

City of Cooper City Comprehensive Plan Chapter 5 Conservation Element

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CHAPTER 5

CONSERVATION ELEMENT

I DATA AND ANALYSIS

A. Introduction

The Conservation Element is a required element of the comprehensive plan as per Subsection 163.3177, Florida Statutes. This Element examines the natural resources in Cooper City, the regulations surrounding them, their present condition and future needs, and the level of management required to preserve and enhance environmental quality in the city.

The South Florida Water Management Districts (SFWMD) strategic goal for all of its water supply planning efforts is to ensure an adequate supply of water to protect natural systems and to meet all existing and projected reasonable beneficial uses, while sustaining water resources for future generations. Therefore, the City of Cooper City and all local governments within the Lower East Coast (LEC) Planning Area are required to prepare a Water Supply Facilities Work Plan with a minimum planning horizon of 10 years. The City of Cooper City and all local planning governments must also adopt revisions to their respective comprehensive plans which identify specific water supply projects that meet the local government's projected future demands. Cooper City must provide these draft amendments to the Florida Department of Economic Opportunity for review prior to adoption. On September 12, 2014 SFWMD approved the 2013 LEC Water Supply Plan Update and Cooper City is required to adopt amendments to its comprehensive plan no later than March 12, 2015.

The planning service area for the Conservation Element includes the incorporated areas of the City of Cooper City. The short range planning horizon for the Comprehensive Plan and this Element is 2006. The long range planning horizon is 2015. Furthermore, this element includes a 2030 planning horizon for the Water Supply Facility Work Plan only, in accordance with 2005 statutory changes.

The Broward County Charter gives the Broward County Commission the authority to protect the County's environment by prohibiting or regulating air and water pollution and the destruction of natural resources. Due to the fact that some state and federal agencies also have jurisdictional and operational responsibilities concerning the conservation and protection of natural resources in the County, efforts have been made to ensure consistency of the City's Comprehensive Plan with the plans and programs of those applicable agencies.

The following definitions are provided to clarify terms used in the Conservation Element.

A-H Zone – Is the flood insurance rate zone that corresponds to the area of 100-year shallow flooding with a constant water surface elevation (usually areas of ponding) where average depths are between 1 and 3 feet.

Aquifer - a stratum or formation of permeable material that will yield groundwater in useful quantities.

Aquifer Recharge - the addition of water to the groundwater system by natural or artificial processes.

Base Flood Elevation (BFE)--A Base Flood Elevation (BFE) is the height of the base flood, usually in feet, in relation to the National Geodetic Vertical Datum of 1929, the North American Vertical Datum of 1988, or other datum referenced in the Flood Insurance Study report, or average depth of the base flood, usually in feet, above the ground surface.

Community - an assemblage of plants and animals living in a particular area or habitat.

Desalinization - removing the salt from saline waters to produce potable water.

Dissolved Oxygen - a measure of the amount of oxygen available for biochemical activity in water.

Ecosystem - the living and non-living components of the environment which interact or function together, including plant and animal organisms, the physical environment, and the energy systems in which they exist. All the components of an ecosystem are interrelated.

Endangered Species - species whose numbers have declined to such a critically low level or whose habitats have been so seriously reduced or degraded that without active assistance their survival in Florida is questionable.

Estuary - a semi-enclosed, naturally existing coastal body of water in which saltwater is naturally diluted by fresh water and which has a connection with oceanic waters, including bays, embayments, lagoons, sounds, and tidal streams.

Exotic Species or Exotics - species not native to the region.

Groundwater - subsurface water in the zone of saturation.

Hazardous Substance - a substance that has one or more of the following characteristics: ignitable; corrosive; reactive; toxic.

Listed Animal Species - means animal species listed as endangered, threatened, or of special concern by the Florida Fish and Wildlife Conservation Commission in Rule Chapter 68A-27, Florida Administrative Code.

Natural Communities - Natural Community means a community that is dominated by native plant species as described in the Florida Natural Areas Inventory publication, “Guide to the Natural Communities of Florida.” A Natural Community generally possesses the following characteristics: the plant species composition includes most of the more common species typical of that natural community type; the community may contain small areas of exotic or invasive plants that could be easily controlled by prescribed burning or other forms of management; evidence of historical disturbance may be present but disturbance has not destroyed or prevented the re-establishment of a mature natural community type; and, the community is not substantially disturbed by recent human activities, except for such disturbance as low intensity forestry activities that allow the natural community to recover to previous conditions.

One Hundred Year Flood – The flood elevation that has a 1% chance of being equaled or exceeded each year.

Preserve - to save from change or loss other than those caused by natural geological and evolutionary processes, and reserve for a special purpose.

Protect - to save or shield from loss, destruction, or injury or for future intended use.

Rare Species - species which, although not presently endangered or threatened are potentially at risk because they are found only within a restricted geographic area or habitat in the state or are sparsely distributed over a more extensive range.

Raw Water - untreated potential drinking water.

Sheetflow - large volumes of shallow water moving very slowly.

Sole Source Aquifer - the sole or principal drinking water source for an area which, if contaminated, would create a significant hazard to public health.

Species of Special Concern - a species that does not clearly fit into the endangered, threatened, or rare categories yet which, for certain reasons, warrants special concern.

Threatened Species - species that are likely to become endangered within Florida in the foreseeable future if current trends continue. Includes species which may still be abundant, but are being subjected to serious adverse pressure throughout their range.

Toxic Substance - a chemical or mixture that presents an unreasonable risk of injury to health or the environment.

