CONSERVATION ELEMENT

Data
Analysis

INTRODUCTION

The purpose of this plan element is to outline a strategy for conserving and using the City's natural resources.

DATA AND ANALYSIS

WATER BODIES

Inventory

The south fork of the New River Canal forms the southern boundary of the City. The canal is a major drainage water body of the South Florida Water Management system. Water depths of the canal range between four and ten feet. There are no natural surface water resources in the City. Numerous lakes and ponds have been created to serve residential development. Smaller drainage canals are located throughout the City. Most of these connect in some fashion to the New River Canal. The south fork of the New River Canal merges with the north fork in Fort Lauderdale to form the New River. The New River drains into the Intracoastal Waterway at a point just south of Las Olas Boulevard. See Existing Land Use map for water body locations.

As a non-coastal community, there are no bays or estuaries. Transitional wetland areas located within the City are shown on Figure 1.5 in the Future Land Use Element Volume II (Data and Analysis). They were impacted years ago by agricultural development and clearcutting resulting in loss of hydroperiod and sheetflow.

Although the quality of these transitional wetland areas is very poor, activities requiring dredging and/or filling may require permits if their projects are adjacent to canal systems with the state's jurisdiction. The concern is to maintain state water quality standards in the canal systems. The City has established a wetlands banking program to maintain wetlands and to mitigate any potential loss.

Existing Use

Recreational fishing and boating plus lawn irrigation are the most significant uses of the surface water bodies. A number of golf courses and City parks are located along these water bodies.

Pollution

Stormwater runoff directly affects the quality of the water for recreational uses. Recreation and the promulgation of fish and wildlife is the sole use of canals and waterways in Plantation. Urban and agricultural runoff and, to a lesser extent, wastewater pipe leakage constitute the major sources of surface water pollution.

In order to monitor surface water quality in the County, 44 stations were established where water samples are analyzed on a quarterly basis. Many water quality parameters are analyzed at each station. Among the tests conducted are ones for water temperature; turbidity; PH; specific conductance; salinity; dissolved oxygen; biochemical oxygen demand, organic carbon, organic nitrogen, total phosphorous and fecal coliform. Station 22 is located within Plantation on the North New River Canal at the 125th Avenue bridge (see Figure 7.1). Station 23 is on the same water course but located to the west of the City near U.S. 27.

Dissolved oxygen: The proper amount of oxygen is an important requirement for fish and aquatic organisms. The concentration of dissolved oxygen in the water is the result of photosynthetic activity, decomposition of organic matter, meteorological conditions and other factors. The flushing time of a canal or water body also has a major influence on the oxygen level. The canals in Plantation have small surface areas relative to their depths and many are sheltered from wind-induced mixing. Aeration through mixing at the surface does not work well on waterways that are narrow.

The Broward County Environmental Protection Department has set a minimum standard of 5 milligrams of dissolved oxygen per liter of water. Aquatic animals are not able to inhabit water with less than that amount for extended periods of time. Plantation waterways contain low levels of oxygen. On the average, however, Table 2.44 shows that this measure of water quality improved during the eight-year period.

Table 2.44
Dissolved Oxygen, New River Canal, 2005 and 2016 In Milligrams Per Liter of Water

Station Number	2005 Average	2016 Average	2016 One Day Maximum	2016 One Day Minimum
22 (N.W. 125th Ave)	3.59	3.15	4.59	1.59
23 (U.S. 27)	4.88	5.14	6.18	4.53

Source: Broward County Environmental Planning And Community Resilience, 2016

Phosphate: Phosphorous or phosphate stimulates the growth of algae and rooted aquatic plants. Water which receives sewage, agricultural or industrial wastewater drainage is characteristically high in phosphate concentrations. These increased phosphate concentrations and resultant growths or "blooms" are often associated with what is termed eutrophication. When occurring naturally, eutrophication is a biologically positive activity. However, eutrophication caused by man-made action usually leads to unacceptable changes in water quality including reduction in aesthetic quality (and thus recreational use), the presence of unpleasant taste and odor, and in severe cases, toxic by products. This can also result in difficulties farther along the food chain. The present Broward County Environmental Protection Department (EPD) water quality standard for phosphorous is a maximum of 0.2 mg per liter of water. Based on the data received from the EPD and shown in Table 2.45, a minimal amount of phosphorous is found in the Plantation segment of the Canal, well. below the County's maximum allowable standard.

Table 2.45
Dissolved Phosphorous, New River Canal, 2005 and 2016 In Milligrams Per Liter of Water

Station Number	2005 Average	2016 Average	2016 One Day Maximum	2016 One Day Minimum
22 (N.W. 125th Ave)	0.027	0.013	0.016	0.011
23 (U.S. 27)	0.027	0.021	0.033	0.01

Source: Broward County Environmental Planning And Community Resilience, 2016

Fecal Coliform Group: The source of this pollutant is typically leaking sewer lines and lawn runoff with pet waste.

At present, EPD daily maximum limits for the fecal coliform group in Class III waters is 800 colonies per 100 milliliters of a sample of water (col./100m1) daily maximum. Several runoff-related episodes have significantly increased the amount of fecal coliform in the New River Canal for short periods of time, as shown in Table 2.46.

