



City of Pompano Beach, Florida

Comprehensive Plan Conservation Element

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Ordinance 210 - 19

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City of Pompano Beach, Florida

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**CITY OF POMPANO BEACH, FLORIDA
COMPREHENSIVE PLAN
JANUARY 2010**

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I. INTRODUCTION

The Conservation Element of the Comprehensive Plan has been prepared consistent with the applicable sections of Rule 9J-5 of the Florida Administrative Code. This updated Element incorporates the recommended EAR Based Amendments and revisions in the data and analysis to reflect current conditions and annexations.

Walter H. Keller, Inc. was retained by the City in 2006 to prepare its updated Conservation Element. The format of the Element varies from the former document in that the City previously adopted the entire document including the Goals, Objectivities and Policies, the Natural Resource Maps, the data and analysis, and the Land Use Implementation were adopted.

This document incorporates an entirely new data and analysis section reflecting approximately a 25% increase in City area. Underlines and strike-thru's are provided in the Goals, Objectives and Policies. The new data and analysis, however, fully replaces the former data and analysis without strike-thru's and underlines.

II. CONSERVATION ELEMENT GOALS, OBJECTIVES AND POLICIES

Goal

09.00.00 To protect, enhance and effectively manage the natural resources of the City in order to achieve a high environmental quality including factors that effect energy conservation.

Objective **Air Quality**

09.01.00 The City shall put forth an effort to ensure compliance with the minimum air quality standards established by the Florida Department of Environmental Protection and the Broward County Department of Environmental Protection including factors that effect energy conservation.

Policies

09.01.01 The City shall coordinate with Broward County Department of Environmental Protection efforts to preserve air quality.

09.01.02 The City shall implement a Climate Change Program that supports mitigation and sensitivity to the impacts of climate change in coordination with other municipalities, Broward County, private businesses, other governmental agencies and the State of Florida. This program will focus on mitigating the causes and consequences of greenhouse gas emissions in a cost-effective and efficient manner that preserves the City's overall values and quality of life.

Objective **Surface Water Quality**

09.02.00 The City shall continue to undertake the following actions to assure surface water quality including impacts on the ocean are minimized.

Policies

- 09.02.01 Enforce the City regulations that require new development (other than low density residential) retain the first flush of storm water before it enters surface water bodies and in other ways meet the "best management practices" of the South Florida Water Management District.
- 09.02.02 The City shall encourage the appropriate agencies to monitor wastewater discharged into the ocean to assure compliance with secondary wastewater standards.
- 09.02.03 The City shall report all prohibited discharges of untreated wastewater into canals and the Intracoastal Waterway to the Broward County Department of Environmental Protection and/ or the South Florida Water Management District .
- 09.02.04 The City shall encourage the planting of acceptable vegetation along waterways to provide cleansing action, except where sea walls now exist.
- 09.02.05 The City shall keep any ocean sewage outfall at least one mile from the off-shore coral reef tract.
- 09.02.06 The Broward County Department of Environmental Protection requires all marinas to have pumpout facilities and prohibits discharge from boats into the surface water and to obtain a permit for such operation.
- 09.02.07 The City and other regulatory agencies shall require the use of proper turbidity control measures during any major operation (e.g. beach re-nourishment) in the vicinity of the coral reef and the responsible permitting agency shall monitor the measures.
- 09.02.08 The City shall coordinate with Broward County in the environmentally sensitive management of aquatic weeds.

- 09.02.09 The City shall conduct canal dredging in an environmentally sound manner.
- 09.02.10 The City shall encourage the rapid cleanup of any off-shore oil spill; this is the responsibility of County and Federal agencies.
- 09.02.11 The City shall conform to the flood management plans of the County, South Florida Water Management District and local drainage districts in order to maintain adequate flood carrying and storage capacities.
- 09.02.12 The City shall encourage the use of on-site lakes to meet irrigational water needs.
- 09.02.13 The City shall preserve and manage wetlands in compliance with the County, State and Federal regulations.
- 09.02.14 The City shall continue to maintain Chapter 53 of the Land Development Regulations to ensure consistency with Broward County Code of Ordinances which establish stormwater quality standards.

Objective Ground Water Quality

- 09.03.00 The quality and quantity of the City's groundwater resources shall be maintained and, where possible, enhanced.

Policies

- 09.03.01 The City shall make certain that all development within a production "wellfield cone of influence" complies with the County Wellfield Ordinance.
- 09.03.02 The western wellfield production quantity and quality shall be monitored particularly because of the increasing reliance on that wellfield.

- 09.03.03 City policies shall promote water conservation and, wherever possible, promote and continue the re-use of water where the quality requirements permit.
- 09.03.04 The City shall keep current the emergency water conservation plan.
- 09.03.05 The City shall make certain that all unused wells are capped (per County and SFWMD regulations) to avoid pollution.
- 09.03.06 The City shall explore the possibility of servicing alternative sources of water.
- 09.03.07 The City shall, within its jurisdiction, enforce the graduated detailed and specific water reductions set forth by the South Florida Water Management District during times of water shortage.
- 09.03.08 The City will adopt and enforce stormwater discharge water quality standards as established by Broward County, specifically Article V, Chapter 27 of the Broward County Code of Ordinances, and as specified in the National Pollution Discharge Elimination System (NPDES) permit.
- 09.03.09 The City shall implement the permit regulations contained within the National Pollution Discharge Elimination System (NPDES) permit when issued by the EPA and provide adequate funding,
- 09.03.10 The City shall continue its water reuse program to combat saltwater intrusion.
- 09.03.11 Protect and conserve the water resources of the Biscayne Aquifer by reducing the per capita demand for potable water and developing alternative water supplies, primarily reuse water.

Objective Soil Erosion

09.04.00 The City shall enforce the adopted soil erosion controls.

Policies

09.04.01 All new development permits will comply with City regulations requiring shoreline and slope stabilization during and after all development activity, including vegetative stabilization after development.

09.04.02 The City shall work with the U.S. Soil Conservation Service in their soil erosion control program.

09.04.03 All mining and quarrying activities in Pompano Beach shall comply with the permit requirements of the Broward County Department of Environmental Protection.

Objective Native Plant & Wildlife Protection

09.05.00 All ecological communities identified by Broward County Department of Environmental Protection and the City as known to contain plant species listed in the Regulated Plant Index for protection by the Florida Department of Agriculture and Consumer Services shall be managed, protected and conserved as appropriate.

Policies

09.05.01 In reviewing development applications or park proposals, efforts will be made to preserve native vegetative communities.

09.05.02 City policies and ordinances will support Broward County's efforts:

- A. The sea turtle head start program, including beach lighting controls, and
- B. The Florida Manatee protection program, including concerted winter enforcement of boat speed regulations.

- C. Protect and conserve those areas known to be reproduction, nesting and feeding areas for animals listed in Appendix 19-2 of the Broward County Land Use Plan as endangered or threatened species or species of special concern.

