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# 2018 BROWARD COUNTY COMPREHENSIVE PLAN SUPPORT DOCUMENTS

Broward County Board of County Commissioners
Environmental Protection and Growth Management Department
Planning and Development Management Division

BROWARD COUNTY FLORIDA

# SUPPORT DOCUMENTS

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# Broward Municipal Services District Land Use and Community Planning Support Document

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Agricultural Uses - Activities within land areas which are predominantly used for the cultivation of crops and livestock including cropland, pastureland, orchards, vineyards, nurseries, ornamental horticulture areas, groves, confined feeding operations, specialty farms, and silviculture areas.

Airport Facility - Any area of land or water improved, maintained or operated by a government agency for the landing and takeoff of aircraft, or privately-owned paved runways of 4,000 or more feet in length, and any appurtenant area which is used for airport buildings, or other airport facilities or rights-of-way.

Airport Obstruction - Any structure, object of natural growth, existing condition, or use of land which obstructs the airspace required for the flight of aircraft during arrival or departure at an airport or which otherwise increases the risk of danger to aircraft operations.

Areas Subject to Coastal Flooding - The areas delineated by the hurricane evacuation study applicable to Broward County as requiring evacuation. These areas include the area requiring evacuation in the event of a 100-year storm or Category 3 storm event (see Evacuation Zone).

Arterial Road - A roadway providing service which is relatively continuous and of relatively high traffic volume, long trip length, and high operating speed.

Borrow Pit Lake - A lake which is dug to drain adjacent land for development, with the material extracted during the digging of the lake being used as fill on the adjacent land.

Broward County Municipal Services District (BMSD) – Unincorporated areas where the Broward County Board of County Commissioners (Board) serves as the local governing body and is responsible for providing services and infrastructure, including potable water, parks, sewer, drainage (such as canals, lakes, stormwater management), roadways, streetlights, and transit. The following areas are included in the BMSD (2018):

1) Neighborhoods—Broadview Park, Central County (Roosevelt Gardens, Washington Park, Franklin Park, and Boulevard Gardens) and North County/Hillsboro Pines and Hillsboro Ranches.
2) Regional facilities—Fort Lauderdale-Hollywood International Airport and landfill areas.
3) Residential enclaves—including unincorporated parcels near the cities of Parkland and Sunrise.
4) Other enclaves adjacent to the Seminole Tribal lands near Hollywood and Davie
5) Right of Way—Florida's Turnpike interchanges at Cypress Creek Road and Sample Road, as well as the Pompano Service Complex, among others.

Climate Change - Alteration of long term weather patterns that can be identified (e.g. using statistical tests) by shifts in the mean and/or the variability of these properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Article 1 of the United Nations Framework Convention on Climate Change (UNFCCC) defines 'climate change' as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (International Panel on Climate Change (IPCC)).

Clustering - A land use planning technique in which a portion of a site is allowed to be developed at a greater density than would otherwise be allowed, in favor of leaving the rest of the site as open space

Coastal Area - Broward County and all its coastal municipalities.

Coastal High Hazard Areas - The evacuation zone for a Category 1 hurricane established in the regional hurricane evacuation study applicable to Broward County.

Collector Road - A roadway providing service which is of relatively moderate traffic volume, moderate trip length, and moderate operating speed.

Commercial Uses - Activities within land areas which are predominantly connected with the sale, rental and distribution of products, or performance of services.

Compatibility - A condition in which land uses or conditions can co-exist in relative proximity to each other in a stable fashion over time such that no use or condition is unduly negatively impacted either directly or indirectly by another use or condition.

Concurrency - The provision of the necessary public facilities and services to maintain the adopted level of service standards when the impacts of development occur. In the BMSD, concurrency applies to the following public facilities: potable water, sanitary sewer, solid waste, drainage, roads, mass transit, local and regional parks, and public schools.

Concurrency Management System - The procedures and processes used by a local government to assure development orders and permits are not issued unless the necessary facilities and services are available concurrent with the impacts of development.

Concurrency Determination - A decision made by local government as to whether a development proposal meets concurrency requirements.

Conservation Uses - Activities or conditions within land areas designated for the purpose of conserving or protecting natural resources or environmental quality, including areas designated for such purposes as flood control, protection of quality or quantity of groundwater or surface water, floodplain management, commercially or recreationally valued fish and shellfish, or protection of vegetative communities or wildlife habitats.

Crown Elevation - The peak of a road, often in the middle, which diverts stormwater down gentle slopes and off the surface of the road.

Density - An objective measure of the number of people or residential units allowed per unit of land. Examples include persons per square mile and dwelling units per acre.

Development - The carrying out of any building activity or mining operation, the making of any material change in the use or appearance of any structure or land, or the dividing of land into three or more parcels. The following activities or uses are development: a reconstruction, alteration of the size, or material change in the external appearance, of a structure on land; a change in the intensity of use of land, such as an increase in the number of dwelling units in a structure or on land or a material increase in the number of businesses, manufacturing establishments, offices, or dwelling units in a structure or on land; alteration of a shore or bank of a seacoast, river, stream, lake, pond, or canal, including any coastal construction as defined in Section 161.021, FS; commencement of drilling, except to obtain soils samples, mining, or excavation on a parcel of land; demolition of a structure; clearing of land as an adjunct to construction; and deposit of refuse, solid or liquid, or fill on a parcel of land.

Development Controls - The standards in the comprehensive plan which control the development or use of land, which are in addition to the densities, intensities, and uses assigned to land by the BMSD Map Series.

Distribution - The spatial array of land uses throughout an area.

Drainage Detention Structure - The collection and temporary storage of stormwater for the purpose of treatment through physical, chemical, or biological processes with subsequent gradual release of the stormwater.

Dredge - To deepen a waterway using a special apparatus, often carried on a barge, through the removal of bottom material by digging or using suction.

Dredge Spoil - The material, often composed of rocks, vegetation and muck, removed from the bottom of a waterway to ensure its suitability for navigational and flood control purposes.

Educational Uses - Activities and facilities of public or private primary or secondary schools, vocational and technical schools, and colleges and universities licensed by the Florida Department of Education, including areas of buildings, campus open space, dormitories, recreational facilities or parking.

Evacuation Zone - An area that will be required to move under an evacuation order for an impending storm.

Everglades Buffer Strip - The area of land between U.S. 27 and the Water Conservation Areas extending from S.R. 84 to Miami -Dade County which has been designated for acquisition by the South Florida Water Management District for water management purposes.

Facility Adequacy or Availability - The ability of a facility to operate at a level of service standard which satisfies the concurrency management system. A facility adequacy determination is conducted in Broward County at the time of plat approval.

Flood Plains - Areas inundated during a 100-year flood event or areas identified by the National Flood Insurance Program as Zone A or Zone V on Flood Insurance Rate Maps or Flood Hazard Boundary Maps.

Floodprone Areas - Areas inundated during a 100-year flood event or areas identified by the National Flood Insurance Program as Zone A on Flood Insurance Rate Maps or Flood Hazard Boundary Maps.

Floor Area Ratio (FAR) - The total gross floor area of all buildings and structures on a lot, divided by the total lot area.

Functional Relationship - A complementary and interactive relationship among land uses or development, including at a minimum a substantial and positive exchange of human interaction, goods, resources, institutions, services, jobs or workers between land uses or developments.

Goal - The long-term end toward which programs or activities are ultimately directed.

Green Certification Programs - Programs that apply criteria and standards to the design and construction of buildings that conserve and protect the environment, increase profitability through energy efficiency and create healthier places to live, work, and play.