Table 2.46
Fecal Coliform, New River Canal, 2005 and 2016 In Milligrams Per Liter of Water

Station Number	2005 Average	2016 Average	2016 One Day Maximum	2016 One Day Minimum
22 (N.W. 125th Ave)	266	193	620	5
23 (U.S. 27)	106	188	580	<2

Source: Broward County Environmental Planning And Community Resilience, 2016

Nitrogen: This exists in surface water in several forms. High levels of ammonia-nitrogen often indicate sewage, runoff from agricultural lands or lawn fertilizer. Nitrogen in the form of nitrites is an intermediate stage in the nitrogen cycle and occurs in surface waters as a result of decomposition of plant materials. Trace amounts of nitrite can also indicate certain industrial discharges. High concentrations stimulate growth of algae and rooted aquatic plants. Although the effects of some nitrogen is positive for plant growth, excessive amounts can result in the reduction use of the water body as it becomes a marsh. The Broward County EPD standard for total nitrogen is a maximum of 1.5 mg per liter of water. Plantation surface waters contain lower levels of nitrogen than the County minimum standard. Lawn fertilizer is probably the primary cause of what nitrogen pollution there is in Plantation including some upstream agricultural uses that may impact the New River Canal.

Table 2.47
Total Nitrogen, New River Canal, 2005 and 2016 In Milligrams Per Liter of Water

Station Number	2005 Average	2016 Average	2016 One Day Maximum	2016 One Day Minimum
22 (N.W. 125th Ave)	1.62	2.16	1.77	1.31
23 (U.S. 27)	1.57	1.53	1.84	1.05

Source: Broward County Environmental Planning And Community Resilience, 2016

Future Conservation, Use or Protection

In addition to the canal problems, some detention ponds have been ruled unsafe for fishing due to pollution. The principal implication of this analysis of water body pollution is that efforts should be made to educate the residents about the need to use lawn fertilizer sparingly. It also suggests the importance of periodic sewer line checks to minimize leakage.

The principal use of these water bodies will continue to be fishing, boating and storm runoff storage or control. A linear park is proposed for the Plantation side of the New River Canal. The wetland areas should be preserved (in whole or in part with mitigation) when development occurs on these tracts.

AIR QUALITY

Inventory and Pollution:

The air quality in Broward County is generally in the “good” range over 80% of the time and in the “moderate” range 20% of the time, and has not exceeded the EPA NAAQS for over ten years. The lack of valleys or other restrictive relief features and the subtropical marine climate encourage almost

constant air movement, preventing lasting air inversions and other weather patterns which exacerbate pollution concentrations. As a result, locally produced pollutants are quickly dispersed and replaced by cleaner ocean breezes. The high amounts of annual rainfall also remove particulate matter via scrubbing action. Emission from automobiles is the major air pollution source in the City. Temperature inversions during the morning rush hour tend to elevate pollutant levels, especially ozone. Winds blowing from other urban areas also contribute to the air quality both positively and negatively. Large scale events like major fires in the Everglades can create significant short term air pollution problems.

Ambient air is that part of the outdoor atmosphere to which humans are exposed. The Broward County Environmental Protection Department monitors ambient air at 20 sites throughout the County. One site is just outside Plantation in the Town of Davie. The monitoring site monitors the amount of particulate matter smaller than 2.5 microns and 10 microns in the air.

Particulate Matter: Sources of particulate vary from natural ones such as pollen, sea salt or blowing dust to man-made vehicle emissions, industrial smoke, dust from roads or construction sites, crushed stone processing or lawn mowing in large parks or golf courses. As shown in Table 2.48 and 2.49, amounts of particulate matter monitored in Davie are generally in the good to moderate quality range. Amounts are greatest during the summer months when the hot humid conditions raise the likelihood of an air inversion. Conversely, particle amounts are lowest during October through December.

Table 2.48
Particulate Matter 10 (PM_{10}) Units : $\mu g/m^3$

2016	Quarterly Averages				Ranked 24-hour averages			Weighted Annual Average
	1st	2nd	3rd	4th	1st	2nd	3rd	
	12.0 $\mu g/m^3$	12.1 $\mu g/m^3$	12.6 $\mu g/m^3$	14.0 $\mu g/m^3$	25 $\mu g/m^3$	22 $\mu g/m^3$	22 $\mu g/m^3$	12.6 $\mu g/m^3$

The national ambient air quality standard for PM 10 is: 150 micrograms per cubic meter for a 24-hour average concentration. The 24-hour standard is attained when the expected number of exceedances is less than or equal to 1. The expected exceedances are the averages of the estimated exceedances from the most-recent 3 years.
Source: Broward County Environmental Protection and Growth Management Department, 2016

Table 2.48.1
Particulate Matter 2.5 ($PM_{2.5}$) Units: $\mu g/m^3$

2016	Quarterly Averages				Ranked 24-hour averages			98th Percentile	Weighted Annual Average
	1st	2nd	3rd	4th	1st	2nd	3rd		
	5.77 $\mu g/m^3$	6.45 $\mu g/m^3$	6.53 $\mu g/m^3$	6.07 $\mu g/m^3$	16.8 $\mu g/m^3$	16.0 $\mu g/m^3$	15.7 $\mu g/m^3$	13.7	6.2 $\mu g/m^3$