09.05.03 In the case of new development, enforce city regulation which require the berming of viable remaining Cypress stands to insure the viability of their ecosystems.

Objective Natural Habitats

09.06.00 The City shall use a combination of public education, land acquisition and ordinances to achieve protection or mitigation of the remaining natural habitats.

Policies

09.06.01 Where feasible environmentally significant portions of the one remaining Urban Wilderness areas shall be preserved.

09.06.02 In accordance with the City landscape ordinance continue to levy severe penalties for removal of native vegetation, and encourage the planting of native vegetation coupled with the removal of exotic vegetation as a part of the site plan review process.

09.06.03 The City ordinances shall require mitigation of all adversely impacted wetlands.

09.06.04 The City ordinances shall encourage the planting of vegetation along the shores of ponds, lakes, borrow pits, and swales.

09.06.05 The City shall require that fisheries, wildlife habitat, lakes, floodplains, estuarine marshes and marine habits are preserved and conserved in compliance with applicable County, State and Federal regulations.

09.06.06 The City shall coordinate inter-governmentally when opportunities for the preservation or conservation of unique vegetative communities are located within multiple governmental jurisdictions.

09.06.07 All natural ecological communities which have been identified as the basis for management using the criteria established by Broward County related to Local Areas of Particular concern and in particular for the protection of rare and endangered specie shall be designated on the Land Use Plan Map.

Objective Hazardous Waste

09.07.00 The City shall comply with the County hazardous waste management program relative to the storage, recycling, and disposal of hazardous waste.

Policies

09.07.01 The City shall coordinate with the County's emergency response plan to handle accidents involving hazardous wastes.

09.07.02 The City shall promote the recycling of hazardous wastes by:

A. Distributing lists of approved recyclers, and

B. Publicizing County "amnesty days".

Objective Dune Restoration

09.08.00 The sand dune system shall be completed along the City-owned beach front in accordance with the Beach Master Plan.

Policies

- 09.08.01 The City shall use its development code standards for the beach sand dune to assure proper location, vegetation, walkovers, etc., when private development takes place.

- 09.08.02 The City shall work with the Broward County Department of Environmental Protection to assure that any beachfront construction obtains a Coastal Construction Permit.

III. DATA AND ANALYSIS

Air Resources

The primary regulatory agencies involved with managing air quality within the City of Pompano Beach are the Air Quality Section of the Pollution Prevention, Remediation & Air Quality Division of the Broward County Environmental Protection and Growth Management Department (BCEPGM), the United States Environmental Protection Agency (EPA) and the Air Resource Management Division of the Florida Department of Environmental Protection (FDEP).

The BCEPGM operates under Chapter 27 of the Broward County Code of Regulations. Their duties required under this Chapter are to eliminate, prevent and control air pollution. The Chapter was adopted to achieve and maintain certain levels of air quality as to protect human health and safety, prevent injury to plant and animal life and property, foster the comfort and convenience of people, promote the economic and social development of this county and facilitate the enjoyment of the natural attractions of this county.

The legal authority for Florida's air resource management program is embodied in the Florida Statutes. In particular, Chapter 403, F.S., gives the FDEP authority to establish and administer a comprehensive air pollution control program and carry out the state's responsibilities under the federal Clean Air Act. Their duties involve reviewing plans for proposed development coordinating and monitoring the activities of local agencies and monitoring the regional air quality.

Broward County's air quality is considered "good" most of the time and has not exceeded federal NAAQS standards for many years. South Florida was re-designated an "attainment" area in 1996. According to the Broward County 2008 Environmental Benchmarks Report, Broward County outdoor air quality was rated "good" eighty-three percent (83%) of the time.

Water Resources

The water resources identified within the City of Pompano Beach include surface water (both marine and fresh) and groundwater. Regulatory agencies involved in the management and protection of the City's water resources include:

- Florida Department of Environmental Protection (FDEP)
- Broward County Environmental Protection & Growth Management Dept (BCEPGM)
 - Environmental Monitoring & Enforcement (BCEME)
 - Natural Resource Planning & Management (BCNRPM)
 - Water Resources Division (BCWR)
- South Florida Water Management District (SFWMD)
- United States Geological Survey (USGS)
- United States Coast Guard (USCG)

Figure 1 depicts locations for monitoring the air and water quality within the City.

Figure 1 - Air & Water Quality Monitoring Stations



Surface Water

The FDEP has developed a classification program for all waters within the State. The Florida Administrative Code (FAC) Chapter 62-302 (Water Quality Standards) lists the classification criteria. All surface waters within the study area are defined by FAC Chapter 62-302.530 as Class III waters. A class III Surface Water is defined by the state as water which can be utilized for recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

Marine Surface Waters

With the exclusion of approximately three (3) miles of coastline within the study area, the dominant marine water resource in the City of Pompano Beach is the Intracoastal Waterway and the intricate and extensive network of finger canals. The City's adopted Recreation and Open Space Element lists a total of thirty-two (32) miles of navigable waterways within the City. The locations of these canals are shown in Figure 2. Within the network of finger canals, six (6) marine water lakes have been identified.

Fresh Surface Waters

Salinity structures are used to create a head of subsurface fresh water to hold the salt zone in place. One structure is located on the Pompano Canal, just east of the Cypress Road bridge. The second structure is located on the Cypress Creek Canal, just east of Dixie Highway. Surface waters located to the west of the salinity control structures are fresh water.

A network of canals and interconnected lakes have been constructed to facilitate drainage. Two primary waterways provide drainage for the City: the Pompano Canal; and, the Cypress Creek Canal, also known as the C-14 Canal. A large portion of the lakes are relatively small in size and are privately owned. The locations of the canals, lakes and borrow pits are shown in Figure 2.

One of the borrow pits, Rock Lake, is being filled by the owner with clean construction debris to create additional land for industrial development. Other borrow pits may also be filled in a similar manner in the future to provide developable land parcels.

Water Quality

The local regulatory agency monitoring and regulating the ground and surface water quality within the City of Pompano Beach study area is the Broward County DEP. Four sampling stations, numbers 5, 6, 7 and 35, have been established within the City. Monitoring station number 34, located just north of the City is also indicated. Figure 1 shows the locations of the five DEP monitoring stations. Sampling occurs at quarterly intervals and each station is sampled for the following parameters:

- water temperature
- pH
- specific conductance
- dissolved oxygen
- biochemical oxygen demand
- total organic carbon
- organic nitrogen
- total ammonia nitrogen
- fecal Coliform
- fecal Streptococci
- total kjeldahl nitrogen
- nitrates
- nitrites
- total nitrogen
- total phosphorous
- total Coliform
- fecal Coliform
- fecal Streptococci

The applicable water quality standards, which the quarterly sampling results must be compared to are defined in the Broward County Code of Ordinances Chapter 27 – Pollution Control, Article V – Water Resource Management.

Standards for marine waters are defined by the Florida Department of Environmental Protection, Florida Administrative Code Chapter 62-302.530 criteria for Class III waters.