Greenhouse Gas Emissions (GHGs) - Any gaseous compound, such as carbon dioxide or methane, often resulting from the burning of fossil fuels, that absorbs infrared radiation and traps heat in the atmosphere.

Gross Acreage - The total number of acres in an area, including acreage used or proposed for streets, lakes, waterways, and other proposed land uses permitted in residential areas by the Broward County Comprehensive Plan. Acreage calculations on the BMSD Future Land Use Map Series will necessarily be approximate, due to the scale of the map. Where edges of future land use categories are close to property lines, streets, transmission lines or other existing lines, edges should be construed to follow those lines. A lake or canal should be construed as having been assigned the same land use category as that assigned to adjacent unsubmerged land. The rivers and canals of the primary drainage system as identified within this plan shall not, however, be construed as having credit towards residential density.

Gross Density - The number of dwelling units constructed or proposed within an area, divided by the gross acreage of the area or parcel.

High Recharge Area or Prime Recharge Area - An area, designated by the South Florida Water Management District (SFWMD) governing body, which is distinguished by its natural capability to recharge groundwater in large quantities.

Historic Resources - All areas, districts, or sites containing properties listed on the Florida Master Site Plan File, the National Register of Historic Places, or designated by a local government as historically, architecturally, or archeologically significant.

Industrial Uses - The activities within land areas predominantly connected with manufacturing, assembly, processing, or storage of products.

Infill - The development of vacant parcels in otherwise built up areas where public facilities such as sewer systems, roads, schools, and recreation areas are already in place.

Infrastructure - Engineered man-made structures which serve the common needs of the population, such as roads, sewers, water treatment plants, canals, and public schools.

Intensity - An objective measurement of the extent to which land may be developed or used, including the consumption or use of space above, on or below ground; the measurement of the use of or demand on natural resources; and the measurement of the use of and demand on facilities and services. Often measured as the maximum floor area ratio (FAR) allowed on a parcel of land or as percentage of lot coverage.

Interagency Hazard Mitigation Report - The recommendations of a team of federal, state, regional, or local officials which address measures to reduce the potential for future flood losses and which is prepared in response to a Presidential Disaster Declaration.

Levee, Conservation Levee, Everglades Levee - The engineered earthen barrier maintained by the SFWMD as a flood control mechanism that separates the urbanized area of Broward County from the Water Conservation Area and the Everglades, including levees 33, 35A, 36, L-37 and L-35.

Level of Service (LOS) - An indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based upon and related to the operational characteristics of the facility. Level of service shall indicate the capacity per unit of demand for each public facility.

Level of Service Standard - The design capacity of a facility. Also, the standard established by the local government of how a service will be provided to the public.

Mass Transit - Passenger services provided by public, private or non-profit entities such as the following surface transit modes: commuter rail, rail rapid transit, light rail transit, light guideway transit, express bus, and local fixed route bus.

Minerals - All solid minerals, including clay, gravel, phosphate rock, lime, shells (excluding live shellfish), stone, sand, heavy metals, and any rare earths, which are contained in the soils or waters of the state.

NatureScape Broward - Is a strategy of landscaping that encourages the use of native plants to create Florida friendly green spaces that conserve water, protect water quality, and create wildlife habitat. Native species are uniquely adapted to south Florida and require little watering and are naturally resistant.

Nonpoint Source Pollution - A form of water, soil, or air pollution which is diffused in its origin and frequently widespread in its occurrence. These contaminants are typically dissolved in stormwater run-off, adhered to soil particles, or suspended in air.

Objective - A specific, measurable, intermediate end that is achievable and marks progress toward a goal.

Open Spaces - Undeveloped lands suitable for passive recreation or conservation uses.

Pattern - The form of the physical dispersal of development or land use.

Policy - The way in which programs and activities are conducted to achieve an identified goal.

Redevelopment - See urban redevelopment.

Resilience – The capacity to recover quickly or adjust easily to change, which can be caused by events such as a disaster or major storm, or by health, economic, climate change, or political adjustments.

Slough - The valleys spanning the Atlantic Coastal Ridge in an east-west direction which, historically, provided natural mechanisms by which water drained from the Everglades.

Smart Growth - Planning principles and issues that address the quality of life will be maintained for this and future generations of Broward County inhabitants.

Suitability - The degree to which the existing characteristics and limitations of land and water are compatible with a proposed use or development.

United States Green Building Council Leadership in Energy and Environmental Design (LEED) - Organization whose mission is to "transform the way buildings and communities are designed, built, and operated, enabling an environmental and socially responsible, healthy, and prosperous environment that improves the quality of life."

Urban Redevelopment - The demolition and reconstruction or substantial renovation of existing buildings or infrastructure within existing urban service areas.

Urban Sprawl - Urban development or uses which are located in predominantly rural areas, or rural areas interspersed with generally low-intensity or low-density urban uses, and which are characterized by one or more of the following conditions: the premature or poorly planned conversion of rural land to other uses; the creation of areas of urban development or uses which are not functionally related to land uses which predominate the adjacent area; or the creation of areas of urban development or uses which fails to maximize the use of existing public facilities or the use of areas within which public services are currently provided. Urban sprawl is typically manifested in one or more of the following land use or development patterns: leapfrog or scattered development; ribbon or strip commercial or other development; or large expanses of predominantly low-intensity, low density, or single use development.

Water Conservation Area - Water Conservation Area means the 796 square miles of Broward County west of Levees 33, 35A, 36, L-37 and L-35.

Wellfield Cone or Zone of Influence - An area around one or more major water wells, the boundary of which is determined by the government agency having specific statutory authority to make such a determination based on potential impacts to potable water resources due to groundwater travel or drawdown depth.

# LIST OF ACRONYMS

| | |
|---|---|
| BMSD | Broward Municipal Services District |
| EPGMD | Environmental Protection and Growth Management Department |
| FS | Florida Statutes |
| 1989 FUALUE | 1989 Future Unincorporated Area Land Use Element |
| MPO | Metropolitan Planning Organization |
| NAVD 88 | North American Vertical Datum of 1988 |
| PDMD | Planning and Development Management Division |
| SFWMD | South Florida Water Management District |
| TAZ | Traffic Analysis Zone |
| TCMA | Transportation Concurrency Management Area |
| USACOE | United States Army Corps of Engineers |
| WCA | Water Conservation Area(s) |

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Broward Municipal Services District

## INTRODUCTION

The Broward Municipal Services District (BMSD) Land Use and Community Planning Element (BMSD Element) guides the physical growth and development of the community over a short-term of five years and a long-term time frame of 10 years. After the initial five years, the document and associated maps are evaluated and revisions made to respond to changing conditions, directives from the Broward County Board of County Commissioners (Board), and as required by Florida Statutes. Minor revisions may be processed periodically to ensure the information in the document is current. The Broward County Comprehensive Plan, including the BMSD Element, is a policy document, intended to provide for orderly growth and development, while at the same time flexible enough to respond to social, environmental, economic, climate related, and other changes which may occur.

### A. General.

Consistent with Florida Statute (FS) 163.3177, the purpose of the BMSD Element is the management of future land uses as reflected in the goals, objectives and policies of the local government comprehensive plan elements. The BMSD Element Support Document provides the data and analysis used as the basis for the goal, objectives, and policies included in the element.