The national ambient air quality standards for PM 2.5 are: (1) 35 micrograms per cubic meter for a 24-hour average concentration and (2) 12.0 micrograms per cubic meter for an annual mean concentration. The 24-hour standard is attained when the 3-year average of the annual 98th percentile values is less than or equal to the 24-hour standard. The annual standard is attained when the 3-year average of the annual means is less than or equal to the annual standard.
Source: Broward County Environmental Protection and Growth Management Department, 2016

Carbon Monoxide: This is a poisonous gas with no color or taste. Low concentrations occur naturally from plants, forest fires and other sources. CO is also produced from the burning of organic fuels such as coals, gasoline or wood. The largest cause of CO in the Plantation area is emissions from motor vehicles and to a lesser extent, power plants, airplanes and trains. Concentrations of emitted CO are much higher when engines are idling or traffic is moving slowly. The national primary ambient air quality standards for CO are: (1) 9 ppm for an 8-hour average concentration not to be exceeded more than once per calendar year and (2) 35 ppm for a 1-hour average concentration not to be exceeded more than once per calendar year. Table 2.50 details monitored levels of CO for 2016. The amount of carbon monoxide in the Plantation area is well below the minimum acceptable level. The City has implemented an ambitious road landscape program which reduces carbon monoxide impacts along roadways.

Table 2.49
Carbon Monoxide (Trace Level) Units: parts per million (ppm)

2016	Ranked 1-hour averages		Ranked 8-hour averages	
	1st	2nd	1st	2nd
	1.1 ppm	1.1 ppm	0.7 ppm	0.6 ppm

Source: Broward County Environmental Protection and Growth Management Department, 2016

Other Pollutants:

Table 2.49.1
Sulfur Dioxide (Trace Level) Units: parts per billion (ppb)

2016	Ranked 1-hour averages		Ranked 3-hour averages		Ranked 24-hour averages		Annual Average
	1st	2nd	1st	2nd	1st	2nd	
	4 ppb	1 ppb	2 ppb	1 ppb	0 ppb	0 ppb	0.1 ppb

The 1-hour national ambient air quality standards primary standard for SO_2 is met when the design value (3-year average of the 99th percentile annual daily max) is less than or equal to 75 ppb. The national 3-hour ambient air quality secondary standard for SO_2 is 0.5 ppb. The secondary standard is attained when the number of exceedance is no more than once per calendar year.
Source: Broward County Environmental Protection and Growth Management Department, 2016

Table 2.49.2
Ozone Units: (ppb)

2016	Ranked Daily Maximum 8-hour averages			
	1st	2nd	3rd	4th
	0.066 ppm	0.065 ppm	0.062 ppm	0.061 ppm

The 8-hour primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the design value (3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration) is less than or equal to 0.07 ppm. Daily maximum 8-hour averages are computed based on 13 or more valid 8-hr averages from 7AM-11PM.

Source: Broward County Environmental Protection and Growth Management Department, 2016

Analysis

The monitoring program results demonstrate that the County meets all air quality regulatory standards. In comparison to the other metropolitan areas throughout the nation, Broward County ranks near the top; e.g., third best for ozone and fourth for particulate. This is a result of the climate coupled with effective pollution control regulations.

However, a Federal mandate to improve air quality still applies. This requirement comes as a result of the Federal Environmental Pollution Agency classification of the southeastern airshed, which is composed of Broward, Dade and Palm Beach Counties. The airshed concept dictates that air quality standard violations which occur anywhere in the airshed must be addressed by all members. Since Dade County is presently in violation of ozone pollution standards, Broward and Palm Beach must also reduce emissions. Motor vehicles are the principal cause of ozone pollution in South Florida. Ozone is not emitted directly by cars and trucks but is the result of a series of atmospheric reactions in sunlight between nitrogen oxides and hydrocarbons primarily emitted from vehicle exhaust. Ozone in the natural environment appears as a haze on the skyline. Air pollution from cars and trucks accounts for over 90 percent of the ozone in the air.

Several actions are possible to implement an air quality improvement program. The County currently participates in the Regional Planning Council review of the air quality implications of traffic generated by major development projects which are subject to Development of Regional Impact analysis.

However, from the standpoint of Plantation, this analysis underscores the importance of incorporating mass transit into City plans, incorporating landscaping that helps clean the air, and encourages developments which will reduce vehicular trips.

FLOODPLAINS

Inventory

Although almost the entire City is located within the 100 year flood plains, no areas of Plantation are projected to experience significant flooding events. Limited flooding might occur because of overflow from the New River Canal or other storm drainage canals. However, the canal's upstream dam and levee system was constructed primarily for flood control. In the event of a worst case scenario flood, damage would probably be limited to the landscape and water seepage on the first floor. Figure 1.2 in the Future Land Use Element, illustrates and identifies the Federally designated flood zones in Plantation.

Existing Commercial, Recreational and Conservation Uses

Most of Plantation's development is within the 100-year flood plain. The only exception is the southeastern neighborhood.

Pollution

Not applicable.