Unconfined Aquifer - an aquifer in which the water table defines the upper surface of the zone of saturation.

Understory - assemblages of natural low-level woody, herbaceous, and groundcover species which exist in the area below the canopy of the trees.

Wetlands - those areas that are inundated by surface water or ground water at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce, or persist in aquatic environments or anaerobic soil conditions. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps and marshes, hydric seepage slopes, tidal marshes, mangrove swamps, and other similar areas.

X-Zone Zone X is the flood insurance rate zone that correspond to areas outside the 100-year floodplains, areas of 100-year sheet flow flooding where average depths are less than 1 foot, areas of 100-year stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 100-year flood by levees. No BFE's or depths are shown within this zone.

Zones of Influence - zones delineated by iso-travel contours around wellfields, within which toxic substances will be regulated to protect the quality of the groundwater.

B. Air Resources

Air Quality is a function of topography, climate, weather patterns, commercial/ industrial/ urban sources, and governmental regulations and controls. Because Broward County is relatively flat, and its semi-tropical, marine climate is tempered by prevailing southeasterly trade winds from the Atlantic Ocean, its overall air quality is good the majority of the time.

The air quality in Broward County is generally in the "good" range over 70% of the time and in the "moderate" range less than 30% of the time. Criteria for these designations are provided below. The frequent occurrence of a sea breeze helps keep the pollutant levels well dispersed and contributes to generally good air quality for the region. Occasionally, Broward County experiences "unhealthful" pollution levels. The Broward County Department of Planning and Environmental Protection (DPEP) maintain air quality monitoring stations throughout the county and reports a daily pollution standards index (PSI). The PSI is a uniform method of reporting daily pollution levels and associated health effects.

The PSI is based on a national standard scale ranging from 0 to 500 with a corresponding descriptor range as follows:

- 0-50.....GOOD
- 51-100.....MODERATE
- 101-199.....UNHEALTHFUL
- 200-299.....VERY UNHEALTHFUL
- 300-500.....HAZARDOUS

Ozone has been the primary pollutant of concern for South Florida, for many years. Ozone is formed through the complex chemical reactions of nitrogen oxides (NOX) and volatile organic compounds (VOC) in the presence of strong sunlight. The highest ozone concentrations usually occur during the spring and early fall. Motor vehicles are responsible for more than 50% of the ozone related emissions.

Very little heavy industrial uses exist in the areas surrounding Cooper City that would reduce air quality levels. Industrial uses in Cooper City and those in surrounding communities are primarily light industrial and office park developments, which have minimal impacts on air quality.

The major means of air pollution mitigation for the City is through transportation improvements, the addition of extensive vegetative cover in medians and alongside roadways, and provisions of pedestrian ways, bike ways and mass transit as alternatives to automobile travel. These improvements which improve traffic flow and emissions could consist of: 1) modification of intersections; 2) higher travel speed on roadway links; or 3) more right turns on red. The Transportation Element describes in detail the measures implemented by the City including the Community Shuttle which are designed to reduce reliance on the automobile.

C. Water Resources

The water resources identified within Cooper City include surface water (fresh) and groundwater.

1. Surface Water

The State's Water Quality Standards (Chapter 17-3, FAC), defines the criteria for surface water found in the City. These criteria or standards identify five categories or classes of water quality with Class I being the best. These categories are:

Class I	Potable Water Supplies
Class II	Shellfish Propagation or Harvesting
Class III	Recreation, Propagation and Maintenance of a Healthy, Well Balanced Population of Fish and Wildlife

Class IV	Agricultural Water Supplies
Class V	Navigation, Utility and Industrial Use

Generally, the state regulated surface waters are classified with a Class III use designation. These water bodies must be suitable for use as recreation and the propagation and maintenance of a healthy, well balanced population of fish and wildlife. The only exception to the Class III designation within Broward County is one abandoned rock pit (a Class I water designation), which is not situated in or adjacent to the City. The surface waters located in the City consist of man-made lakes and canals created primarily for the purpose of drainage and flood protection.

2. Surface Water Drainage

The primary drainage canal for the study area is the C-11. This canal (also known as the South New River Canal) runs in the east-west direction along Griffin Road. The C-11 is maintained by the South Florida Water Management District and was originally constructed to provide flood protection to the low-lying areas of the Lower East Coast. In addition to flood protection, this and the other primary drainage canals in Broward County aid in providing water supply, drainage enhancement, and mitigation of saltwater intrusion. These canals provide opportunities in some areas for recreational boating, canoeing, freshwater fishing, and water skiing. Water in the canals is replenished by rainfall, surface water runoff, and discharges and seepages from water in the Water Conservation Areas. In drought conditions, local water supplies can be supplemented by deliveries of water stored in Lake Okeechobee and transported via the canal system. However, these deliveries may not be able to meet the demand as experienced during the drought conditions of the late 1980's.

The western edge of the study area is bordered by the Snake Creek canal (also called the C-11 South Canal), flowing north-south. This canal runs along Flamingo Road up to Stirling Road then flows in an easterly direction, approximately one thousand feet, and serves as, an interconnect between the C-11 canal and the C-9 basin.

The C-11 canal structure has two water control structures. One structure, located just west of State Road 441, east of the study area, is the S-13. This salinity control structure was built to separate the fresh water to the west from the marine water in the east. There are no marine waters in the study area due to this structure.