Part I of the Support Document identifies the service areas and planning horizons, defines key terms, and provides background on the BMSD. Part II addresses the land use patterns, the data requirements and includes inventories of natural resources, conditions of existing uses, characteristics of planning sectors, and population projections. Part III includes an analysis of the availability of facilities and services to serve existing uses, the character and magnitude of existing vacant or undeveloped land in order to determine the suitability of use, the amount of land needed to accommodate the population, the need for redevelopment, the proposed development and redevelopment of flood prone areas, the need for additional dredge spoil disposal sites, and the BMSD Element Map Series. Part IV addresses implementation of the BMSD Element. Part V are the appendices.

### B. Service area.

The planning service area and the regulatory service area are limited to the unincorporated areas.

### C. Planning horizons.

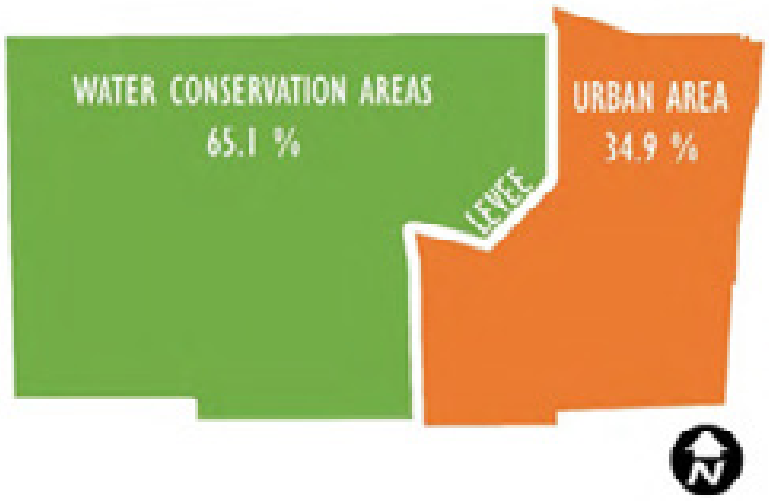
The short-term planning horizon is five years; the long-term horizon is 10 years.

## DATA REQUIREMENTS

### A. Existing Conditions

Broward County contains 1,224.7 square miles of land which is bounded on the north by Palm Beach County, on the south by Miami-Dade County, on the east by the Atlantic Ocean, and on the west by Hendry and Collier Counties. Only 427.8 square miles are developable and the other 796.9 square miles are the Water Conservation Areas, a portion of the Florida Everglades. Broward County is divided into 31 incorporated municipalities and the Broward Municipal Services District (BMSD).

Figure 1: Broward County Urban & Water Conservation Areas




The BMSD comprises unincorporated areas where the Board serves as the local governing body and is responsible for providing services and infrastructure, including potable water, parks, sewer, drainage (such as canals, lakes, stormwater management), roadways, streetlights, and transit.

The following areas are included in the BMSD (2018):

1) Neighborhoods—Broadview Park, Central County (Roosevelt Gardens, Washington Park, Franklin Park, and Boulevard Gardens) and North County/Hillsboro Pines and Hillsboro Ranches.

2) Regional facilities—Fort Lauderdale-Hollywood International Airport and landfill areas.
3) Residential enclaves—including unincorporated parcels near the cities of Parkland and Sunrise.
4) Other enclaves adjacent to the Seminole Tribal lands near Hollywood and Davie
5) Right of Way—Florida's Turnpike interchanges at Cypress Creek Road and Sample Road, as well as the Pompano Service Complex, among others.

Broward County also includes Native American reservation lands, belonging to the Seminole and Miccosukee tribes, where the regulation of development activities is the sovereign authority of the tribal government.

The developable area of Broward County is the land located east of the Water Conservation Area levees. The location and the rate of urban growth within this eastern developable area has historically depended upon draining and filling land; constructing major roadways, including the Florida Turnpike, I-95, I-75, I-595 and the Sawgrass Expressway (SR 869); and a steady rate of residential in-migration.

Excluding the Water Conservation Area, the land area that constitutes the BMSD is approximately 11.41 square miles, of which, 5.61 square miles are occupied by County Regional Facilities, and the remaining 5.80 square miles are occupied by other urban development. Figure 2 is the BMSD Generalized Boundary Map. This dispersed configuration is the result of ongoing incorporation and annexation activity.

Figure 2: Broward Municipal Services District Generalized Boundary Map

From 2000 to 2008 the BMSD decreased from 20,837.1 acres to 7,159.62 acres. In 2009, the BMSD increased to 8,561.76 acres, as a result of a boundary change with Palm Beach County. This additional land, better known as the "wedge", is located in the Northwest part of Broward County.

Table BMSD-SD-1
BMSD Area Size Broward County: 2000-2016

| Years | Developable BMSD Area (acres) | Total BMSD Area (acres) |
|---|---|---|
| 2000 | 16,191.7 | 20,837.1 |
| 2005 | 4,804.9 | 8,975.2 |
| 2010 | 4,290.3 | 8,451.4 |
| 2015 | 3,166.8 | 7327.9 |
| 2016 | 3,158.6 | 7,319.7 |

Source: Planning and Development Management Division/GIS 2010, 2017

Continual development and annexations within the BMSD is reflected by the decrease of vacant and agricultural land between 2000 and 2016.

Table BMSD-SD-2
BMSD Vacant & Agricultural Land: 2000-2018

| Years | Vacant BMSD Area (acres) | Agricultural Area (acres) |
|---|---|---|
| 2000 | 799 | 1,497 |
| 2010[1] | 843 | 675 |
| 2018 | 157 | 0 |

Source: Planning and Development Management Division/ GIS, updated in 2018
Notes: [1]Figures include 1,949 acres of unincorporated land transferred from Palm Beach County to Broward in 2009, known as the "Wedge."

As of 2018, the BMSD has 157 acres of vacant, undeveloped land, which includes vacant residential, commercial, industrial and institutional. At this time, there is no land designated as Agricultural on the BMSD Future Land Use Map. However, existing agricultural uses comprise approximately 697 acres. Over 678 of those acres (97%) are located within or adjacent to the "wedge". Decreases in almost every other major land use category have occurred as a result of annexations

Currently, the developable areas of the BMSD includes three neighborhoods, Broward County's Fort Lauderdale-Hollywood International Airport, and a few small scattered enclaves. Any new

development will likely result as redevelopment in the neighborhoods, including Central County, Broadview Park, and to a lesser extent in the Hillsboro Pines/Hillsboro Ranches neighborhoods in North County.

The Water Conservation Areas (WCA), which include the Miccosukee and Big Cypress Seminole reservations, total approximately 797 square miles. They are located west of Levees L-33, L-35, L-35A, L-36, and L-37and include WCA-2B and portions of WCA-2A, WCA-3A, and WCA-3B. The WCAs are part of the Central and Southern Florida Flood Control Project, designed to provide flood control and water supply to South Florida. The South Florida Water Management District (SFWMD) owns portions of the WCAs or maintains rights to monitor and regulate surface water flow and flood elevations for flood control, water quality, water storage and aquifer recharge purposes. The WCAs closely resemble the historic Everglades and are not suitable for urban development. However, the WCAs offer an abundance of outdoor recreational opportunities, including fishing, hunting, canoeing, and bird watching. The Florida Fish and Wildlife Conservation Commission, under an agreement with the SFWMD, manages WCAs 2 and 3 as the Everglades and Francis S. Taylor Wildlife Management Area. The Big Cypress Seminole and Miccosukee reservations, located between WCA-3A and the western boundary of Broward County, generally contain undeveloped wetlands and tree islands.