Sources of Pollution Problems

The following are potential and existing sources of surface and groundwater pollution in Pompano Beach.

Pollution to Surface Water Quality

- Ocean sewage outfall
- Runoff of hazardous wastes (pesticides, herbicides, etc.)
- Petroleum spills from motor boats
- Stormwater runoff
- Possible disaster with oil tanker
- Animal wastes
- Any secondary effluent discharged to canals from wastewater treatment plants
- Industrial wastes dumped in canals
- Saltwater intrusion

Pollution to Ground Water Quality

- Septic tank overflow
- Leaking storage tanks
- Hazardous material dumpage
- Infiltration into the Biscayne aquifer of pesticides, herbicides and fertilizers
- Leachate production from landfills
- Infiltration of runoff water from roads
- THM (trihalomethane) production (when chlorine from water treatment plants react with organics in the water)
- Saltwater intrusion

Flood Plains

Flood plains are areas inundated by water from heavy rains (i.e. 100 year storm intensity), high tides (due in part to the phase and distance of the moon from the earth), storm surge (due to the lower pressure exerted on the water by a low pressure storm such as a hurricane) and from overflow of drainage canals. Figure 3 shows the 100 year storm flood elevations.

Flood elevations are lower in the eastern portion of the City due to the existence of a large system of canals and the proximity to the Atlantic Ocean coastline. The eastern and southeastern areas of the City are subject to 100 year flood elevations. The western area is under 100-500 year conditions. Drainage is managed by the South Florida Water Management District (SFWMD), Broward County and two (2) independent water control districts. There are no natural flood plain areas in the City.

Drainage basins which encompass the study site are shown on Figure 4. The drainage basins are C-14 West, C-14 East and the Coastal Basin.

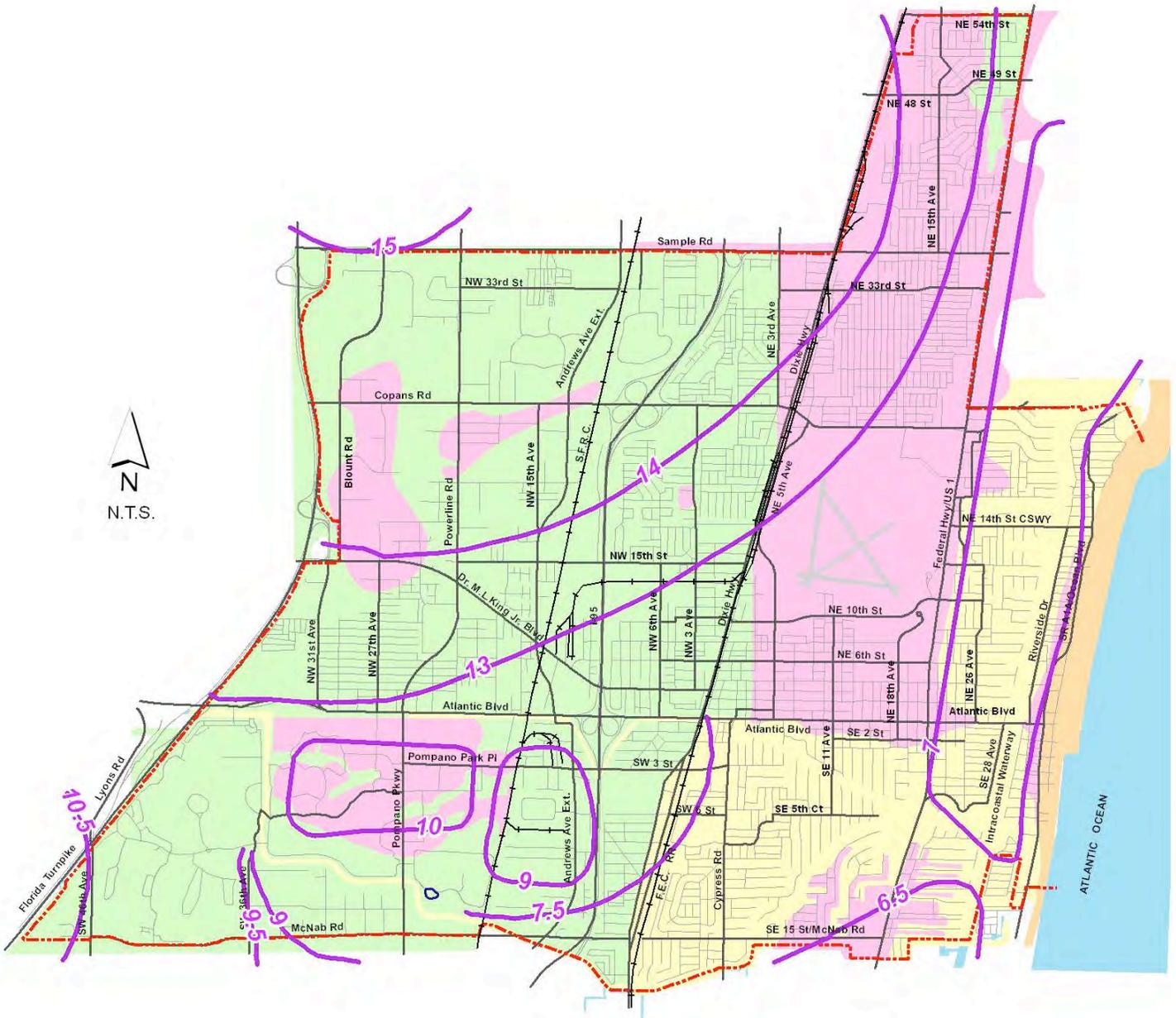
The City has created a Stormwater Utility. All property in the City is assessed a Stormwater Utility tax for the maintenance and improvement of the City drainage system. Additional information can be found in the Drainage Sub-Element of the Infrastructure Element of the Comprehensive Plan.

Other agencies which manage drainage related issues in addition to the City are as follows:

1. South Florida Water Management District (state)
2. Water Control District Number 3
3. Water Control District Number 4
4. Broward County Water Resources Division

The jurisdictions of the Water Control Districts are also illustrated in Figure 4.