The second structure (13-A) is a manually operated sluice gate consisting of four culvert pipes. The important purpose of this gate is to divide the C-11 West Drainage Basin from the C-11 East Drainage Basin. The dividing line between

these basins is Palm Avenue. Water levels are kept higher on the west side of the 13-A than on the east side. Water on the west side of the 13-A is pumped to and discharged into the Everglades. Water on the east side of the structure goes to the east. During the dry season in South Florida, the flow from the west side of the 13-A is discharged to the east in part to further supply fresh water and to help prevent salt water encroachment. Exhibit 5-1 shows the drainage basins for the area.

The rest of the surface water system of the study area is a network of canals, ditches and interconnecting lakes dredged for the purpose of drainage. The drainage system is described in detail in the Infrastructure Element.

Generally speaking, existing drainage in the City is adequate to meet the needs of flood protection, water supply, wetland enhancement, and protection from saltwater intrusion. Each new development is reviewed by the City and other applicable regulatory agencies and is required to provide drainage improvements in accordance with the standards of the Central Broward Water Control District, South Florida Water Management Water District, Broward County Water Resources Management Division and the City in order to maintain an adequate drainage system for the City and the region. Further discussion of drainage standards and compliance is provided in the Infrastructure Element. Also see Section D of this Element regarding flood plains.

3. Groundwater

The Biscayne Aquifer and Floridan Aquifer both lie below the City. The Biscayne Aquifer is closest to the surface and is the source of drinking water for the City. The Biscayne Aquifer is one of the most productive water producing aquifers in the world. Cooper City currently operates six (6) Biscayne wells with a total rated capacity of 10.9 mgd.

The upper zone of the Floridan Aquifer extends about 900 feet to 1,900 feet below sea level. Groundwater from the Floridan Aquifer in the Cooper City area contains high concentrations of dissolved solids and requires reverse osmosis treatment before it can be used for public supply. The Floridan Aquifer would be a potential source for potable water should Cooper City's current Biscayne Aquifer wells become contaminated or should their Water Use Permit limit the use of additional water from this source.

Broward County has established a network of 61 groundwater monitoring wells located throughout Broward County which are used to monitor the groundwater surrounding major wellfields and in areas of high aquifer recharge. Three of these groundwater monitoring stations are located within Cooper City. See Exhibit 5-2 and Section 4 below for additional details.

4. Water Quality

The local regulatory agency monitoring and regulating water quality for Cooper City is the BCDPEP. The County's water quality program involves sampling and testing at 14 surface water-monitoring stations and 61 groundwater wells. Three ground water and one surface water monitoring stations are located within Cooper City. See Exhibit 5-2.

During the summer months or rainy season, urban runoff (non-point source pollution) from rainfall, combined with high water temperature, creates a concentrated nutrient environment that promotes the growth of aquatic pests such as bacteria, algae, water hyacinths, hygrophyta, and cattails which deplete water of dissolved oxygen. Urban runoff also transports toxic materials such as pesticides, heavy metals, hydrocarbons and dissolved inorganic materials.

As development activity increases, the total amount of polluted urban runoff also increases. Therefore, urban development and storm water runoff have a serious negative impact on surface water quality. The largest pollution threat to surface waters in the county is stormwater runoff from roadways, parking lots, golf courses, and residential lawns. The DPEP has monitored surface water quality in Broward County since 1972. The long-term water quality monitoring program involves the sampling and testing of a network of 44 surface water stations located on major waterways of the county. Each station is selected to represent the water typically found within a specific drainage basin. The tests measure general water quality and are used to characterize the overall ecological health of the system and to evaluate any potential human health risks. The network is sampled quarterly.

The DPEP also conducts special project tests such as drainage basin characterizations which include general water quality testing; testing for metals, pesticides, herbicides, and other organic compounds; and chemical and biological evaluations of bottom sediments.

All sampling and analyses are performed by the Laboratory Services Section of the Environmental Monitoring Division. The laboratory is certified by the U.S. EPA, the Florida DEP, and the Florida HRS as a full-service air and water quality testing facility.

Cooper City continues to require all new developments to comply with the drainage and water discharge requirements of the applicable regulatory agencies in order to protect surface water quality and maintain the integrity of the existing drainage system.

Lake excavation in the County is regulated by Chapter 27 of the Broward County Code. Licenses are required by DPEP for the creation of lakes, canals, and other water bodies. In order to obtain a license, the planned lake must meet the

Broward County Code requirements for minimum side slope and vegetation. Previously, many lakes were constructed with little or no side slope, which were dangerous for children and non-swimming adults and provided little erosion control. Earlier designs also rendered them biologically dysfunctional and provided direct access of polluted runoff to the Biscayne Aquifer. These poorly designed features increased the opportunity for unfiltered or untreated urban runoff to enter the aquifer. Since the licensing program's inception in 1993 newly created lakes have been successfully designed to meet certain side slope and vegetative requirements.

Protection of groundwater quality in Broward County is dependent upon proper management of the Biscayne Aquifer. Saltwater intrusion is one of Broward County's most serious water quality problems. The saltwater intrusion line had been moving westward for the past four decades and currently impacts wells in the eastern portion of Broward County. Generally, the saltwater intrusion line is located east of I95 and the City's Wellfields are not threatened at this time.

Saltwater intrusion is caused by the drainage of freshwater wetlands and resultant loss of freshwater head, and by increased pumping of groundwater and surface water for drinking water, irrigation, and other purposes. Salt water contamination of the Biscayne Aquifer would result in closure of contaminated wells and require use of the Floridan Aquifer for potable water supply. Water from the Floridan Aquifer requires desalinization. The U. S. Geological Survey and DPEP operate a groundwater monitoring system designed to track the extent of saltwater intrusion in the County. Saltwater intrusion impacts the municipalities in eastern Broward County but does not threaten the wellfield in Cooper City. Future intrusion is unlikely due to the City's inland location.