Urban growth cannot exceed the limits of the Water Conservation Area levees without approval from the SFWMD. Urban development will continue to proceed between the levees and the Atlantic Ocean, subject to meeting the adopted level of service standards for facilities and services and preserving the integrity of the water management and drainage areas. Other physical and environmental factors have been considered in determining the density and intensity of urban growth, including water supply, soil suitability, the character of natural and historic resources, topography and the threat of flooding. This analysis is based upon the data presented within the Broward County Land Use Plan's Natural Resources Map Series, as well other best available data sources. The intensity and rate of urban growth is also dependent upon the provision of level of service standards adopted within the elements of the Comprehensive Plan. The primary intent of the BMSD Element is to designate future land use categories in a manner which promotes healthy communities that contain a mix of uses that serve the needs of the community, while protecting conservation lands.

Section 163.3177, FS, requires that the future land use element designate the future general distribution, location, and extent of the uses of land for residential uses, commercial uses, industry, agriculture, recreation, conservation, education, public facilities, and other categories of the public and private uses of land. The approximate acreage and the general range of density or intensity of use shall be provided for the gross land area included in each existing future land use category. The element shall establish the long-term end toward which land use programs and activities are ultimately directed; be based upon surveys, studies, and data regarding the area; and include a future

land use map displaying natural resources and the proposed distribution, location, and extent of the various categories of land uses. It also requires the inclusion of population projections.

## B. Natural Resources.

The Broward County Land Use Plan Natural Resource Map Series and the Broward County Comprehensive Plan Map Series provide the spatial extent of Broward County's natural and historic resources. Some maps present Countywide data; others are specific to the Broward Municipal Service District. Historically, development limitations due to poorly draining soil types, low elevations, and flooding potential have somewhat limited urban growth in the developable area of Broward County. These limits may be overcome through the application of standard land management practices, including drainage, fill, and some wetland mitigation; however, constraints exist due to the presence of wetlands and wellfield zones of influence

### 1. Potable Water Wells and Wellhead Protection Areas.

The Wellfield Protection Zones and Contaminated Sites map (Map C-2) of the Conservation Element illustrates the general locations of public wellfields and the extent of their zones of influence in Broward County. Within the urban area of the BMSD, these wellfield protection zones affect Broadview Park and the Hillsboro Pines and Ranches neighborhoods.

The Water Management Element and Chapter 27, Article XIII, "Wellfield Protection", of the Broward County Code of Ordinances 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 or wellfield protection areas of water supply wells. Map C-2 shows the Wellfield Protection Areas are divided into three concentric zones, each of which provides a certain level of protection based upon travel time contours.

### 2. Rivers, Bays, Lakes, Floodplains, and Harbors.

The Broward County Waterbodies Map WM-6 displays the major surface water features, including canals, rivers, bays, lakes, floodplains, and harbors. A network of drainage canals and remnant rivers flow into the Intracoastal Waterway, which are maintained by the SFWMD. The New River and the Middle River are former natural rivers which have been channelized to provide upland drainage protection. There are no natural lakes within the BMSD; however, lakes exist as the result of excavation. The Broward County Land Use Plan Natural Resource Map Series, Flood Plains and Flood Prone Areas Map, indicates that most of the County is located within a flood prone area. The BMSD neighborhoods are mostly outside of flood-prone areas, except for small portions near drainage lakes and canals.

The Broward County Environmental Protection and Growth Management Department (EPGMD), through its Countywide review and permit authority, requires floor area elevations to meet 3-day, 100-year storm design criteria. The lowest floor of livable space must meet a minimum height requirement of 8.49 feet on the North American Vertical Datum of 1988

(NAVD 88). The EPGMD's review also requires local and County roadway crown elevations to meet 1-day, 10-year storm event design criteria.

### 3. Wetlands

The Water Conservation Areas (WCAs) are a wetland of global importance. There are four WCAs, 2-A, 2-B, 3-A, and 3-B, which are managed jointly by the South Florida Water Management District (SFWMD) and the Florida Fish and Wildlife Conservation Commission (FWC) in Broward County. The WCAs are located in the non-developable portion of the county and constitute a significant part of the Florida Everglades. The main functions of the WCAs are to provide flood protection, water supply, natural systems management, providing fish and wildlife habitat and outdoor recreational opportunities, and water quality management.

Broward County Code of Ordinances, Chapter 27, Article XI, Aquatic and Wetland Resource Protection includes provision for wetland protection. More information about the County's wetland protection programs is found in the Conservation Element.

### 4. Soils

Natural soil patterns have been substantially modified to allow urban development. The Broward County Land Use Plan Natural Resource Map Series, Soils, indicates the following soil types are located in the BMSD:

- The Central County Community contains Urban-Immokalee-Basinger and Urban Land-Dade-Duette.
- The North County neighborhoods of Hillsboro Pines and Ranches, primarily contain Hallandale-Margate-Boca soils, which sustain low flatwoods, sloughs and marshes and are associated with historic cypress and sawgrass wetland vegetative communities.
- Broadview Park has a combination of Urban-Immokalee-Basinger, Urban Land-Dade Duette, and Hallandale-Boca-Margate soil types. The areas closest to Butterfly Lake and the North New River Canal are the most poorly drained, while soils further north have better drainage qualities.

### 5. Minerals.

The Broward County Land Use Plan Natural Resource Map Series, Minerals, indicates there are primarily three mineral resources within Broward County: sand, limestone, and peat. There are no active mining areas in the BMSD.

## C. Existing Use Conditions.

### 1. Existing Uses.

Figure 5 shows the approximate acreage and percent of existing land uses by general land use category. The BMSD is classified into the developable area, which is the land east of the

Water Conservation Area levees and the non-developable area, which is the land west of the Water Conservation Area levees.

Table BMSD-SD-3
Existing Land Use

| Use | Acres | Percent Developable Area[1] |
|---|---|---|
| Vacant | 349 | 5 |
| Single-Family | 625 | 9 |
| Multi-family | 96 | 1 |
| Commercial | 108 | 2 |
| Industrial | 88 | 1 |
| Agriculture | 665 | 10 |
| Community facility | 3,011 | 44 |
| Utility | 1,833 | 27 |
| SubTotal | 6,775 | 100 |
| Conservation | 510,000 | 0 |
| Total | 516,775 | N/A |

**Notes:** 1 Developable area includes land east of the Water Conservation Areas. Land in the Water Conservation Areas is considered non-developable.
**Source:** Broward County GIS, PDMD, 2018.

### a. Vacant.

The area is nearly fully developed. Vacant land includes previously developed sites that have been torn down and urban infill lots. Vacant land constitutes about five percent (5%) of the total developable area.

### b. Residential.

Approximately ten percent (10%) of existing land uses are residential. The largest concentrations of residential uses are found in the Central County and Broadview Park neighborhoods. Nearly 87 percent of the land area devoted to residential land uses is occupied single-family residential.

### c. Commercial.

Commercial uses are characterized by businesses which are predominantly used for activities related to the sale and distribution of products or the performance of services. There are approximately 108 acres of commercial uses that occupy 1.6 percent of the land area. The existing commercial uses mainly serve the nearby neighborhoods in which they are located.

### d. Industrial.

Industrial uses include businesses involved in manufacturing products from raw or semi-finished materials; transporting and warehousing finished products, raw

materials, or semi-processed materials; extracting raw materials; and disposing of industrial by-products. Industrial uses occur close to regional transportation networks, particularly highways which provide quick and efficient access to other modes of transport, such as rail, water, and air. Nearly acres 88 or one (1) percent of all existing uses are industrial.