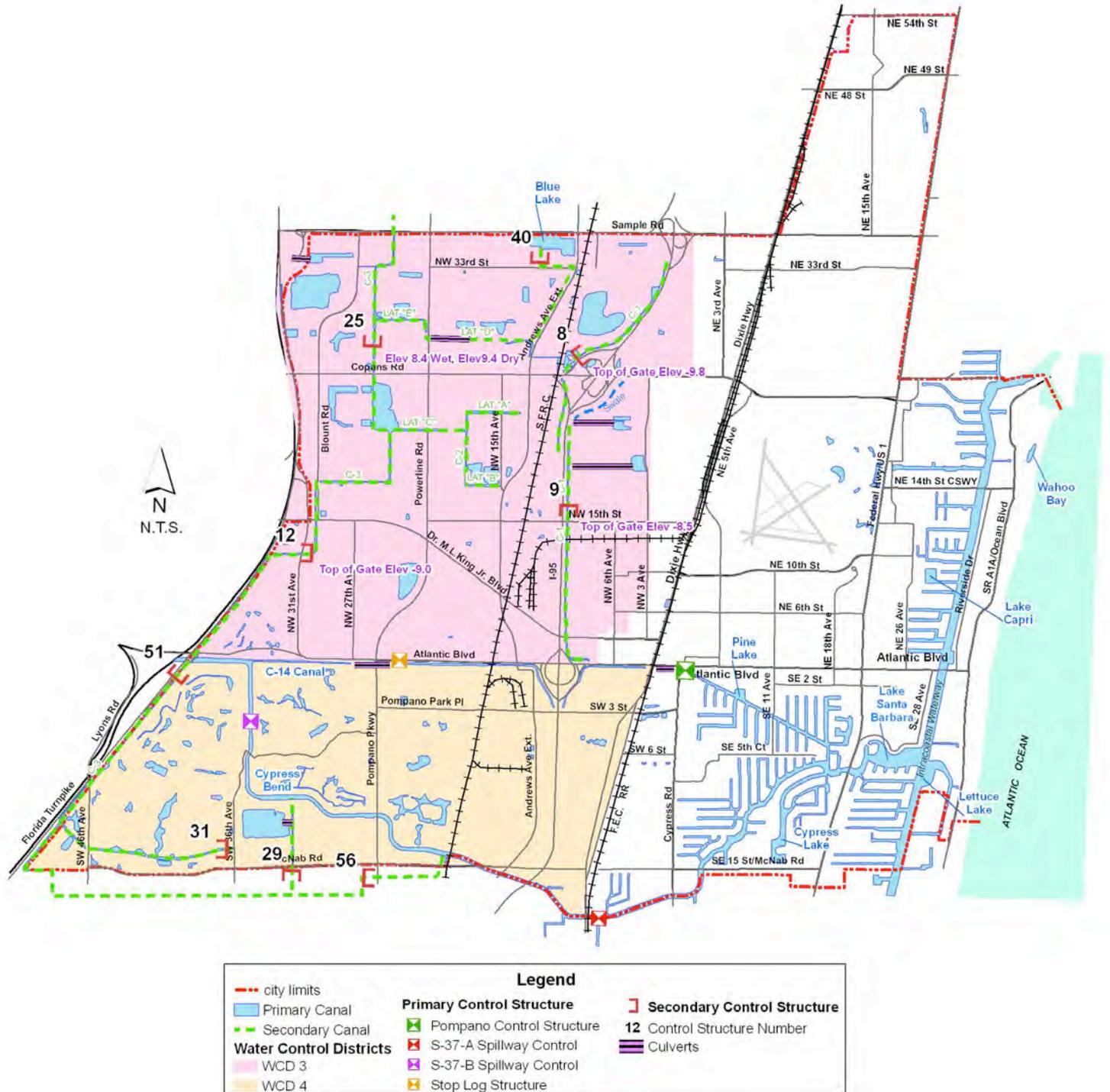
Figure 3 - Flood Plains and Flood Prone Areas



Legend	
	City Limits
	100 Year Flood Contours
Flood Zones	
	AE Base Flood Elevation Determined
	AH Flood depth of 1 to 3 feet (usually areas of ponding); base flood elevations determined
	VE Coastal flood with velocity hazard (wave action); base flood elevation determined
	X Areas outside 500 year flood plan

Source: Broward County, Dept. of Planning & Environmental Protection
Date: March 2000

Figure 4 - Drainage Systems



Wetland Areas

Most of Pompano Beach has undergone a considerable amount of development, therefore, very few wetlands exist (due to earlier agricultural land clearing and development activities).

A field investigation of the coastal barrier island revealed the existence of some Mangrove Trees (red and white) in the isolated brackish water body referred to as Wahoo Bay near the north end of the coastal beach.

There are some remaining isolated Mangrove strands (consisting of a small number of trees) along some portions of the shallow finger canals, the Cypress Creek Canal (east of Federal Highway), very small sections of the Intracoastal Waterway, Lake Santa Barbara and the Pompano Canal.

Regulatory agencies with jurisdiction over wetlands are:

- U. S. Army Corps of Engineers
- Florida Department of Environmental Protection (FDEP)
- South Florida Water Management District
- Broward County Environmental Protection & Growth Management Dept. (BCEPGM)

Water Needs and Conservation

The least expensive, most desirable and available source for potable water within the study area is from the unconfined Biscayne Aquifer. Water withdrawal by production wells from the aquifer is regulated through a consumptive use permit by the South Florida Water Management District. The Consumptive Water Use Permit for the City is Number 06-00070W. Further concerns as to the availability of water are discussed in the Section entitled Wellfield Expansion Analysis.

The greatest demand is for potable water use. Industrial uses are also present in the study area, but most of these uses also require the availability of a potable water source. The projected average annual raw water demand for 2008 is 17.79 million gallons per day (MGD). The projected average annual raw water demand for 2018 is 21.23 MGD.

The City has implemented a separate water re-use program with a plant capacity of 7.5 million gallons. The plant is located adjacent to the outfall system of the Broward County Regional Wastewater Plant. The original distribution system covered the municipal golf course and was extremely successful, conserving millions of gallons of water that would otherwise be utilized for irrigation purposes. The City is expanding the distribution system of the water re-use plant to serve additional areas to the east and south. The City will continue to examine additional methods of water re-use to promote conservation.

Broward County is also considering raising the canal water levels in Water Management Districts 3 and 4 to enhance the recharge of the Biscayne Aquifer. Because the Biscayne Aquifer is the sole source of potable water, contamination is still a threat through ground water pollution. No aquifer problems exist at this time with the exception that the water from the western wellfield has a high hardness level and requires additional treatment. The City has added a 10 MGD nanofiltration membrane facility to soften the raw water. The filter has a 85% recovery rate.

Septic tank wastewater disposal is used in only a small portion of the City in the area north and west of the State Farmers Market and in portions of the areas annexed in 2004. While the City's soils are not generally conducive to septic tank use, short term contamination problems are not expected. Broward County has committed to provide sanitary sewer improvements in the annexed areas. The industrial land uses in the area adjacent to the State Farmers Market are low volume generators. The City will work to upgrade these remaining septic tank use areas as redevelopment occurs.

Other ground water contamination threats exist, such as chemical pollution, however, no problems were found to exist. Broward County enforces a strict wellfield protection ordinance which is effective within the City. The City enforces the water conservation measures adopted by the South Florida Water Management District.

Soil Analysis

The City has twenty-four (24) soil types. The majority of the soils support urban development. However, the soil types in certain areas do not support use for septic tank wastewater disposal. The City has completed a significant reduction in the number of existing septic tanks. The north-central area of the City is the only area containing erosion type udorthent soil. The land is flat and generally not subject to erosion. Erosion by both wind and waves affect the coastal beach dunes.

