural floodplain systems are absent, flooding risks remain due to intense rainfall events and the City's relatively flat topography. Areas subject to flooding during a 1% annual chance event (commonly referred to as the 100-year flood) are delineated on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), dated October 5, 2017. These Special Flood Hazard Areas (SFHAs) are primarily designated as Zone AE, where Base Flood Elevations (BFEs) have been established.

The Base Flood Elevation for Westlake's AE zones is 18.5 feet, referenced to the North American Vertical Datum of 1988 (NAVD 88). The City has adopted minimum finished floor elevations that exceed the FEMA BFE, ensuring an added margin of protection against flooding in accordance with its adopted stormwater Level of Service (LOS) standards.

Areas mapped as AE include:

- Man-made swales, canals, and ditches used for prior agricultural irrigation
- Low-lying agricultural fields
- Stormwater retention and detention ponds

As urban development continues, many of these features are being replaced or retrofitted into a comprehensive stormwater management system that includes interconnected lakes and vegetated treatment areas. Consequently, the relevance of existing AE designations may diminish over time as infrastructure improvements elevate and reconfigure topography and surface water conveyance.

Continued coordination with FEMA, Palm Beach County, and SFWMD will be essential to ensure that:

- Future FIRMs reflect land use changes and elevation modifications

- Development remains consistent with updated floodplain management practices
- The City remains eligible for the National Flood Insurance Program (NFIP) and Community Rating System (CRS) incentives, if pursued

Ground Water Recharge

The City is regulated by the SFWMD. The City is located within the SFWMD's Lower East Coast (LEC) Planning Area. The principal ground water resource for the LEC Planning Area is the Surficial Aquifer System. The extensive water management and lake system within the City has been permitted by the SFWMD and will provide for recharge of the local surficial aquifer as required by District regulations.

Water Conservation and Reuse Water

Palm Beach County supplies reuse water to SID through an Interlocal Agreement for the Purchase and Sale of Bulk Reclaimed Water dated April 20, 2010. City residents will use reuse water from SID for landscape irrigation. The existing SID water use permit, which allows for withdrawals from the M Canal for agricultural irrigation purposes, has demands based on the irrigation requirements for agricultural crops. SID will modify its permit over the long term planning period consist with SFWMD requirements as the City develops and agricultural land converts to other land uses. If reuse is not available from the County, it will be supplemented with surface water as allowed pursuant to SID's permit with the South Florida Water Management District. The existing permitted water use allocation (3,000 MGD) can cover the reuse needs of the entire City if reuse is not available from the County.

LAND COVER

Natural Habitats

The City of Westlake has undergone extensive land alteration over the past several decades, primarily due to historic agricultural activities. The area was originally cleared, ditched, and modified for citrus cultivation and other forms of commercial agriculture. These practices, sustained for more than 50 years, resulted in the complete removal of native upland and wetland ecosystems, including the elimination of indigenous vegetation communities and associated wildlife habitats.

As such, there are no functionally intact natural systems remaining within the City, and opportunities for on-site conservation of pre-development ecosystems are minimal. Future ecological value may be achieved through restoration, mitigation, and integration of green infrastructure as part of the City's ongoing urban development.

Wetlands

The agriculture improvements and operations that have been conducted for the past 50 plus years have resulted in no naturally occurring wetlands within the City. There are approximately 258.5± acres of surface waters existing today throughout the City, which consist of man-made swales, ditches, and canals that are currently used or were previously used, for agricultural irrigation at the site, and for surface water management. The swales primarily consist of very shallow depressional areas which can either contain shallow standing water or no water. The ditches primarily consist of unvegetated water areas with steep-

sided unvegetated banks that experience frequently fluctuating water levels depending on on-site agricultural irrigation activities and surface water management. The canals primarily consist of unvegetated, deep water areas with steep-sided unvegetated banks.

During the permitting process for the Minto development, Minto purchased 5.90 freshwater herbaceous federal credits from the Loxahatchee Mitigation Bank in conjunction with the Army Corps of Engineers (ACOE) Permit No. SAJ-2004-07618, which mitigates for Waters of the United States on the property at the time of the permit.

Uplands

As noted earlier, due to previous agricultural activities, no existing native habitats or natural features exist within the City. The agricultural activities since 1964 eliminated any native upland habitats or natural features that may have been present on the property prior to agricultural development.

Although there are areas within the City in which native vegetation can be found, these are limited to tree nursery and pine plantation areas where native species are being cultivated for commercial sale or uses. They do not constitute forests, native habitats or natural features as they are monotypic single species stands under cultivation for production of landscape vegetation or silviculture.

WILDLIFE

Protected Species

Wildlife is a valuable resource within the Palm Beach County area. Although there are no naturally occurring wetlands or preferred habitat for wetland-dependent endangered or threatened wildlife species or species of special concern within the City, man-made ditches, canals, and excavated ponds can support a large number of wildlife species. To date, there are no known threatened or endangered species living within the City.

Invasive Species

South Florida has become an inviting destination for some undesirable species that threaten to undermine the health of the environment. More than an inconvenience, invasive plants and animals can greatly alter the native landscape, adversely impact native wildlife, destroy agricultural crops and threaten public health.

Invasive Plants

Non-native invasive plants were brought into Florida through a variety of methods. Certain non-native plants are more harmful to the ecosystems of Florida than others. Those that begin to cause widespread ecological damage to the native plant and animal communities are called invasive. These non-native invasive plants grow quickly, produce abundant seeds, have no natural enemies, flourish in a wide range of soil conditions, and prevent native species from growing. These invaders destroy natural habitat, out competing native plants for space, soil, sunlight, air, and water. This loss of habitat impacts Florida wildlife. Local and State governments are also affected, spending millions annually to control these invasive non-native plants and to restore natural habitat which has been impacted due to their prolificacy.

Having been in active agriculture over the past 50 years, there are few invasive species remaining within the City. The Plan requires removal of all invasive vegetation identified by the Florida Exotic Pest Plant Council found during the process of approving new development within the City.

Invasive Animal Species

Invasive animal species are not native to Florida and are introduced by human activity. They are brought in either intentionally as ornamentals or pets, or accidentally, as hitchhikers that arrive at airports, seaports or through the mail. Species have always moved around the globe, and the majority are not problematic. It is today's enormous volume of global trade and travel that provides an unprecedented opportunity for species to invade. One-third of all plant species in Florida are now exotic. (https://nps.gov/ever/learn/education/upload/2008-Florida-invaders-For-web.pdf).

Having been in active agriculture over the past 50 years, there is no natural habitat for either native or invasive species within the City.

ENVIRONMENTALLY SENSITIVE LANDS

Environmentally sensitive lands have not been identified or designated within the City. As previously described, the majority of the lands have been utilized for agricultural purposes resulting in the elimination of all native and natural habitat features. Therefore 163.3177(6)(d)2.h., Florida Statutes is not applicable.