#### e. Agricultural.

Agricultural uses primarily include activities relating to the cultivation of crops and livestock. Agricultural uses are mostly located in the northern part of BMSD and account for approximately 665 acres or nearly 10% of existing land uses. Historically, agricultural areas have been converted to urban uses and few agricultural uses remain countywide.

#### f. Community Facility.

Community facility uses include parks, community centers, schools, houses of religious worship, convalescent homes, and other similar uses. Approximately 3,010 acres or 44% of existing land uses are devoted to community uses.

#### g. Conservation.

Conservation uses are found in those areas primarily used for activities relating to the conservation or protection of natural resources or environmental quality. They include floodplain management, fisheries management, and protection of vegetative communities and wildlife habitat. Areas east of the Water Conservation area levees are classified as urban or generally suitable for development, while the area west of the levees is conservation or not suitable for development.

### 2. Historic Resources.

The Historical Districts and Properties Map identifies the locations of the County's historic district boundaries and properties. Due to annexation activities and an error in the 1989 FUALUE, the number of historical sites in the Unincorporated Area has decreased from three to zero.

### 3. Designated Areas of Critical State Concern.

No areas within Broward County are designated an "Area of Critical State Concern" pursuant to Section 380.05, FS. However, the westernmost portion, located within the Miccosukee Tribe of Indians Reservation, abuts the Big Cypress National Preserve, which is a designated Area of Critical State Concern.

## D. Population methodology: Estimates and Projections.

Florida Statute 163.3177(1)1 provides the comprehensive plan must be based upon permanent and seasonal population estimates and projections. These estimates and projections must be based

upon those provided by the University of Florida, Bureau of Economic and Business Research or another professionally accepted source. The estimates and projections used in the Broward County Comprehensive Plan are generated by the Broward County Population Forecast and Allocation Model (PFAM). The PFAM projects population using the cohort-survival model which consists of two major parts, natural increase and net migration. Appendix BMSD-B provides population forecasts for the BMSD.

# ANALYSIS REQUIREMENTS

Florida Statute 163.3177(6) 8, requires the future land use element be based upon an analysis of the availability of facilities and services to serve existing land uses and the ability of existing vacant or undeveloped land to meet the needs of the population.

A. Availability of facilities and services. The availability of facilities and services needed to accommodate existing land uses and population is addressed within the Transportation, Recreation and Open Space, and Sanitary Sewer, Potable Water, Solid Waste, Drainage and Natural Groundwater Aquifer Recharge, and Public School Facilities Elements. This section summarizes the information contained in these elements.

1. Traffic Circulation. The Transportation Element identifies the level of service standards for roadway segments which are arterials or collectors, except municipal collectors. Level of service standards for roads are based upon a qualitative assessment of the road user's perception of the quality of flow, ranked "A" through "F", with "A" being the most favorable and "F" being the least favorable. The level of service standard "D" for the County road network is generally being maintained.

   The Broward County Transportation Concurrency Management System divides the County into ten (10) Concurrency Districts (See Transportation Element Map T-10). The Northwest and Southwest Districts are subject to roadway concurrency. The remaining eight (8) districts are Transportation Concurrency Management Areas (TCMAs), as defined in Section 163.3180(7), FS, Transportation Concurrency Assessments are based on projects within the five-year Capital Program adopted by the County Commission. The revenues from Transportation Concurrency Assessments must be used to fund transportation enhancements in the District.

2. Sanitary Sewer. The Water Management Element identifies five utilities that provide wastewater treatment for the BMSD. The sanitary sewer system operated by Broward County has sufficient capacity to meet the anticipated needs of the projected population within their respective service areas.

3. Solid Waste. The majority of solid waste from the BMSD is processed at the South Wheelabrator Plant (South Plant) located south of I-595 and west of the South Fork of the New River, which has an electricity generating capacity of approximately 68.5 megawatts. An ash monofill is located adjacent to the South Plant provides for efficient disposal of ash residue produced by plant operations.

   A small percentage of solid waste is non-processable and cannot be processed at the resource recovery facility. There are two sanitary landfills in Broward which serves the BMSD for the disposal of non-processable waste. The Monarch Hill Landfill, located at 3000 NW

48th Street in Unincorporated Broward County, is privately owned and operated by a subsidiary of Waste Management, Inc. The second sanitary landfill is the Broward County Landfill (BCL) located north of Sheridan Street and east of U.S. 27 Highway. It is a 588-acre facility that also serves as a non-processable waste disposal option for the BMSD.

Solid waste facilities which are disposal options that serve the BMSD have sufficient capacities to continue to meet the needs of anticipated projected population increases in the BMSD.

4. Drainage. The Water Management Element identifies the drainage facilities in Broward County and their adopted level of service standards. Broward County maintains a three-tiered approach to drainage consisting of primary, secondary, and tertiary systems. The primary drainage system is operated by the South Florida Water Management District (SFWMD) and serves the lower east coast. Primary drainage features include the Water Conservation Area levees, channelized streams, and manmade canals. All connections to the primary canals must be permitted by the SFWMD. Secondary drainage is provided through dependent drainage districts managed by Broward County and other local governments. Independent drainage districts which operate under special authority and are delegated taxing powers also provide secondary drainage. Secondary drainage systems serve a smaller geographical area and are connected to the primary system. Tertiary drainage systems are designed to remove stormwater from individual developments and may connect with a secondary canal or directly to a primary canal. The primary drainage system is designed to provide a level of service to ensure protection from the three-day, 100-year storm event. It is anticipated the drainage infrastructure will be adequate to meet the needs of the projected population.

5. Potable Water. The Water Management Element identifies twenty-eight utilities providing potable water service in Broward County. The primary supply of water is contained in the unconfined Surficial Aquifer and, more specifically, a highly prolific zone in the Surficial named the Biscayne aquifer. The Biscayne aquifer is designated by the Environmental Protection Agency (EPA) as a sole source aquifer, meaning it is an underground water source that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. Areas served by sole source aquifers have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water.

   Broward County Water and Wastewater Services (WWS) operates two water treatment plants, served by two retail and two regional wellfields producing water from the Biscayne aquifer. WWS' regional wellfields also serve raw water to Deerfield Beach, Dania Beach, Hallandale Beach, and Hollywood utilities.

6. Natural Groundwater Aquifer Recharge. The Water Management Element identifies groundwater recharge areas. Recharge of the surficial aquifer groundwater in Broward

County primarily occurs by seepage from the western Water Conservation Areas, regional canals and permeation of rainfall through soil. Recharge of the aquifer groundwater at a sufficient level is particularly important in Broward County because it is designated as a sole source aquifer. Inadequate recharge of the groundwater can result in aquifer contamination from salt water intrusion. Map C-4 of the Conservation Element delineates the extent of salt water intrusion.

B. Land use suitability of vacant or undeveloped land. This section analyzes the extent of vacant or undeveloped land and the suitability for the development of vacant or undeveloped land in terms of soils, topography, natural resources, and historic resources.

1. Extent. Approximately one percent (1%) of the land considered to be part of the BMSD is developable. The remainder is part of the historic Everglades found in the Water Conservation Areas. Of that one percent (1%), only five percent (5%) is vacant. It is expected that growth will be accommodated through urban infill and redevelopment.

2. Soils. The developable area is primarily characterized by urban land soil associations, which are generally favorable for development. Land management practices, including draining and filling, are standard development procedures.