In order to ascertain the suitability of the septic systems in areas not having sanitary sewers, an analysis was performed of the soil types in areas of Pompano Beach using septic tanks.

As shown on Table 1, the soil types found in septic tank areas within the study area have severe limitations for septic tank use. In those areas, the problems are due to the proximity of the bedrock to the septic tank drain field, due to wetness and ponding of water within the soil and due to the poor filter capacity of the soil. For this reason sewers are planned for those areas still relying on septic tanks.

All data used to determine the suitability of the described area for septic tanks was taken from the United States Department of Agriculture Soil Conservation Service soil survey. A more detailed investigation would be needed to determine definitive descriptions of the soil types and their suitability for septic tanks. Ideally the soil combinations most suited for septic tank use has a high degree of permeability and porosity, is composed primarily of limestone and has no overlying soil layer.

Table 1 - Soil Types in Locations Using Septic Tanks

<u>Symbol</u>	<u>Soil Names</u>	<u>Suitability for Septic Tanks</u>
Ia	Immokalee fine sand	Severe limitations - wetness
Ma	Margate fine sand	Severe limitations - depth to rock, ponding, poor filter
Hb	Hallandale/Urban Land complex	Severe limitations - depth to rock, wetness
Pp	Pompano fine sand	Severe limitations - wetness, poor filter
Hm	Hallandale & Margate soils	Severe limitations - depth to rock, wetness
Ur	Urban Land	Soil not rated for this use
Po	Pompano fine sand	Severe limitations - wetness, poor filter
Ba	Basinger fine sand	Severe limitations - wetness, poor filter
Sa	Sanibel muck	Severe limitations - ponding, poor filter
Iu	Immokalee/Urban Land complex	Severe limitations - wetness
Ir	Immokalee, limestone substratum/Urban Land complex	Severe limitations - wetness

Source: Soil Survey of Broward County, Florida, Eastern Part, United States Department of Agriculture, Soil Conservation Service, , May 1984

Erosion

Generally, the soils located within the City of Pompano Beach are not highly erosive. The only soil type with a severe erosion problem is the udorthents (The map symbol on the United States Department of Agriculture (USDA) soils survey map is "Ud").

Figure 5 indicates the areas within the City of Pompano Beach which are composed of udorthents soils. All Ud areas indicated on the USDA soils survey maps are located in north-central Pompano Beach.

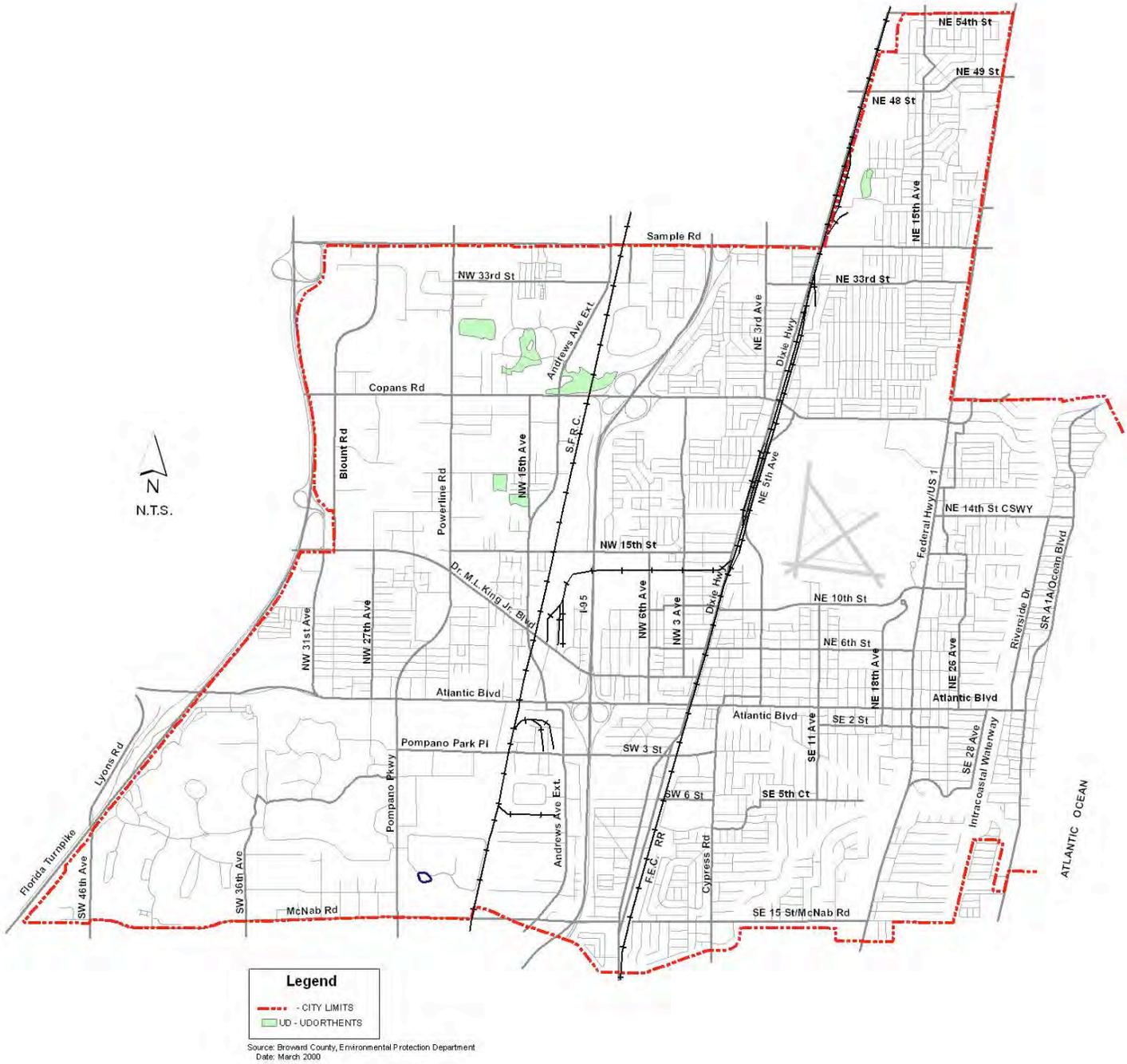
Known Commercial Minerals

Mineral extraction, in the form of basin sand, formerly was located on one (1) site in the northwestern part of the City. The site has since been filled. The primary minerals that exist in the City are basin sand, used for concrete, building site fill, other fill and limestone, which is used for concrete mix and road fill. Limestone exists in large quantities, as it underlines the City.

All mining that occurs in Pompano Beach must be permitted by the following agencies when their jurisdiction applies:

- The State of Florida Department of Environmental Protection
- Broward County Water Resources
- South Florida Water Management District
- The United States Corps of Engineers
- Broward County Environmental Protection & Growth Management Department
- City of Pompano Beach

Figure 5 - Erosion Susceptible Soil



Wildlife and Vegetative Communities including Threatened and Endangered Species

Due to the previous agricultural nature of the City and the present extent of development, very few areas exist that can support wildlife habitat. The vegetative communities that could support a habitat for wildlife or threatened/endangered species were removed prior to agricultural and developmental activities many years ago.