Future Conservation, Use or Protection

The City's land development code should continue to place flood damage prevention restrictions on all new development to minimize potential damage.

SOIL EROSION

Inventory

No land in Plantation is currently subject to significant erosion. The general topography of the City is flat and the soils are sandy. Erosion occurs in places that either have significant relief, experience severe meteorological or tidal events, or contain soils that are silty and thus subject to runoff. As Plantation contains none of these major contributors to erosion, land is not expected to experience significant erodal events.

Existing Commercial, Recreational and Conservation Use

Not applicable.

Pollution

Not applicable.

Future Conservation, Use or Protection

Not applicable.

COMMERCIALLY VALUABLE MINERALS

Inventory

Based on information obtained in a 1982 survey conducted by the Florida Department of Environmental Regulation, the only commercially valuable mineral mined in Broward County was limestone. Although one mining corporation was identified as having an office in Plantation, no active mines within City boundaries were reported. Mining in Broward County is minor. Non-metallic minerals, mostly crushed limestone and gravel used in construction, account for the majority of mining activity. This activity in Broward County is declining as urban uses encroach into the areas previously limited to mining.

WILDLIFE AND VEGETATIVE COMMUNITIES

Inventory

Natural Vegetation: The City is near build out, so there are no large areas of natural vegetation including none designated by the Broward County Environmental Coalition..

There are several small sites that retain their natural character. A small cypress strand lies to the north of the Deicke Auditorium. Another strand lies in the rear of an automobile dealership on State Road 7. Park and other public sites have retained as much of the native vegetation as is possible. For example, the City library tract has extensive native plant material.

Plantation Acres contains some wooded areas that (with removal of exotic trees) is worthy of retention around the low density residential construction. The existing tree and landscape ordinances are not able to prevent native tree removal in this neighborhood.

Landscape Program: The City has long been recognized for its successful urban landscape program as evidenced by 27 consecutive years of designation as a Tree City USA by the National Arbor Day Association. This designation is given to cities which spend at least $1.00 per capita for tree planting or similar activities. The cornerstone of the Plantation landscape effort is the street tree program. Under this program, interested parties contact the City about the planting of trees adjacent to streets. The City purchases and plants the trees, and bills the requesting owners for 50 percent of the cost.

The City has also adopted a strong landscape ordinance which requires a 30 percent minimum impervious surface ratio for all building projects. The City also requires commercial and multifamily developers to plant street trees if their properties are located on major roadways. Developers are also required to landscape medians that abut their property. The City requires the use of native plant materials in meeting landscape requirements.

Wildlife: Although the City does not contain any extensive natural areas untouched by man, certain forms of wildlife thrive in this urban environment. Rabbits, squirrels and other rodents are prevalent in the City golf courses and landscaped areas. The City is home to several endangered or threatened species at certain times of the year. Animals (and plants) that are threatened or endangered are listed in the appendix, also listed are the bird species found in the Plantation area. The Landscape Department determines which yards may be awarded the designation as a certified wildlife habitat.

The Plantation Preserve Golf Course houses a linear park and 29 acres of wetland preserve that numerous wildlife species are now calling home.

Policing of boat speeds in the canals is important to the reservation of manatees and alligators. The emphasis upon preserving native vegetation in the parks and Plantation acres is prompted by the need for habitats for the Osprey, Kestrel, Peregrine Falcon and other wildlife.

Fisheries and Marine Habitats: With no ocean or estuary frontage and no other extensive water bodies, these are not applicable.

Existing Commercial, Recreational or Conservation Use

Recreational Use: The extensive public and private open space system in Plantation provides the principal use and conservation of plants and thus wildlife.

The largest example is 667 acre Markham Park located just west of Plantation. It includes 82 camp sites, an observatory, a boat ramp, hiking trails and canoe rentals. Within Plantation, Heritage Park is a 90 acre County facility which includes extensive natural areas with picnic facilities. One interesting feature of the park is an agricultural learning center. The area contains a working garden with space for outdoor classrooms and demonstrations. A portion of the garden is available for children to grow their own plants. Four golf courses are located in the City. They are 1) the Jacaranda Country Club on Broward Boulevard, 2) the Lago Mar golf course located on Southwest 127th Avenue, 3) the Fort Lauderdale Country Club on Country Club Road and 4) the Plantation Preserve on West Broward Boulevard, which includes a wetlands linear park. Each of these courses contains extensive trees, lakes and natural vegetation.

Managed Major Natural Area: The Everglades Conservation Area Number 2 is managed by the Florida Fresh Water Fish and Game Commission and is located just west of the City. The major purpose of the area is to provide flood control and water conservation. The wildlife and plant management responsibilities are retained by the Freshwater Fish and Game Commission while the South Florida Water Management District manages the quantity and quality of water resources. Water Conservation Area 2 encompasses 2,500 acres of wetland, sawgrass, Cypress domes, slew and tree islands. The area is part of the geologic region known as the Everglades and supports extensive plant and wildlife communities as well as its aquifer recharge function.

Pollution Problems

None of the vegetation areas cited are threatened by pollution.

Future Conservation, Use or Protection

Since most of the City's significant vegetation and wildlife habitat areas are in public ownership or required to remain in private open space, only vigilance of maintenance programs is relevant. However, Plantation Acres deserves special attention as does the development code in general, as it relates to landscaping and pond design.