Another serious water quality threat is wellfield contamination by industrial/commercial pollution. DPEP operates a groundwater monitoring system which consists of 61 wells used to monitor the groundwater surrounding the major wellfields and in undeveloped areas of high aquifer recharge. The Broward County Board of County Commissioners adopted the original Wellfield Protection Ordinance in August, 1984. The purpose of the Ordinance is to safeguard public health by providing criteria for the regulation of storage, handling, use or production of hazardous or toxic substances within the zones of influence of water supply wells. Exhibit 5-3 shows wellfield protection zones in the City. Cooper City continues to require that all developments receive the proper environmental permits as mandated by the Wellfield Protection Ordinance in order to maintain the quality of the source of its drinking water. There have been no reports of contamination to the City Wellfields. The wellfield protection regulations are described in further detail in section H(6) of this report.

The DPEP also implements the Hazardous Material Regulations and Storage Tank Regulations, which prevents discharges to the air, soil, groundwater and surface water by providing specifications for facility design, construction, operation,

maintenance and closure which include early detection, containment and recovery of discharges. DPEP maintains a response program to investigate threats of contamination, participate in the cleanup and prepare enforcement cases as appropriate. A remediation program is currently involved in various aspects of contamination cleanups at over 900 sites in Broward County. DPEP provides technical and non-regulatory assistance to help businesses meet environmental regulations, identify alternative materials to reduce the quantity and toxicity of hazardous materials used. Exhibit 5-4 identifies the sites in Cooper City that are currently identified by DPEP under this program. Appendix 5-1 provides further details concerning these sites and the status of the clean up.

The State has already begun to help improve the quality of water within its surface water system. Municipalities can no longer legally discharge effluent from wastewater treatment plants into canals. Approved effluent disposal techniques include deep well injection, ocean outfall and spray irrigation methods.

In 2008, the Florida Legislature enacted an ocean outfall statute (Subsection 403.086(9), F.S.) requiring the elimination of the use of six ocean outfalls in southeastern Florida as the primary means for disposal of treated domestic wastewater. In addition, the affected wastewater utilities have to reuse at least 60 percent of the outfall flows by 2025. The objectives of this statute were to reduce nutrient loadings to the environment and to achieve the more efficient use of water for water supply needs. This statute became effective on July 1, 2008.

The City had disposed of its treated wastewater via ocean outfall to a point two miles offshore into the Atlantic Ocean. This sewage interconnect was installed by both Cooper City and the Town of Davie and joined the City of Hollywood's ocean outfall. In 2002 the City completed a deep-well injection system to dispose of membrane water concentrate as well as effluent. In addition, in 1992 Cooper City entered into an agreement with the City of Hollywood in which the City of Hollywood agreed to receive wastewater effluent from Cooper City effluent for further processing in its water reuse system. This system then delivers reclaimed water to the appropriate uses. The Cooper City effluent pump station pumps wastewater to the City of Hollywood for their Reuse Program as a primary disposal system, with Cooper City's Deep Injection Well available as a backup.

D. 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), and from overflow of drainage canals. The majority of properties in the City are within the AH 100-year flood zone designation with a few exceptions that are within the X-Zone.

The study area is within both the C-11 West and C-11 East Drainage Basins, the latter having a larger discharge capability. Basically, the divide between the C-11 West and C-11 East Drainage Basin is at S.W. 100th Avenue.

Agencies that manage the drainage related issues for the City include the South Florida Water Management District (state); Broward County Water Resource Management Division (county); Broward County Department of Planning and Environmental Protection (county) and Central Broward Water Control District (a special taxing district). In addition, the Federal Emergency Management Agency is responsible for flood loss prevention and recovery throughout the nation.

DPEP, through its review and permit authority, requires floor area elevations to meet three-day, one hundred year design storm criteria. The DPEP review also requires road crown elevations to be at or above the 10-year, 1-day design storm stage for County roads on the Functional Classification Map. Section 6-71 of the City's Code of Ordinances addresses floodplain management regulations which are implemented through the land development and permitting process. The adopted base flood elevation in Cooper City is 7.0 MSL (Mean Sea Level). Section 6-71 of the Code provides for minimum street centerline and first floor building elevations for development throughout the City. These regulations are designed to limit the amount of damage to life and property due to flooding.

In general, floodplains have been managed successfully through the review and permitting process. Flooding problems have been alleviated, to a great extent, by the creation of water control districts which have developed a system of secondary canals and small manmade lakes. As discussed in the Infrastructure Element, the City has only experienced two (2) repetitive losses due to flooding. Even with the existence of flood control regulations and structures, flooding as a result of a natural disaster is still a major issue. As a result, the City is a recognized participant community in the Federal Flood Insurance Program. Through participation in FEMA's community rating system, the City has received a class 8 which results in a 10% reduction in insurance rates for flood insurance policies issued for properties in Cooper City.

E. Wetlands

The City relies on the programs established by Broward County to identify wetlands pursuant to its countywide planning authority. The DPEP has administered a program to protect and preserve wetlands since 1993. Its purpose is to maintain the functions and values provided by aquatic and wetland resources so there will be no overall net loss and to strive for a net resource gain over present conditions. Adverse impacts must be regulated by avoidance as the first priority, minimization as a second priority, or mitigation as a third priority. Wetland resource alteration includes the dredging, filling, drainage, or flooding of jurisdictional wetland areas. A license must be issued by DPEP prior to the alteration of wetlands. Decisions to issue licenses are made by evaluating the quality and condition of the wetland and deriving a numerical ranking of the wetlands importance.