However, some wildlife species have adapted to the urban environment. The Florida Game and Fresh Water Fish Commission has identified several species of threatened and endangered species that may exist in the area. Burrowing owls and gopher turtles along with foxes have been observed in the vicinity of the Urban Wilderness Area. Manatees and Sea Turtles do frequent the area as the City has water habitat for manatees and coastal beach area for nesting turtles.

The City enforces a landscape ordinance to control vegetation planting and exotic removal. The ordinance also requires the use of native plant material.

Largely due to the development in southeast Florida, there are a number of animal and plant species which are considered by the Federal Government and the State to be Endangered or Threatened. Some other animals common to the area are presently disappearing because their habitat is being destroyed. Examples of Endangered and Threatened species which can be found in Pompano Beach are the Peregrine Falcon, the Wood Stork, the Manatee and the Sea Turtle.

Urban Wilderness Areas

Urban Wilderness Areas are chosen by the Urban Wilderness Advisory Board, and then approved by the Broward County Commission. They are areas of endangered habitat which must be owned by a municipality. The County is concerned that the habitat in these areas be conserved and may consider buying the property should it be necessary to preserve all or part of the area. There are some restrictions which are placed on use and maintenance of these areas, as required by the Urban Wilderness Board.

The Pompano Airport Natural Arboretum (a 33-acre sand pine/scrub community) is a scrub habitat. The site is located on publicly owned land which contains an adjacent Municipal Airport and Municipal Golf Course. It not readily accessible to the general public. The City received a grant from the State of Florida Department of Agriculture and Consumer Services to remove exotic species that invaded the site. The grant required future site maintenance to remove new growth of exotic plant materials.

Two (2) natural areas in the City were acquired by Broward County through Parks Bond Programs. The Crystal Lake Pineland Scrub Natural Area is located on NW 3rd Avenue, south of Sample Road. The area is 24.25 acres in size and is also a rare sand scrub pine area. The Highlands Scrub Natural Area is located in the Pompano Highlands area just east of the Florida East Coast Railroad. The area is 38.7 acres in size and is also a rare sand scrub pine area.

Figure 6 illustrates the location of native stands of vegetation within the study area as identified by the Broward County Office of Planning, biologists and by interpretation of aerial photographs. Generally, these naturally vegetated areas are found in the northwest and southwest regions of the study area as well as around the Pompano Beach Airpark. Further characterization (i.e. wetland designation) of these areas would necessitate site specific field investigations.

Figure 6 - Native Vegetative Stands



Vegetative Communities

The City of Pompano Beach contains no Outstanding Florida Waters (OFWs) as administered by the FDEP (Section 403.061 Florida Statutes). OFWs are waters in certain parks and wilderness areas that are designated by the FDER where activities are restricted in order to retain the quality of the resource.

The City of Pompano Beach does not contain any designated aquatic preserves as administered by the Florida Department of Natural Resources (DNR) (Section 258.35 Florida Statutes and implemented by Chapter 18-18 and 18-20 Florida Administrative Code).

Aquatic Preserves are areas designated by the State where development is allowed, but after another state review and possibly with more restrictions. Aquatic Preserves are being protected to preserve the resources which they contain.

Areas of Critical State Concern (Local Areas of Particular Concern) (LAPC) are administered by the Florida Department of Community Affairs (DCA), the local government and the state cabinet. The City contains no areas of Critical State Concern and no Local Areas of Particular Concern.

Coastal Zone – Beach

The barrier island of Broward County includes two tidal inlets: Hillsboro Inlet (at the north part of Pompano Beach) and Port Everglades Inlet (south part of Fort Lauderdale). Hillsboro Inlet is an artificially stabilized inlet with a jetty on each side (with one side containing a weir structure). Figure 7 provides aerial photographs in four parts of the barrier island and coastal area in the City. The photographs include major street names, the Erosion Control Line and the Coastal Construction Line.

Figure 7 – Barrier Island Aerial Photo (1 of 4)



Legend

- R027 ● Monuments
- City Limits
- Erosion Control Line
- Coastal Construction Line

Source: Broward County Property Appraiser 2000 Aerial
 Broward County Coastal Protection Project Database 2/2002
 Florida Department of Environmental Protection

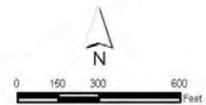


Figure 7 – Barrier Island Aerial Photo (2 of 4)



Legend

- R027 ● Monuments
- City Limits
- - - Erosion Control Line
- - - Coastal Construction Line

Source: Broward County Property Appraiser 2008 Aerial
 Broward County Coastal Protection Project Database 2/0002
 Florida Department of Environmental Protection

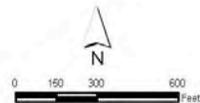
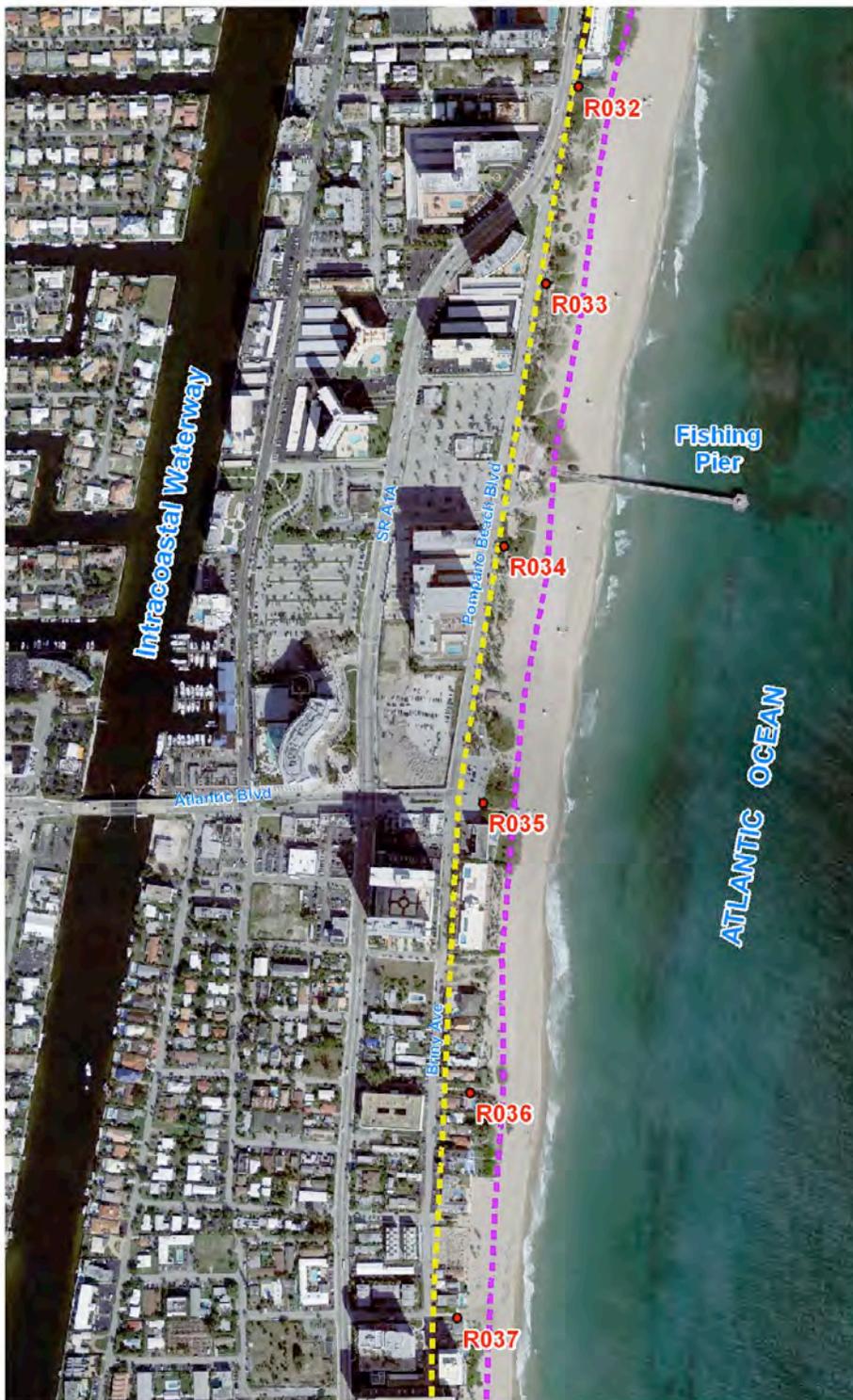