WATER SOURCES AND NEEDS

Groundwater Sources

The Biscayne Aquifer is the prime groundwater resource for all areas of south Florida. The Federal Environmental Protection Agency has designated the Biscayne Aquifer as

sole drinking water source for the Dade, Broward and Palm Beach Counties. Recent regulations have made utilities investigate the use of alternate water supply, including the Floridan Aquifer.

The Biscayne Aquifer is a permeable sediment body of varied thickness, ranging from approximately 200 feet in depth near the coast to less than 80 feet in the western conservation areas. Since the aquifer is unconfined, water is withdrawn via the pump method rather than rising naturally as would happen under artesian conditions. The aquifer is recharged by a combination of local rainfall and surface water released from Lake Okeechobee through the regional water management canal system, in spite of the high rate of recharge, the Biscayne Aquifer is constantly under stress caused by a variety of natural and man-made factors. The combined impact of heavy withdrawal, salt water intrusion and chemical contamination have placed a heavy burden on this water source.

The South Florida Water Management District (SFWMD) has prepared a water shortage plan to be used in times of drought emergencies. The plan is designed to produce an immediate but temporary overall reduction in pumpage from the aquifer. The plan also raises the awareness of water resources and emphasizes the importance of water conservation. The City is required to conform to a County ordinance based upon the SFWMD plan.

The 2007 Regional Water Availability Rule limits the ultimate consumptive use allocation from the Biscayne aquifer to the highest consecutive 12-month period of usage during the five year period proceeding April 1, 2006. This "base condition water use" restricts Plantation to a 17.4 MGD AADF allowance from the Biscayne Aquifer.

Groundwater Pollution

The Broward County Environmental Protection Department of Natural Resource Protection (EPD), in cooperation with the U.S. Geological Survey (USGS), initiated groundwater quality monitoring program for Broward County. The system consists of 61 monitoring wells in 31 locations with most locations containing a cluster of two wells. The locations were selected to monitor the quality of water flowing to wellfields as well as within wellfields. In most locations, one deep well and one shallow well were constructed. No identification of site specific contamination was intended to be identified.

The two monitoring stations within Plantation are 1) along the Panama Canal to the west of Pine Island Road, and 2) at the City park near Northwest 72nd Avenue and 11th Place. See Figure 7.1. Based on the data from these monitoring wells, the groundwater quality has been consistently good. Evaluations from the Water Management District indicate that the groundwater quality in Plantation is better than most cities in the County because of its proximity to the Conservation Area.

Hazardous Waste

The private hauler under contract to the City inadvertently picks up some household hazardous waste when it is mixed with other garbage. To help counter this, Broward County organizes amnesty days on an annual basis whereby specially trained public sanitation workers set up disposal areas for potentially dangerous substances. The City does not have a large amount of land in industrial or heavy commercial use of a kind that generates hazardous waste.

The County's 1984 Storage Tank Regulations supplement and the Wellfield Protection Ordinance are aimed at controlling the use and storage of potentially hazardous waste in or near wellfields.

Policy 3.1.1 of the Infrastructure Element, Potable Water, discourages land use plan amendments that propose industrial uses that could result in contamination of the groundwater.

Potable Water Needs

The South Florida Water Management District (SFWMD) has determined that traditional water supply sources will not be sufficient to meet the demands of the growing population and needs of the environment, agriculture, and industry over the next twenty years. The Florida Legislature enacted bills in 2002, 2004 and 2005 in order to more effectively address the state's water supply needs as potential limitations on the continued use of traditional water supplies, such as the Biscayne Aquifer, became increasingly apparent. Significant changes were made to Chapters 163 and 373, Florida Statutes (F.S.) in 2005 to improve the coordination of water supply and land use planning. Senate Bills 360 and 444 strengthened the linkage between the regional water supply plans prepared by the water management districts and comprehensive plans prepared by the local governments.

The SFWMD approved the Lower East Coast Water Supply Plan 2005-2006 Update in February 2007 which encouraged the development of alternative water supply projects in the wake of uncertainty concerning water availability from the regional system. Accordingly, the SFWMD adopted the Regional Water Availability Rule (RWAR) in February 2007 which limits the amount of water that can be withdrawn from the Biscayne Aquifer for future water supply. Based on the restrictions identified in the RWAR, the City of Plantation raw water allowance from the Biscayne Aquifer is capped at 17.4 million gallons per day (MGD) annual average daily flow (AADF).

The City of Plantation is required to submit a 10-year water supply facilities work plan (hereinafter referred to as the Water Supply Plan) in order to comply with the current provisions of Chapter 163, F.S. and the Florida Department of Economic Opportunity (DEO). The Work Plan must address the development of traditional and alternative water supplies, sales agreements, and conservation and reuse programs that are necessary to serve existing and new development for at least a 10-year planning period. Chapter 163, F.S. requires local governments to prepare and adopt Water Supply Plan into their comprehensive plans within 18 months following water management district approval of a regional water supply plan or its update.