There are many techniques for assessing wetland values. The best known are the U.S. Fish and Wildlife Service's Habitat Evaluation Procedure (HEP) and the U.S Army Corps of Engineer's Wetland Evaluation Technique (WET). Due to the limitations of these techniques, however, Broward County has established its wetland evaluation method. The Wetlands Benefit Index (WBI), codified in Chapter 27, Article XI. of the Broward County Code of Ordinances, is based upon factors which include fish and wildlife values, hydrophyte dominance, intactness of wetland community, connectedness of surface water hydrology, connectedness of the location in the landscape, hydroperiod, soils, and habitat diversity. These factors are used to develop a numerical ranking of wetlands, which range from 0.25 to 1.0. It provides that property should be developed so that it avoids or minimizes, to the greatest degree practicable, impacts on wetlands.

Wetlands acreage in Broward County continues to decline due to development pressure primarily in southwest Broward. To compensate for unavoidable wetland impacts, DPEP has required appropriate levels of mitigation for these impacts dependent upon the quantity and quality of wetlands that are dredged or filled. These mitigation areas are designed to replace the functions and values lost through development. Small, isolated wetlands exist throughout the undeveloped areas of Cooper City. However, none of these areas have been identified as a significant regional resource.

Impacts on these isolated wetlands will continue to be reduced and mitigated through the land development permitting process. The measures include:

- Site plan review and modification to avoid impacts on wetlands;
- Enhancement of water flows to wetland areas to improve the function of wetlands;
- Wetland plantings to improve the function of wetlands; and,
- Contributions to approved off-site wetland mitigation banks

F. Water Needs and Conservation Analysis

The projections for water use for the year 2030 are 6.2 mgd of raw water on a maximum day basis and 4.14 mgd raw water on an average day basis. Therefore Cooper City's 2030 demands can be met by the 7 mgd treated water (or 8.4 mgd raw water) capacity Water Treatment Plant. The City's Consumptive Use Permit (CUP) allows raw water withdrawal of 4.55 mgd for an average day and maximum monthly withdrawal of 171.5 MG. These allocations are adequate to meet the City's projected demands through 2030.

The least expensive, most desirable and available source for potable water within the study area is from the unconfined Biscayne Aquifer. The City's water withdrawal from the Biscayne Aquifer is regulated for consumptive use (from production wells) by the South Florida Water Management District (SFWMD). The greatest demand for water is for potable use. The City of Cooper City continues to comply with and endorses all

programs of the South Florida Water Management District pertaining to water conservation and protection.

In addition, the City continues to require compliance with the Broward County Wellfield Protection Ordinance, which further insures continuous quality water. This program is described in further detail in Section 6 of this element.

The Potable Water Sub-Element of the comprehensive plan gives additional details regarding water uses.

G. Soil Erosion

Soil erosion can result in damage to building and property and high turbidity in surface in surface waters, which is detrimental to aquatic life. Generally the soils located within Cooper City are not highly erosive. The only soil type with a potentially severe erosion problem is the Udorthents (Ud). According to the soil survey (USDA Soil Conservation Service, 1984), there are no Ud soils within the study area (See Exhibit 5-5). At the present time there are no soil erosion problems in Cooper City. Generally, soil erosion problems are minimal in inland areas, except at construction sites. During the site plan review process, the City requires proper lake slopes for all new lake excavations to limit soil erosion. In addition, the City requires that development sites are properly sloped and vegetation planted as soon as possible after construction.

H. Natural Areas Inventory for Cooper City

The following section analyzes the presence and condition of natural areas including: commercially valuable minerals, important fishing resources, wildlife and wellfields.

1. Commercially Valuable Minerals

According to Florida Department of Environmental Regulation's Mining Atlas (1982), the only two commercially valuable items within Broward County are limestone and sand. Currently within Cooper City there are no major commercial mining operations other than those which remove fill for lakes in approved residential or commercial developments.

2. Fisheries

a. Recreationally Important Fish or Shellfish

Recreational fishing is one of the most important activities in the coastal cities in Broward. It is also important in the freshwater areas of the county in-land, with fishing activities primarily occurring in the Water Conservation Areas. There are no navigable waters in Cooper City that would be considered significant recreational fishing areas.

The aquatic environment in Broward County supports the West Indian Manatee which is an endangered mammal with an estimated total population of 2,165 (December 2002). Manatees have been sighted in the canals in Cooper City.

- b. **Commercially Important Fish or Shellfish**
Very little commercial fishing takes place in Broward County waters and there are no commercial fishing areas in Cooper City.

3. Marine Habitats

Marine habitats are areas where living marine resources naturally occur, such as mangroves, sea grass beds, algae beds, salt marshes, transitional wetlands, marine wetlands, rocky shore communities, hard bottom communities, oyster bars or flats, mud flats, coral reefs, worm reefs, artificial reefs, offshore springs, near shore mineral deposits, and offshore sand deposits.

Being an inland community, there are no marine habitats within Cooper City.