Figure 7 – Barrier Island Aerial Photo (3 of 4)



Legend

- R027 ● Monuments
- City Limits
- Erosion Control Line
- Coastal Construction Line

Source: Broward County Property Appraiser 2008 Aerial
Broward County Coastal Protection Project Database 2002
Florida Department of Environmental Protection

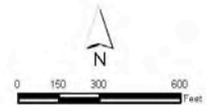


Figure 7 – Barrier Island Aerial Photo (4 of 4)



The shoreline beaches in the City are generally composed of fine sand with shell and coral fragments. Erosion problems along much of the beach necessitated construction of assorted jettys, groins and seawalls which have in turn further complicated and disrupted the beach's longshore sand dynamics.

Several beach nourishment projects have been conducted on Pompano Beach. Phase I (of the two phases which have already taken place) was conducted from May through October, 1970. A total of 1,034,000 cubic yards of sand were placed along the beach between FDNR surveyed transect stations R-31 and R-49. These transects are located with R-31 about one mile south of Hillsboro Inlet and R-49 located in the north part of Lauderdale by the Sea. The cost of the Phase I project was \$1,870,000.

Phase II beach renourishment was conducted at the study site starting May through August, 1983. A total of 1,890,000 cubic yards of fill was placed between FDER station R-25 located immediately south of the Hillsboro Inlet and R-53 located in close proximity to the Lauderdale-by-the Sea Fishing Pier. The cost of the Phase II project was \$10,004,000.

The next beach renourishment work (maintenance fill) was to be conducted on Pompano Beach in the summer of 1993, to renourish a volume of approximately 1,000,000 cubic yards of sand (Note: maintenance projects are generally conducted every 10 years to replace the sand that has eroded away). However, the 1,000,000 cubic yard project which was planned did not materialize as the beach has accreted making the project unnecessary. The beach dunes are still not continuous, but the condition is improving especially on the northern beaches. Efforts still should be made to replace missing dune portions, provide walkovers to prevent damage to existing dunes, and more dune plant material should be installed to prevent further erosion. The City is maintaining coastal beach plants on public property to assist in controlling dune erosion.

Coastal Zone - Dunes

In 1985, a total of 37,000 coastal plants were planted on parts of the beaches of Pompano Beach for use in sand stabilization and subsequent dune creation. The species which were planted include: sea oats (protected by the state), seashore paspalum, beach ivy, bay bean, beach sunflower, silver buttonwood, and mimusops.

The beach species were planted in a sand/compost medium, then were fertilized after being planted. Parts of the dune were irrigated with water to help the establishment of the plants. There is a maintenance program still continuing at the site.

Seventy five percent (75%) of the cost for the dune plantings was funded by the State of Florida Department of Natural Resources and 25% was funded by the City of Pompano Beach. Coastal dunes have two major functions, both of importance to the beach: as a source of sand (available to the coastal dune/beach/littoral drift system); and as a source of protection to the land behind them (whole or partial protection from wave action, or flooding).

There are no apparent pollution problems which can be linked to sand dunes. Due to the benefits which coastal dunes provide, existing dunes must be preserved. It is estimated that approximately 20% of the beach front in the study area has no existing sand dunes, or remnants thereof.

When dune vegetation is destroyed, the area may become susceptible to a “blowout” because of the resulting soil erosion. Such holes in the dune partially destroy the dune’s protective potential at the beach. To prevent pedestrian traffic, a wooden structure is frequently constructed over the dune, referred to as a walkover structure. Dune areas should be protected to retain their protective functions to the beach. The planting of dunes must be required as part of beach-front private development. The more continuous the dune line is along the beach, the more effective are its protective services.