The City currently has two wellfields. The eastern district wellfield contains 8 individual wells with a total drawing capacity of 12.0 mgd. See Figure 1.3. The City has eight wells in the central district wellfield. This field provides a capacity of 12.0 mgd. Salt water intrusion into the Biscayne Aquifer within the City of Plantation is not considered to be a problem now or in the foreseeable future.

Existing and future population and water demand is listed in Table 2.50. There is adequate well capacity to meet the buildout population of the City. There are no agricultural or unique industrial water needs; therefore the City does not keep data on the water use/demand separate from other non-residential uses.

Table 2.50
Projected Water Needs, 2015-2040 City of Plantation

Year	City of Plantation Population Served	City of Plantation Average Daily Water Demand in Millions of Gallons Per Day
2015	85,648	10.88
2020	86,928	11.04
2025	87,053	11.06
2030	87,518	11.11
2035	92,074	11.69
2040	97,041	12.37

Source: City of Plantation Utilities Department, 2014.

Water Conservation

The most effective water conservation program initiated by the City was related to the change in billing for water consumption. Effective 1984, the City began assessing sewer charges based on the metered water use rather than on the number of bathrooms, thereby further encouraging water conservation. The City Utilities Department has also been distributing educational materials related to the conservation of water. The City of Plantation in February 2008 initiated a rate schedule to "ticket" water users who are abusing the water restriction limitations as set forth by the SFWMD an ordinance to enable the City to enforce SFWMD restrictions through fines. This ordinance is coupled with and existing tiered rate system currently enjoyed employed by the City. The City of Plantation intends to adopt a water conservation ordinance (See Infrastructure Element Policy 7.5.4) by June 2009, that will have water conservation results similar in nature to the water restrictions that were in place in 2001; resulting in a water consumption rate of 171 GPCD (139 GPCD finished water) or a 10% reduction from current the average daily use of 158 GPD (SFWMD Lower East Coast Water Supply Plan Update 2005-2006).

The City of Plantation is limiting residential water usage, including landscape irrigation, in order to reduce per capita water consumption, through the tiered rate for water usage, and ticketing fines imposed as previously stated above.

The City of Plantation intends to adopt a water conservation ordinance (See Infrastructure Element Policy 7.5.4) by June 2009, that will have water conservation results similar in nature to the water restrictions that were in place in 2001; resulting in a water consumption rate of 171 GPCD (139 GPCD finished water) or a 10% reduction from current average use. The City of Plantation is limiting residential water usage, including landscape irrigation, in order to reduce per capita water consumption, through the tiered rate for water usage and ticketing fines imposed as stated above.

Similarly, per capita water consumption dropped considerably in 2007 to 159 GPCD (raw water) in the wake of water restrictions, or a reduction of sixteen percent. First quarter pumpage comparisons (January to April 2008) shows a 22% reduction of consumption when compared to the first quarter last year.

Although a deficit is not presently projected for the City of Plantation, future updates/ revisions to population projections and/or per capita water use could result in a future need for alternative water supply projects. Furthermore, the City may desire to partner with other utilities to develop alternative water supplies. These utilities would be those that project a raw water supply deficit or that have other regulatory drivers for implementing a reclaimed water project. Potentially, the Project's cost would be shared with the other utilities. For these reasons, the City of Plantation maintains a conceptual alternative water supply project, Spray Irrigation to Jacaranda Golf Course and Plantation Preserve, for future consideration.

The City already has an emergency water conservation ordinance, other water conservation measures should be considered such as xeriscape, whereby native and drought tolerant vegetation is utilized.

APPENDIX

Federally Listed & Candidate Species in Broward County, Florida *Updated September 28, 2006*			
	Common Name	**Scientific Name**	**Federal Status**
Mammals	Florida panther	*Puma (= Felis) concolor coryi*	E
	Puma (=mountain lion)	*Puma (= Felis) concolor (all subsp. except coryi)*	T/SA
	Southeastern beach mouse	*Peromyscus polionotus niveiventris*	T
	West Indian manatee	*Trichechus manatus*	E
Birds	Audubon's crested caracara	*Polyborus plancus audubonii*	T
	Bald eagle	*Haliaeetus leucocephalus*	T
	Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E, CH
	Florida scrub-jay	*Aphelocoma coerulescens*	T
	Ivory-billed woodpecker	*Campephilus principalis*	E
	Piping plover	*Charadrius melodus*	T
	Red-cockaded woodpecker	*Picoides borealis*	E
	Red knot	*Calidris canutus rufa*	C
	Wood stork	*Mycteria americana*	E
Reptiles	American crocodile	*Crocodylus acutus*	E
	American alligator	*Alligator mississippiensis*	T/SA
	Eastern indigo snake	*Drymarchon corais couperi*	T
	Green sea turtle [1]	*Chelonia mydas*	E
	Hawksbill sea turtle [1]	*Eretmochelys imbricata*	E
	Leatherback sea turtle [1]	*Dermochelys coriacea*	E
	Loggerhead sea turtle [1]	*Caretta caretta*	T
Fishes	Smalltooth sawfish [2]	*Pristis pectinata*	E
Invertebrates	Bartram's hairstreak butterfly	*Strymon acis bartrami*	C
	Florida leafwing butterfly	*Anaea troglodyta floridalis*	C
	Staghorn coral [2]	*Acropora cervicornis*	PT
Plants	Beach jacquemontia	*Jacquemontia reclinata*	E
	Johnson's seagrass [2]	*Halophila johnsonii*	T, CH
	Okeechobee gourd	*Cucurbita okeechobeensis* ssp. *okeechobeensis*	E
	Tiny polygala	*Polygala smallii*	E