4. Vegetative Communities

Conservation of wildlife species is dependent upon the conservation of the vegetative resources that provide them with food, shelter, and nesting areas. The Broward County Commission has designated Local Areas of Particular Concern (LAPC) and Natural Resource Areas (NRA) that represent historic remnants of the vegetative communities that once flourished in Broward County. While these designations do not preclude development, they do limit activities that may occur on the site until a certain level of development approval is received. Of the methods for protecting existing natural resource areas, only designation as an Urban Wilderness Area assures preservation. Designated Urban Wilderness Areas, acquired with public funds, are maintained as passive recreation areas in perpetuity. None of these designated areas are located in Cooper City.

In order to re-establish the benefits provided by native plants within the developed environment, native plants are required within landscape plans reviewed by the City. Additionally, plant species known to invade natural vegetative communities are precluded from use by the landscape ordinance.

An important component of wildlife habitat is the structural diversity of the vegetation. Structure refers to the vertical and horizontal components of the vegetation in a given habitat and can be identified as high canopy (such as might be provided by mature trees), mid level canopy (such as might be provided by trees which have not yet approached their full height or trees that do not grow very tall), and under-story (the shrubby layer found under the canopy). Beneath the under-story is the herbaceous/graminoid layer, composed of grasses, grass-

like species (e.g. sedges), and herbaceous species. Properties in Cooper City lack much in the way of structural diversity of vegetation because the under-story component is largely absent.

5. Wildlife

As discussed in the previous section, much of Cooper City is already developed with few areas remaining that can provide support for wildlife habitat.

The more structurally diverse a site is, the more likely it is able to provide habitat for a diverse fauna. Although properties in Cooper City do not provide optimal habitat, a recent survey of the Cooper Colony Golf Course identified 34 avian species on the site, five were exotic species and 29 were native. Of the 29 native species on the site, 5 are listed as protected by the state of Florida: snowy egret, tri-colored heron, white ibis, wood stork, and burrowing owl. The shorelines and aquatic systems provide foraging and resting areas for the anhinga, herons, egrets, ibis, wood storks, geese, ducks, moorhens and kingfishers, which indicated that the existing aquatic systems provide some important habitat habit values for these water-dependent species.

The endangered West Indian manatee has been reported and filmed in the external canal that enters the Cooper Colony Golf Course at its southeastern corner. The manatees are seasonal visitors to this portion of the canal, reported mostly during January and February. The most likely time for this endangered species to visit this canal is during periods of cold weather; manatees are known to seek the warm waters found in some canals during periods of cold weather.

Appendix 5-1 contains an Inventory List for Broward County of Endangered and Threatened Species status.

6. REGIONAL WELLFIELD

Brian Piccolo Park, located in Cooper City, is the location for six of the regional wells for the centralized wellfield southern site for Broward County. The City's wells are located in the north western portion of the City. All the Wellfields within the City are identified on Exhibit 5-3. The Broward County Wellfield Protection Ordinance regulates the use of hazardous substances within zones surrounding existing and proposed Wellfields to protect the quality of the groundwater. The three protection zones are defined as follows:

- Zone 1: The land area situated between the well(s) and the ten day travel time contour.
- Zone 2: The land area situated between the ten day and the thirty-day travel time contours.

Zone 3: The land area situated between the thirty-day and the 210 day travel time contours, or the thirty-day and the one-foot drawdown contours, whichever is greater.

The Ordinance contains a list of regulated substances. Within Zone 1 a non-residential activity which includes the storage, handling and usage or production of any regulated substances is prohibited.

Facilities in Zone 2 which store, handle, use, or produce any regulated substances must obtain a hazardous material wellfield license from the county. Licensed facilities on Zone 2 are subject to conditions including:

- a. Inventory: A record inventory of all regulated substances shall be maintained on a form provided by the county.
- b. Containment: Containment of hazardous materials shall be provided of adequate size to provide not less than one hundred (100) percent of any spill.
- c. Emergency collection devices: Vacuum suction devices or scavenger materials shall be present on site in sufficient magnitude so as to control and collect the total quantity of hazardous materials present.
- d. Daily monitoring: The emergency plan shall designate a responsible person who shall, on a daily basis, five (5) times per week, check for breakage or leakage of any container containing the regulated substances.

Facilities storing, handling, producing, using or manufacturing regulated substances in Zone 3 must obtain a hazardous material license from the county. Also, if spill of a regulated substance occurs on the site, the hazardous material license shall be replaced with a hazardous material wellfield license which would include the conditions in Zone 2 above.

II. CONCLUSION

The following paragraphs summarize the analysis of natural resources in Cooper City. The air quality of the City is generally good. Mobile source emissions are the greatest source of air pollution in the region. Cooper City has implemented the community shuttle to reduce automobile trips in the City. Other measures implemented by the City to reduce automobile travel and improve air quality include installation of sidewalks, bikeways and pedestrian ways.

Regulatory standards are designated to maintain and enhance surface water quality throughout the region. The contaminants found in the canal system within the city are

common to most canals within Broward County. Surface water quality monitoring results indicate that the quality of water in the C-11 canal is in the good to fair range. Cooper City continues to implement land development regulations designed to filter contaminants from runoff water prior to discharge into the water bodies.

Groundwater is generally good in the City. Water treatment facilities owned by Cooper City provide potable water that exceeds the Federal and State standards. The city in conjunction with Broward County supports and implements a number of programs that reduce water consumption as well as the volume of contaminants reaching this valuable resource. These measures include implementation of the Wellfield Protection Ordinance, elimination of septic tanks, and regulation of above and below ground hazardous material storage tanks. Groundwater conservation measures that reduce the volume of water used include requirements for planting native vegetation, enforcement of emergency conservation measures, especially during droughts and use of low flow mechanisms in new construction.