   Land preparation processes, including on-site retention ponds, mitigate periodic flooding. The reconditioning of unsuitable soils prior to development has resulted in some negative environmental impacts, including the loss of wetlands and groundwater recharge areas. Current practices require that a development order shall not be issued for the development or redevelopment of land containing soils with severe limitations for urban uses or septic tanks without first obtaining a permit from the appropriate regulatory agency. These regulatory agencies may include the US Army Corps of Engineers, the Florida Department of Environmental Protection, the Florida Department of Health (septic tank permits), the South Florida Water Management District, and the Broward County Environmental and Growth Management Department.

3. Topography. Conservation Element Map C-11 depicts the topography of Broward County. The topography was calculated from a very dense Light Detection and Ranging (LiDAR) point array. An average was calculated due to the size of the data. Each pixel or cell represents a 10x10 foot area of LiDAR points, roughly the average of about 120 LiDAR points. This map replaces previous contour line maps by providing an elevation map that converts data extracted from LiDAR into a digital elevation model or a surface elevation model ("bare earth"). Based on the data and map, with a few exceptions, Broward County consists of low-lying areas with little noticeable variation in topography. Land has been prepared for development through an extensive system of drainage infrastructure, including canals and non-natural ponds and lakes. Some of the higher elevation areas have been lowered through

excavation while lower elevations have been raised with fill to elevate development, particularly in floodplains.

4. Natural resources. Existing natural resources are sparse and scattered.

    a. *Coastal resources*. The BMSD does not include coastal areas.

    b. *Wetlands*. The Environmental and Growth Management Department regulates development in wetlands through the determination of a particular wetland's ecological importance in accordance with the Broward County Code of Ordinances, Chapter 27, Article XI, Aquatic and Wetland Resource Protection. Wetlands are assigned a numerical value in accordance with the Wetland Benefit Index. Development often requires small scale mitigation but is rarely precluded.

    c. *Minerals*. Mineral resources located on vacant land are largely peat and to a lesser extent sand and limestone. There are no active mines within Broward County. Mining operations are subject to the requirements of Chapter 39, Article XIV, "Excavation Regulations", of the Broward County Code of Ordinances. New mining operations are subject to additional permitting requirements that include performance bonds, zoning limitations, operations, and clean up and rehabilitation of the property.

    d. *Potable water wells & wellfields*. Several wells that are part of the wellfield servicing Water Treatment Plant 3-A are threatened by salt water intrusion. The existing wells and wellfields are anticipated to be adequate to meet short term water consumption needs. As vacant land is developed, the need for additional wellfields may arise.

    Chapter 27, Article XIII, "Wellfield Protection", Broward County Code of Ordinances places certain restrictions on the use, handling, storage and production of hazardous or toxic substances within the zones of influence of public water supply wells.

5. Historic resources. In 2016, the United States Department of the Interior and the Florida Department of State's Division of Historical Resources designated Broward County's Historic Preservation Program as a Certified Local Government. The Broward County Code of Ordinances, Article IX, "Land Development Code" mandates certain procedures and archeological surveys be performed when development is proposed upon a site which may contain valuable archeological resources. Under certain circumstances, development of a site may be restricted through mitigation or preservation requirements.

C. Land use needs analysis. Appendix BMSD-D presents a tabular summary of the density, intensity and maximum development potential of the various future land use designations shown on the Future Land Use Map Series. Appendix BMSD-D, Tables A and B show there is a projected surplus of Commercial, Industrial, Recreation, and Residential land use needed to accommodate the

projected 2035 population. Since the area is nearly fully developed, it is expected that additional growth will be supported by redevelopment and urban infill.

Appendix BMSD-E displays annexations between 2004 and 2018. It is expected that the unincorporated areas will continue to contract through the ongoing annexation process. However, it is expected that facilities and areas of regional importance, such as the Fort Lauderdale-Hollywood International Airport, landfill areas, and the Water Conservation Areas will remain unincorporated. Due to the fragmented character and ongoing geographic contraction of the BMSD, analysis of specific land use designations, densities and intensities needed to serve the projected is not productive.

D. Need for redevelopment. Portions of the BMSD need redevelopment. These areas are generally found along commercial corridors that are characterized by small lots, fragmented ownership, and high vacancy or turnover rates. This section describes several plans/programs Broward County utilizes to aid the redevelopment process.

1. Central County Community Redevelopment Area (CRA) Plan. The Central County Community Redevelopment Area (CRA) includes the BMSD neighborhoods of Boulevard Gardens, Franklin Park, Roosevelt Gardens, and Washington Park. Economic programs are available that offer incentives for private investment and reinvestment. However, there are few qualified applicants. Substantial resources are devoted to code enforcement; however, achieving compliance remains problematic.

2. Renewal of blighted areas. Broward County is renewing blighted areas through the Neighborhood Preservation and Enhancement Program, the Community Development Block Grant program, the federal Department of Housing and Urban Development HOME program. The Housing Finance and Community Redevelopment Division provides funding for single family and multi-family dwelling rehabilitation for qualifying owners of residential buildings. The Broward County Housing Authority has designated two community development target areas among its list of priority neighborhoods for federal Section 8 Rental Assistance, including part of the Unincorporated Area. All housing programs discussed in the Housing Element are available to community development target areas. The Comprehensive Neighborhood Improvement Program implemented by the Water and Wastewater Services targets the Central County Community Redevelopment Area with infrastructure improvements including water, sewer, drainage, and sidewalks.

3. Elimination or reduction of uses inconsistent with the community's character and proposed future land uses. The elimination or reduction of uses inconsistent with the community's character is primarily effectuated through two methods: the prevention of future incompatible uses and the removal of existing incompatible uses. The prevention of incompatibilities is accomplished during the development review process, including the review of zoning and future land use map amendments. Characteristics of surrounding land

use and future land uses are examined and carefully evaluated to ensure the emergence of a harmonious land use pattern. Existing incompatibilities are often difficult to remove because property owners have legally vested rights to continue the use until it dissipates under its own volition. Standards have been adopted for the removal of nonconforming uses in the Broward County Code of Ordinances, Chapter 39, "Zoning".

E. Development and redevelopment in flood prone areas. The Broward County Land Use Plan's Natural Resource Map Series, Flood Plains and Flood Prone Areas identify the flood prone areas of Broward County. Practically the entire county falls within the 100-year flood zone boundaries. The high-risk flood prone areas are primarily located outside BMSD along the New River, drainage canals managed by the South Florida Water Management District, the Intracoastal Waterway, and the Atlantic Ocean.

Broward County administers several programs designed to safeguard the public within identified flood-prone areas. The Broward County Code of Ordinances establishes minimum floor elevations. Any new structure located within a flood prone area must meet minimum standards prior to approval of a development order. Broward County participates in the National Flood Insurance Program. Any owner of property located within a flood prone area identified within the Broward County Federal Flood Insurance Rate Maps is eligible to apply for flood insurance through an insurance company that participates in the National Flood Insurance Program.

A post-disaster redevelopment plan does not currently exist; the Emergency Management Division will coordinate preparation of the plan, as mandated by the Natural Disaster Component of the Coastal Management Element. The South Florida Building Code (Broward County Edition) also sets minimum standards for structures to withstand stress loading due to flooding, wind, and other natural hazards associated with hurricanes.

F. Need for dredge spoil disposal sites. Port Everglades maintains a 25-acre on-site dredge spoil disposal site. The Port Everglades Department also will be consulting with the Department of Environmental Protection and Growth Management, the Florida Inland Navigation District, and the U.S. Army Corps. of Engineers to designate additional dredge spoil disposal sites.

G. Broward Municipal Services District (BMSD) Map Series. The BMSD Map Series is the official future conditions map for the BMSD. The official BMSD Map Series is maintained by the Broward County Planning and Development Management Division. Accuracy and quality is ensured by maintaining a geographic information system (GIS) based map.