Coastal Zone - Coral Reefs

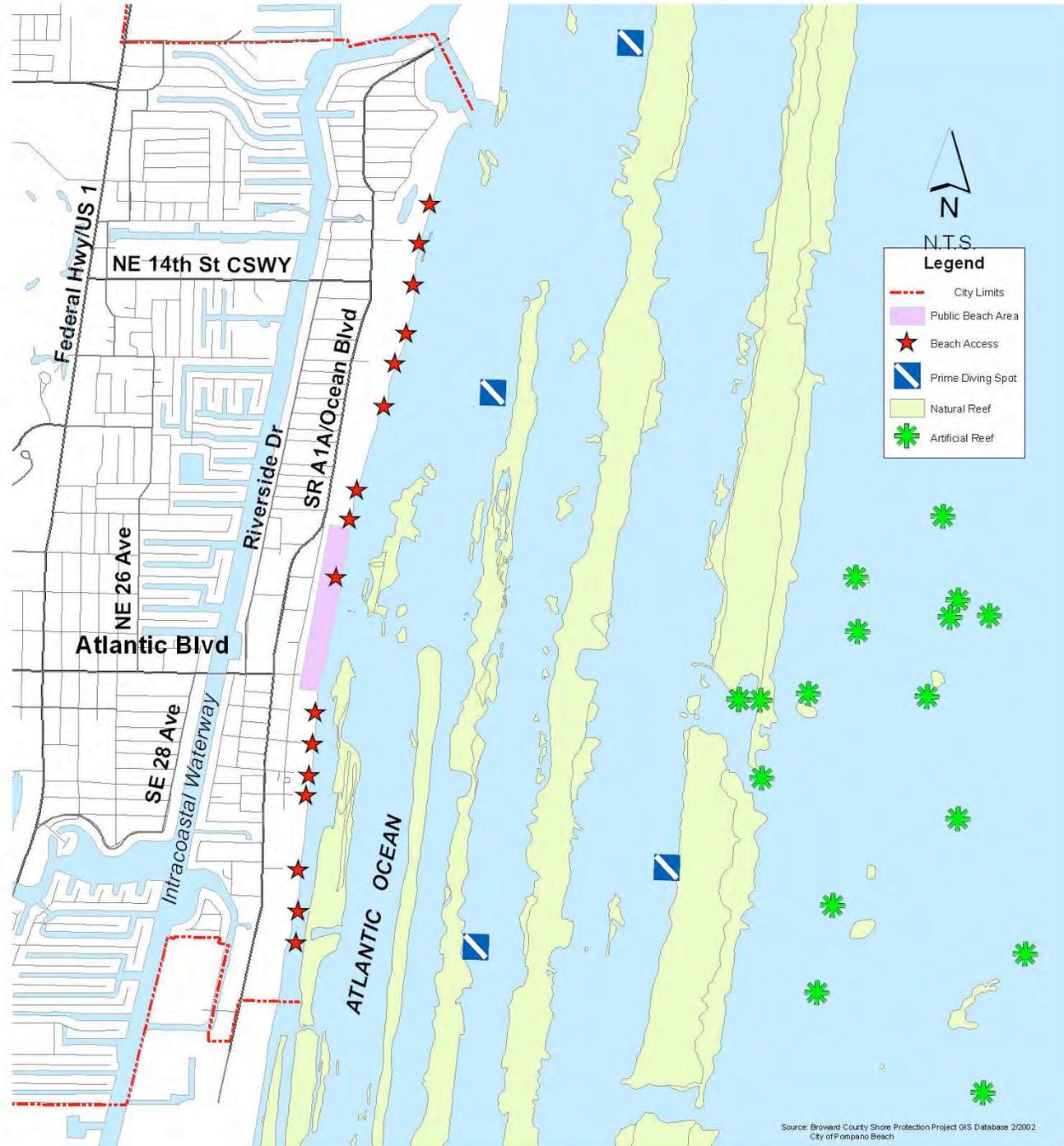
Three (3) offshore natural reefs exist adjacent to the shoreline. They provide protection against coastal storm damage as well as recreational fishing and diving activities. In order to relieve the strain on the natural reefs, additional artificial reefs have been placed to create water habitats for marine life and sport diving utilizing old ships, refurbished fuel tanks, etc. Presently fifteen (15) artificial reefs have been formed in the Pompano Beach area under the direction for the Broward County Department of Environmental Protection and Growth Management.

Figure 8 illustrates the location of coral reefs, artificial reefs, prime dive spots and beach access locations for the City.

Coastal Zone – Additional Information

Additional information on the Coastal Zone can be found in the Coastal Zone Management Element of the Comprehensive Plan.

Figure 8 – Coral and Artificial Reefs



Greenhouse Gas Emissions

According to the “Ecological Impacts of Climate Change” by the National Academy of Sciences (NAS), the world’s climate is changing, and it will continue to change throughout the 21st century and beyond. Rising temperatures, new precipitation patterns, and other changes are already affecting many aspects of human society and the natural world. A relatively rapid increase in temperature has been documented during the past century, both at Earth’s surface and in the oceans. The average surface temperature for Earth as a whole has risen some 1.3° Fahrenheit since 1850, the starting point for a global network of thermometers. If emission rates for greenhouse gases (which trap heat inside Earth’s atmosphere) continue on their current track, models indicate that the globe will be 4.3 to 11.5°F warmer by 2100 than it was in 1990.

The greenhouse effect is a natural phenomenon that is essential to keeping the Earth’s surface warm. Like a greenhouse window, greenhouse gases (GHG) allow sunlight to enter and then prevent heat from leaving the atmosphere. Water vapor (H₂O) is the most important greenhouse gas, followed by carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halocarbons and ozone (O₃). Human activities, primarily burning fossil fuels, are increasing the concentrations of these gases, amplifying the natural greenhouse effect.

The warmer temperatures not only cause glaciers and land ice to melt (adding more volume to oceans) but also cause seawater to expand in volume as it warms. The global average sea level rose by just under .07 inches per year during the 20th century, but that number has risen to .12 inches per year since the early 1990s. Under a “business-as-usual” greenhouse gas emissions scenario, models indicate that sea levels could rise 2 feet or more by 2100 compared to 1990 levels.

The State of Florida with almost 1,350 miles of shoreline and the associated coastal population concentrations is particularly susceptible to rising sea levels associated with climate change. In response to the climate change threats, Governor Charlie Crist signed three (3) Executive Orders on July 13, 2007 establishing immediate actions to reduce greenhouse gas emissions within Florida.

Total U.S. GHG emissions in 2008 were approximately 7,503 million metric tons of equivalent carbon dioxide according to the U.S. Energy Information Administration's "Emission of Greenhouse Gases in the United States 2008". The majority of the GHG emissions, approximately 81%, are attributable to energy related carbon dioxide. Of this U.S. energy GHG component, the conversion of energy to produce electricity accounts for about 41% of the end use, emissions from fuel use in transportation is approximately 33% and direct fuel use in homes and business is about 26%.

In 2005, Florida's gross GHG emissions from fossil fuel were also primarily attributable to power generation (electricity) at 42% and to transportation at 36% according to "Florida's Energy & Climate Change Action Plan" released on October 15, 2008. The report also indicates the direct use of fuel in the residential, commercial and industrial (RCI) sectors accounted for 6% of the State's gross GHG emissions. The State's GHG emissions in 2005 were approximately 4.9% of the total U.S. net GHG emissions. The State's population energy usage directly relates to the amount of GHG emissions.

The Governor's Executive Order 127 establishes GHG emission targets for 2017, 2025 and 2050. The 2050 GHG target reduces GHG emissions to 80% of the 1990 level. Improvements in the energy efficiency in new and existing buildings, using renewable resources and low-GHG energy sources to replace fossil fuels for producing electricity and heat and increasing distributed electricity generation based on combined heat and power are ways to reduce the electric GHG emissions. For the transportation sector, improvements in vehicle fuel efficiency, reducing the amount of single occupant vehicles, the use of low-GHG emission fuels and the reduction of total vehicle miles of travel can provide significant reductions in transportation GHG emissions.

The Conservation Element can reduce future GHG emissions by including:

- Analysis of the factors that affect energy conservation for existing, proposed and future land use patterns; and,
- Analysis of natural resource factors that affect energy conservation for undeveloped, rural, agriculture and green infrastructure.

Because Success Doesn't Just Happen...



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