Much of the historic vegetative cover that provided habitats for wildlife in Cooper City have been removed as a result of previous development activities. However, residents in the City have the opportunity to observe thriving wildlife in the remaining natural areas throughout the City. The City uses land development regulations to encourage the planting of native vegetation, Creation of littoral zones along lake edged and protection of wetlands. These actions provide foraging ground and/or living habitat for wildlife and mitigate soil erosion. These measures have helped to maintain wildlife in the community that can be observed and enjoyed by all the residents.

With the continued encroachment of man into the natural environment, it becomes increasingly critical that a symbiotic relationship exist between these two forces, particularly in light the potential benefits available to each of them.

Results from environmental protection measures implemented in Cooper City thus far have generally been positive. Work is being done to protect, promote and enhance environmental quality in Cooper City. Some environmental issues, however, are regional in nature. Cooper City recognizes this and continues to work with the regional and state environmental agencies through joint planning and permitting efforts to help address these issues.

III: GOALS, OBJECTIVES AND POLICIES

Goal: To protect, enhance, and effectively manage the natural resources of the City in order to continue a high level of environmental quality.

Objective 5.1

Cooper City shall maintain air quality standards at or above those levels established by the Florida Department of Environmental Protection in Rule Chapter 17-2, F.A.C. and Broward County Department of Planning and Environmental Protection in Chapter 27 of the Broward County Code of Ordinances.

Policy 5.1.1

The City's land development regulations shall require new development to provide vegetative buffer strips, particularly along all roadways, in order to improve air quality.

Policy 5.1.2

The City shall reduce the potential for automobile pollution by encouraging mixed use developments, providing a community shuttle, and supporting improvements to the regional transit network.

Policy 5.1.3

The City shall improve air quality by establishing land development regulations which promote Broward County's compliance with the Southeast Florida State Implementation Plan. (BCO 9.14.00)

Objective 5.2

Through the implementation of programs and regulations, the City shall conserve, use appropriately and protect the quality and quantity of current and projected water sources.

Policy 5.2.1

The City shall continue to require developments within the City to comply with Broward County's wellfield Protection Ordinance to protect the quality and quantity of water resources.

Policy 5.2.2

Continue to require monitoring wells to be placed around above and below ground storage tank facilities.

Policy 5.2.3

In order to ensure the quantity of the City's potable water supply, the City will work with Broward County and the South Florida Water Management District to implement measures for water conservation as outlined in the Lower East Coast Regions Water Supply Plan.

Policy 5.2.4

The City will adopt, implement, and maintain the Water Supply Facilities Work Plan to increase the coordination between land use and future water supply planning within 18 months of the adoption of the Lower East Coast regional water supply plan as required by Chapter 163, Florida Statutes.

Policy 5.2.5

In order to protect and preserve the Biscayne Aquifer, the City will investigate utilization of alternate potable water resources to supplement the City's future water supply sources.

Policy 5.2.6 – The City's Work Plan identifies alternative sources of water that can be used to meet existing and future needs as well as the alternative water supply project or projects selected by the City, approved by the SFWMD, and identified in the Lower East Coast Water Supply Plan to supplement traditional sources of groundwater and surface water supplies. (Cross reference Policy 4.6.5 of the Infrastructure Element).

Objective 5.3

Continue maintaining the average daily per capita demand reduction of 5 gallons that was achieved in 2014. Implement the City's water conservation program to the maximum extent practicable and meet the Ocean Outfall requirements described in the Long Term Water Supply Plan by the most appropriate means (cross reference Policy.4.9.4 of the Infrastructure Element).

Policy 5.3.1

Cooper City shall reduce water demands by cooperating with County and Regional agencies to conduct water conservation programs.

Policy 5.3.2

Reduce potable water demands by continuing to implement the City's Florida Friendly Landscape Ordinance and adopted water regulations (SFWMD water use restrictions and Broward County Water Conservation Ordinance No. 91-8, Section 3), which require lawn irrigation hours and the use of low water use vegetation in landscaping (xeriscaping and Florida Friendly Landscaping).

Policy 5.3.3

Reduce per capita water demand by continuing to conduct a year-round public information and education program promoting residential water conservation including monthly water conservation information with monthly billings, distribution of the City's quarterly newsletter, and annual water quality information (the Consumer Confidence Report).

Policy 5.3.4

To reduce per capita water demand, new developments may be required to incorporate rain sensing devices in irrigation systems and low flow mechanisms as outlined in the Florida Building Code.

Policy 5.3.5

The City shall enforce the Broward County Building Code Section 604.4, Maximum flow and water consumption of the Florida Building Code, Plumbing, which contains standards for ultra-low volume plumbing fixtures to be used in all new construction. See Table 604.4 - Maximum Flow Rates and Consumption for Plumbing Fixtures and Fixture Fittings.

Objective 5.4

Conserve minerals, soils, native vegetative communities, fisheries, wildlife, and protect rare, threatened and endangered species.

Policy 5.4.1

City will continue to implement its Tree Protection Ordinance to further preserve and protect native vegetative communities from destruction by development activity and encourage planting of additional native vegetation.

Policy 5.4.2

Cooper City shall distribute any information available from the Florida Fish and Wildlife Conservation Commission regarding identification and protection of any threatened, endangered or rare species within the City's boundaries.

Policy 5.4.3

Cooper City shall implement necessary legislation identified by the Florida Fish and Wildlife Conservation Commission relating to threatened, rare or endangered species.