E=Endangered; T=Threatened; PE=Proposed Endangered; PT=Proposed Threatened; C=Candidate; SA=Similarity of Appearance to a listed taxon; XN=Experimental Population, Non-Essential; CH=Critical Habitat; PCH=Proposed Critical Habitat; [1]=National Marine Fisheries Service has lead for this species in the water, please contact National Marine Fisheries Service for more information and/or consultation for aquatic projects; [2]=National Marine Fisheries Service has lead for this species, please contact National Marine Fisheries Service for more information and/or consultation

Source: U.S. Fish and Wildlife Service

Local Bird Species

Bird	Abundance	Classification
Pied Bill Grebe	C	w
American Anhinga	C	r
Great Blue Heron	C	r
Green Backed Heron	C	r
Little Blue Heron	C	r
Cattle Egret	C	r
Great Egret	C	r
Snowy Egret	C	r
Tri-color Heron	C	r
Yellow Crowned Night Heron	C	r
Blue-winged Teal	C	w
Ring Necked Duck	C	w
Red Tailed Hawk	U	r
Red Shouldered Hawk	C	r
Broad Winged Hawk	C	m
Osprey	C	r
Peregrine Falcon	U	w
Merlin	U	w
American Kestrel	C	w
Common Moorhen	C	r
American Coot	C	w
Killdeer	U	r
Spotted Sandpiper	C	w
Solitary Sandpiper	U	m
Greater Yellowlegs	C	w
Lesser Yellowlegs	C	w
Black-Necked Stilt	C	s
Ring-billed Gull	C	w
Laughing Gull	C	r
Forster's Tern	C	w
Little Tern	C	s
Black Skimmer	C	r
Rock Dove	C	r
Ground Dove	C	r
Red Fronted Amazon	R	r
Yellow-billed Cuckoo	C	s
Black-billed Cuckoo	U	m
Smooth-billed Ani	C	r
Common Screech Owl	C	r
Chuck-will's-widow	C	r
Whip-poor-will	C	w
Common Nighthawk	C	s

Chimney Swift	R	m
Ruby Throated Hummingbird	U	w
Belted Kingfisher	C	w
Common Flicker	C	r
Pileated Woodpecker	U	r
Red-bellied Woodpecker	C	r
Yellow-bellied Sapsucker	C	w
Downy Woodpecker	U	r
Eastern Kingbird	C	m
Western Kingbird	U	w
Eastern Phoebe	C	w
Great Crested Flycatcher	C	r
Eastern Pewee	U	m
Tree Swallow	C	w
Rough Winged Swallow	C	w
Barn Swallow	C	m
Purple Martin	C	m
Blue Jay	C	r
Fish Crow	C	r
House Wren	C	w
Carolina Wren	C	r
Northern Mockingbird	C	r
Gray Catbird	C	w
Brown Thrasher	U	r
American Robin	C	w
Wood Thrush	R	m
Hermit Thrush	U	w
Swainson's Thrash	U	m
Grey-cheeked Thrush	R	m
Veery	U	m
Blue-gray Gnatcatcher	C	w
Ruby-crowned Kinglet	U	w
Cedar Waxwing	C	w
European Starling	C	r
White-eyed Vireo	C	r
Yellow-throated Vireo	C	m
Solitary Vireo	C	m
Black-whiskered Vireo	C	s
Red-eyed Vireo	U	m
Black-and-white Warbler	C	w
Prothonotary Warbler	U	m
Swainson's Warbler	R	m
Worm-eating Warbler	U	m
Tennessee Warbler	R	m
Orange-crowned Warbler	U	w