H. Public schools. The Public School Facilities Element and the School Board of Broward County, Florida's District Educational Facilities Plan provide information about public schools. Chapter 163.3177(6)(a)7, FS requires local government comprehensive plans to identify those future land use map designations where public schools are allowed.

1. Future land use designations where public schools are allowed. BMSD Element Policy 1.1.13 identifies those future land use designations where public schools are an allowable use. Broward County coordinates with the school board to ensure the various future land use designations include sufficient land proximate to residential development to meet the projected needs for schools

2. Sufficiency of appropriately designated lands to meet projected public school needs. Of the 8,429.1 total acres within the unincorporated area, 4,181.5 acres, or 49 percent have a future land use designation that permits public schools. Situations in which future land use designations do not allow schools are generally not an impediment to the expansion of existing schools or the location of new schools.

3. Collocating public school with parks, libraries and community centers. The Public School Facilities Element addresses school facility siting, collocation, and design.

## IMPLEMENTATION

The Environmental Protection and Growth Management Department's Planning and Development Management Division is responsible for land use planning within the BMSD, pursuant to Ch. 8, Part X, Section 8.30 of the Broward County Administrative Code.

Chapter 5, Article IX, "Land Development Code", Broward County Code of Ordinances includes a Development Review Process (DRP) to review new development for the adequate provision of services and facilities and compliance with future land use designations and zoning districts.

Chapter 39, Broward County Code of Ordinances is the zoning code.

The BMSD Future Land Use Map Series identifies future land use designations or categories. All properties within the BMSD are assigned a future land use designation on the BMSD Future Land Use Map Series. Each designation is required to be consistent with the future land use designation shown on the Broward Next 2017 Future Broward County Land Use Plan Map.

# APPENDICES

# Appendix BMSD-A
## Acreage of Existing Uses-2018

| BCPA Use Code | BCPA Use Description | Acres | Percent (%) |
|---|---|---|---|
| 0 | Vacant Residential | 68.94 | 1.02 |
| 1 | Single family | 624.77 | 9.22 |
| 2 | Mobile homes | 0.36 | 0.01 |
| 3 | Multi-family - 10 units or more | 13.87 | 0.20 |
| 4 | Condominium | 0.34 | 0.01 |
| 7 | Miscellaneous residential (migrant camp, boarding homes, etc.) | 0.12 | 0.00 |
| 8 | Multi-family - less than 10 units | 79.67 | 1.18 |
| 9 | Residential common elements/areas | 1.38 | 0.02 |
| 10 | Vacant commercial | 6.66 | 0.10 |
| 11 | Stores, 1-story | 18.86 | 0.28 |
| 12 | Mixed use- store and office or store and residential or residential combination | 9.20 | 0.14 |
| 17 | Office buildings, non-professional services buildings, one-story | 1.60 | 0.02 |
| 18 | Office buildings, non-professional services buildings, multi-story | 3.46 | 0.05 |
| 19 | Professional services building | 0.17 | 0.00 |
| 20 | Airports (private or commercial), bus terminals, marine terminals, piers, marinas | 14.66 | 0.22 |
| 21 | Restaurants, cafeterias | 0.49 | 0.01 |
| 22 | Drive-in restaurants | 2.55 | 0.04 |
| 26 | Services stations | 6.09 | 0.09 |
| 27 | Auto sales, repair and storage, auto-services shops, body and fender shops, commercial garages, farm and machinery sales and services, auto rental, marine equipment, mobile home sales, motorcycles, construction vehicle sales | 20.38 | 0.30 |
| 28 | Parking lots (commercial or patron), mobile home parks | 28.32 | 0.42 |
| 33 | Nightclubs, cocktail lounges, bars, yacht clubs, social clubs, tennis clubs, clubhouses | 1.41 | 0.02 |
| 39 | Hotels, motels | 0.91 | 0.01 |
| 40 | Vacant Industrial | 18.73 | 0.28 |
| 41 | Light manufacturing, small equipment manufacturing plants, small machine shops, instrument manufacturing, printing plants | 19.99 | 0.30 |
| 48 | Warehousing, distribution terminals, trucking terminals, van & storage warehousing | 59.64 | 0.88 |
| 49 | Open storage, new & used bldg supplies, junk yards, auto wrecking, fuel storage, equipment & materials storage | 8.16 | 0.12 |
| 52 | Cropland soil capability class II | 637.57 | 9.41 |
| 63 | Grazing land soil capability class IV | 11.85 | 0.17 |

| BCPA Use Code | BCPA Use Description | Acres | Percent (%) |
|---|---|---|---|
| 69 | Ornamentals, miscellaneous agriculture | 15.30 | 0.23 |
| 70 | Vacant institutional | 2.17 | 0.03 |
| 71 | Churches | 62.77 | 0.93 |
| 72 | Private schools and colleges | 3.09 | 0.05 |
| 74 | Homes for the aged | 0.67 | 0.01 |
| 76 | Mortuaries, cemeteries, crematoriums | 35.56 | 0.53 |
| 77 | Clubs, lodges, union halls | 44.85 | 0.66 |
| 78 | Sanitariums, convalescent & rest homes | 1.52 | 0.02 |
| 80 | Vacant governmental | 252.41 | 3.73 |
| 82 | Forests, parks, recreational areas | 67.65 | 1.00 |
| 83 | Public county schools - includes all property of board of public instruction | 19.73 | 0.29 |
| 86 | Counties (other than public schools, colleges, hospitals) including non-municipal | 2223.31 | 32.82 |
| 87 | State other than military, forests, parks, recreational areas, colleges, hospitals | 106.41 | 1.57 |
| 88 | Federal other than military, forests, parks, recreational areas, hospitals, colleges | 432.43 | 6.38 |
| 89 | Municipal other than parks, recreational areas, colleges, hospitals | 13.20 | 0.19 |
| 91 | Utility, gas & electricity, telephone & telegraph, locally assessed railroads, water & sewer service, pipelines, canals, radio/television communication | 123.58 | 1.82 |
| 94 | Right-of-way, streets, roads, irrigation channel, ditch, etc. | 1029.68 | 15.20 |
| 95 | Rivers & lake, submerged lands | 177.12 | 2.61 |
| 96 | Sewage disposal, solid waste, borrow pits, drainage reservoirs, waste lands, marsh, sand dunes, swamps | 483.22 | 7.13 |
| 98 | Centrally assessed | 19.12 | 0.28 |
| | *TOTAL* | **6773.93** | **100.00** |

**Source**: Broward County Property Appraiser, April 11, 2018.

# Appendix BMSD-B

## Population Forecasts by Traffic Analysis Zone 2015-2040

| BMSD Neighborhood | Traffic Analysis Zone (TAZ) Allocation | | | | | |
|---|---|---|---|---|---|---|
| | 2015* | 2020 | 2025 | 2030 | 2035 | 2040 |
| Boulevard Gardens | 1,870 | 1,928 | 2,133 | 2,242 | 2,317 | 2,376 |
| Broadview Park | 7,593 | 7,828 | 8,662 | 9,105 | 9,409 | 9,648 |
| Franklin Park | 958 | 988 | 1,093 | 1,149 | 1,187 | 1,217 |
| Hillsboro Pines | 401 | 413 | 457 | 481 | 497 | 510 |
| Hillsboro Ranches | 53 | 55 | 60 | 64 | 66 | 67 |
| Roosevelt Gardens | 2,760 | 2,846 | 3,149 | 3,309 | 3,420 | 3,507 |
| Washington Park | 1,310 | 1,351 | 1,494 | 1,571 | 1,623 | 1,665 |
| Other Unincorporated Areas, Including Tribal Lands | 2,546 | 2,625 | 2,904 | 3,053 | 3,155 | 3,235 |
| Total All Unincorporated | 17,491 | 18,033 | 19,954 | 20,973 | 21,674 | 22,225 |

*2015 populations reflect ACS 5-Year Estimates, 2011-2015.