Policy 5.4.4

City shall continue to work with private landowners to use good management practices to protect the habitat of threatened endangered and rare species.

Policy 5.4.5

The City will continue to implement land development regulations that required new developments adjacent to or in the vicinity of Cooper City's surface waters and wetlands be designed to minimize direct discharge of storm water run-off into such bodies of water.

Policy 5.4.6

Cooper City shall require that site design, land dedication and wetland mitigation, be utilized in all new developments to preserve a greater amount of open space and protect native vegetative communities.

Policy 5.4.7

Cooper City Land Development Regulations shall continue to prohibit installation of new seawalls and docks which adversely impact the growth of littoral vegetation.

Policy 5.4.8

The City shall require, through the site plan approval process the preservation or use of native vegetation and limitations on site clearing to ensure the preservation of native vegetation and habitats necessary for the survival of endangered and threatened wildlife.

Policy 5.4.9

The City shall require new developments to mitigate impacts to wetlands and incorporated water retention measures to promote restoration of the Everglades including its hydrological and ecological functions as well as any degraded or substantially disrupted surface waters (BCP 6.01.01)

Policy 5.4.10

The City shall not allow new solid-fill transportation facilities or similar structures within identified water conservation areas without provisions for maintaining the fresh water sheet flow. (BCP 6.01.02)

Policy 5.4.11

The City shall implement land development regulations that protect and conserve those areas known to be reproduction, nesting, and feeding areas for animals listed as endangered or threatened species or species of special concern. (BCP 6.01.04)

Policy 5.4.12

The City shall implement land development regulations that protect the minimum seasonal flow and levels of surface water courses, as established by the South Florida Water Management District. (BCP 6.01.05)

Policy 5.4.13

The City shall implement land development regulations that protect and conserve those areas known to contain plant species listed in the Regulated Plant Index for protection by the Florida Department of Agriculture and Consumer Services. (BCP 6.01.08)

Policy 5.4.14

The City shall support the adopted South Florida Water Management District's east coast buffer by discouraging to the maximum extent feasible incompatible land uses within the identified buffer areas and on adjacent lands. Such incompatible land uses may include, but not limited to, heavy commercial and industrial uses, sewage treatment facilities, solid waste disposal and transfer stations, cemeteries, transportation facilities, and gas and service stations. (BCP 6.01.09)

Policy 5.4.15

The City shall work in close coordination with the South Florida Water Management District and other wetland regulatory and planning agencies to assure that wetland mitigation efforts support and optimize use of identified east coast buffer land. (BCP 6.01.10)

Policy 5.4.16

The City shall promote the acquisition, retention and management of unique natural areas and native vegetative communities in order to preserve their environmental, recreational and other public benefits. (BCP 6.02.02)

Policy 5.4.17

The City shall implement land development regulations that discourage activities in the vicinity of local areas of particular concern which would have a detrimental impact upon such areas. (BCP 9.01.05)

Policy 5.4.18

Cooper City shall support Broward County's policy regarding wetland mitigation within "Cooper City" in the manner set forth below, be used to restore, enhance or replace wetlands

located within “eastern Broward County”; mitigation may be allowed in other areas of the County or, out of the County, only if it is determined by the County Commission and appropriate permitting agencies that suitable sites for such purposes are not available in “eastern Broward County”. Mitigation shall be considered first onsite, second offsite within the same drainage basin with a preference for remaining in the respective municipality, third offsite in “Eastern Broward County”, fourth offsite in Broward County, and finally offsite outside of “Eastern Broward County.” For the purposes of this policy, eastern Broward County is defined as the area east of the Everglades Buffer Strip and the reserve water supply areas as defined in Objective 6.02.00, “Permitted Uses within the Conservation Areas in Natural Reservations” Broward County Land Use Plan. Nothing in this policy shall be construed to encourage small unviable or unsustainable mitigation. (BCP 9.05.18)

Policy 5.4.19

Incompatible future land uses shall be directed away from wetland areas within the City.

Objective 5.5

Support the South Florida Regional Planning Council in the attainment of Goal 49.1 of its Comprehensive Regional Policy Plan by reducing the per capita energy consumption within the City.

Policy 5.5.1

Public facilities operated and maintained by the City will use, to the maximum extent feasible, energy efficient outdoor lighting systems and other public facilities utilizing outdoor electric lighting will be encouraged to use energy efficient lighting systems.

Policy 5.5.2

Efficient energy use shall be required in building design by implementing requirements in the Florida Building Code and City Land Development Regulations regarding insulation, cross ventilation, tinted windows; landscaping and similar methods.

Objective 5.6

Conserve, appropriately use and protect minerals, soils and native vegetative communities including forests.

Policy 5.6.1

Native vegetative communities shall be protected from destruction by development activities through the tree preservation ordinance, site design, and/or mitigation.

IV. APPENDIX

**APPENDIX 5-1
CONTAMINATED LOCATIONS**

Facility Name	Address	Type	Pollutant	Status
Chevron #200168	11173 Sheridan Street	Gas Station	Gasoline	Cleanup ongoing
Cooper City Professional Cleaners	10000 Stirling Road	Dry Cleaner	Chlorinated Solvents	In process with FDEP
Dry Clean USA #11212	2625 North Hiatus Road	Dry Cleaner	Chlorinated Solvents	In process with FDEP
Farm Store #1061 (Petro America)	11345 Stirling Road	Gas Station	Gasoline	Cleanup ongoing
Shell	5704 Flamingo Road	Gas Station	Gasoline	Cleanup ongoing

V. EXHIBITS