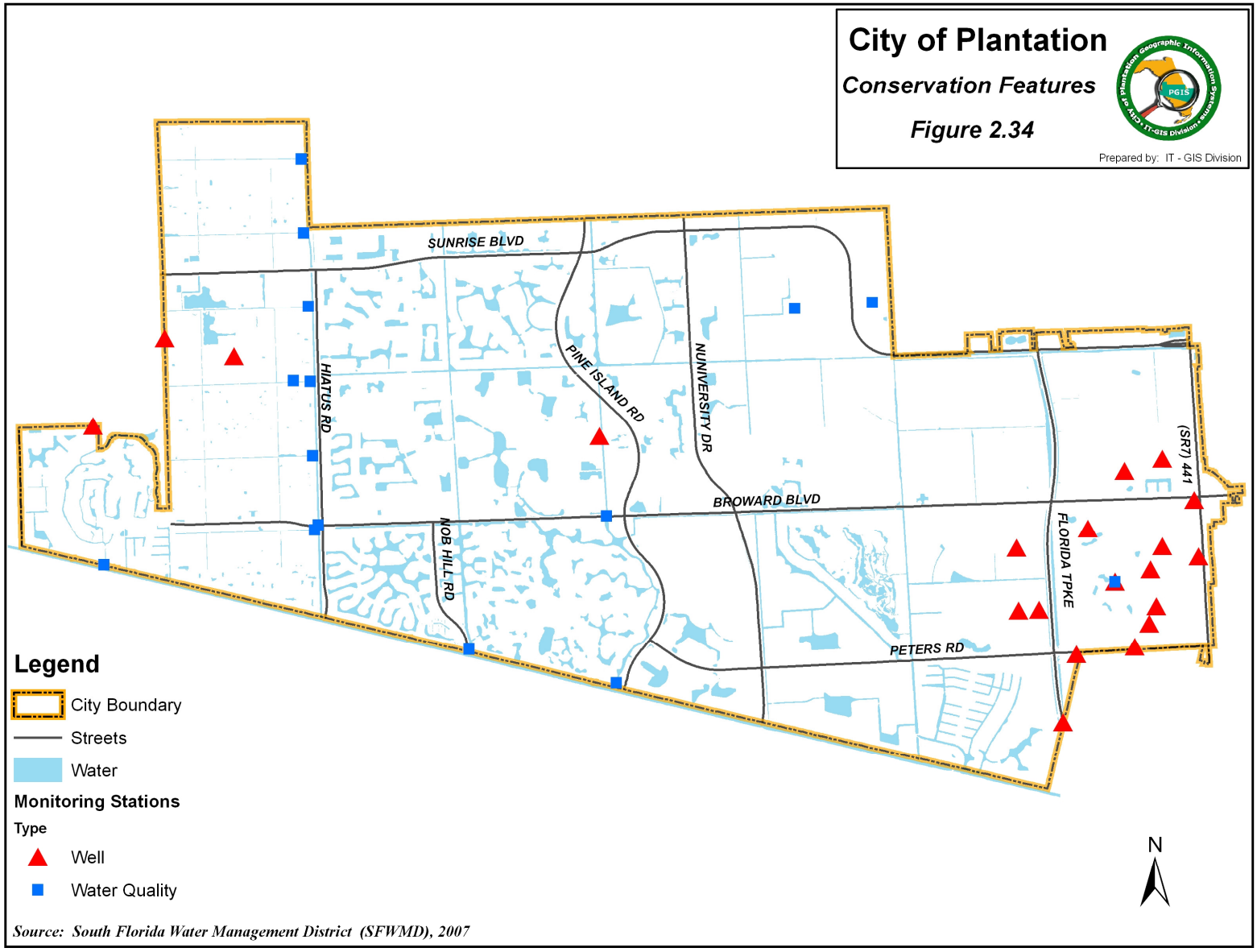
Nashville Warbler	R	m
Northern Parula Warbler	C	w
Yellow Warbler	U	r
Magnolia Warbler	U	m
Cape May Warbler	C	m
Black-throated Blue Warbler	C	m
Yellow-rumped Warbler	C	w
Chestnut-sided Warbler	U	m
Bay-breasted Warbler	U	m
Blackpoll Warbler	C	m
Prairie Warbler	C	w
Palm Warbler	C	w
Ovenbird	C	w
Northern Waterthrush	U	w
Louisiana Waterthrush	R	w
Kentucky Warbler	U	m
Connecticut Warbler	R	m
Common Yellowthroat	C	r
Yellow-breasted Chat	U	w
Hooded Warbler	U	w
Wilson's Warbler	U	m
Canada Warbler	U	m
American Redstart	C	m
House Sparrow	C	r
Bobolink	C	m
Red-winged Blackbird	C	r
Spotted Oriole	C	r
Northern Oriole	C	w
Boat-tailed Grackle	C	r
Common Grackle	C	r
Stripe-headed Tanager	R	o
Western Tanager	R	m
Scarlet Tanager	U	o
Summer Tanager	U	r
Northern Cardinal	C	r
Rose-breasted Grosbreak	C	m
Blue Grosbreak	U	m
Indigo Bunting	C	w
Painted Bunting	C	w
American Goldfinch	C	w
Rufous-sided Towhee	U	r
Savannah Sparrow	C	w
Swamp Sparrow	C	r

NOTE:

C Common; often seen or heard in appropriate habitat.
U Uncommon; usually present, but not always heard or seen.
R Rare; present only in small numbers-seldom seen or heard.

r Resident; present all year-abundance may vary w/season.
s Summer visitor (including spring and fall).
w Winter visitor (including spring and fall).
m Migrant; ordinarily present only during migration.
o Occasional or casual visitor.

Source: Checklist of Southern Florida Birds compiled by Dr. Ira Joel Abramson and Dr. Oscar T. Owre for the Florida Audobon Society as listed in Broward County Comprehensive Plan Conservation Element Volume 4 Support Documents Appendix C.


City of Plantation
Conservation Features
Figure 2.34
Prepared by: IT - GIS Division
SUNRISE BLVD
HIATUS RD
PINE ISLAND RD
NUNIVERSITY DR
BROWARD BLVD
NOB HILL RD
PETERS RD
FLORIDA TPKE
(SR7) 441
Legend
City Boundary
Streets
Water
Monitoring Stations
Type
Well
Water Quality
N
Source: South Florida Water Management District (SFWMD), 2007