**Source:** Planning and Development Management Division, Population Forecast Allocation Model (PFAM) 2017; BEBR Broward County Forecasts 2015, 2020-2045; American Community Survey 5-Year Estimates, 2011-2015, Table B01003; and US Census 2000, 2010.

**Methodology:** The figures provided are the result of the Broward County Population Forecast and Allocation Model (PFAM) 2017 model run. The model allocates Countywide forecasts from the University of Florida Bureau of Business Research (BEBR) in 5-year increments for 2020-2045 to Traffic Analysis Zones (TAZs). These are also combined to define total population for municipalities and the Broward Municipal Service District (BMSD) (unincorporated areas). The model inputs include the BEBR forecasts, as well as household size and distribution from the 2000 and 2010 US Census, It also uses vacancy and seasonal rates from the American Community Survey 5-Year Estimates, 2011-2015. For more information, please visit the Broward County Demographics website and see the PFAM model site and report.

# Appendix BMSD-C

Intensity/Density, Acres, & Maximum Development Potential by Future Land Use Designation-2018

| Future Land Use Designation | Intensity/Density | Acres | Maximum Development |
|---|---|---|---|
| Estate Residential | 1 du/1.0 gross | 112.08 | 112 du |
| Low (2) Residential | Up to 2 du/acre | 298.04 | 596 du |
| Low (3) Residential | Up to 3 du/acre | 54.4 | 162 du |
| Low (5) Residential | Up to 5 du/acre | 865.59 | 4,327 du |
| Low-Medium (10) Residential | Up to 10 du/acre | 235.51 | 23,551 du |
| Medium (16) Residential | Up to 16 du/acre | 66.29 | 1,060du |
| Medium-High (25) Residential | Up to 25 du/acre | 0.28 | 7.0 du |
| Residential in Dashed-Line Area | Vari | 600.54 | N/A |
| Palm Beach County – Rural Residential | 1 du/10 gross acre | 869.02 | N/A |
| Commercial** | N/ | 137.13 | N/A |
| Employment Center- High | N/ | 7.28 | N/A |
| Industrial** | N/ | 818.42 | N/A |
| Community Facilities | N/ | 155.59 | N/A |
| Recreation & Open Space | N/ | 104.01 | N/A |
| Commercial Recreation | N/ | 46.44 | N/A |
| Conservation | N/ | 1.58 | N/A |
| Utility | A N/ | 672.31 | N/A |
| Transportation | N/ | 2,518.13 | N/A |
| Electric Generation Facility | N/ | 120.33 | N/A |
| Water | N/ | 264.78 | N/A |
| Right of Way | N/ | 502.56 | N/A |
| TOTAL | | 8,450.31 | 29,815 du |

* Palm Beach County Future Land Use Designation

** The Zoning Code limits intensity by height and lot coverage.

Source: Broward County Planning Council, 2010.

# Appendix BMSD-D

Generalized Future Unincorporated Area Land Use Adequacy 2040

## Table A: Commercial, Industrial, & Recreation

| Land Use Designation | Acres per 1,000 Population | 2040 Population | Acres Needed | Acres Provided | Project Surplus or (Deficiency) |
|---|---|---|---|---|---|
| Commercial | 3.93 | 22,225 | 68.96 | 97.2 | 28.24 |
| Industrial | 35.92 | 22,225 | 630.25 | 818.4 | 188.15 |
| Recreation | 3.0 | 22,225 | 52.64 | 104.8 | 52.16 |

## Table B: Residential

| Designation | 2040 Projected Dwelling Units | Maximum Number of Dwelling Units Allowed by Future Land Use | Projected Surplus or (Deficiency) |
|---|---|---|---|
| Residential | 8,517 | 6,021 | (2,496) |

# Appendix BMSD-E

## Broward County Annexations: 2004-2018

| Year | City | Number of Properties | Acreage |
|---|---|---|---|
| 2004 | Coconut Creek | 5 | 22.02 |
| | Cooper City | 6 | 762.99 |
| | Deerfield Beach | 4 | 855.76 |
| | Weston | 1 | 265.86 |
| | Southwest Ranches | 1 | 3.83 |
| | Lauderdale Lakes | 1 | 1.37 |
| | Lauderdale by the Sea | 2 | 2.6 |
| | North Lauderdale | 1 | 29.25 |
| | Pompano Beach | 4 | 1500.2 |
| Total | | 25 | **3443.88** |
| 2005 | Fort Lauderdale | 2 | 476.08 |
| | Oakland Park | 3 | 804.02 |
| | Coral Springs | 1 | 57.8 |
| | Lauderhill | 3 | 579.31 |
| | West Park | 2 | 1418.54 |
| Total | | 11 | **3335.75** |
| 2006 | Coconut Creek | 8 | 22.03 |
| | Fort Lauderdale | 1 | 3.7 |
| | Lauderhill | 4 | 391.6 |
| | Davie | 3 | 870.22 |
| | Parkland | 8 | 365.68 |
| | Cooper City | 8 | 164.77 |
| | Pembroke Pines | 1 | 30.05 |
| | Southwest Ranches | 1 | 31.42 |
| Total | | 34 | **1879.47** |
| 2007 | Tamarac | 1 | 3.92 |
| Total | | 1 | **3.92** |
| 2008 | Plantation | 1 | 1.64 |
| | County | 1 | 0.21 |
| | Lauderhill | 1 | 3.83 |
| | Tamarac | 3 | 7.98 |
| Total | | 6 | **21.5** |

| Year | City | Number of Properties | Acreage |
|---|---|---|---|
| 2009 | Coconut Creek | 1 | 1.94 |
| | West Park | 1 | 21.14 |
| | Southwest Ranches | 1 | 0.43 |
| | County | 1 | 1355 |
| | Parkland | 1 | 665.63 |
| Total | | 5 | 2044.14 |
| 2010 | Coconut Creek | 6 | 6.44 |
| | Fort Lauderdale | 4 | 21.55 |
| | Lauderhill | 2 | 1.21 |
| | Tamarac | 1 | 74.85 |
| Total | | 13 | 104.05 |
| 2012 | Dania Beach* | na | 0 |
| | Sunrise | 2 | 0.51 |
| | Parkland | 1 | 512 |
| Total | | 3 | 512.51 |
| 2014 | Parkland | 1 | 44.85 |
| Total | | 1 | 44.85 |
| 2015** | Parkland | 1 | 426.27 |
| | Parkland | 1 | 64.4 |
| | Cooper City | 1 | 9.43 |
| | Pembroke Pines | 1 | 66 |
| Total | | 3 | 566.1 |
| 2016 | Coconut Creek | 1 | 5 |
| | Parkland | 1 | 3.2 |
| Total | | 2 | 8.2 |
| 2018 | Dania Beach | 1 | 0.18 |
| Total | | 1 | 0.18 |

Annexation is impacted by laws and acts of the Florida Legislature, as well as activities of the Broward Legislative Delegation (Broward County's five Senate and 14 House members), Broward County Board of County Commissioners, community leaders, and the general public. It is recognized by the Board and the Broward Legislative Delegation that the unincorporated areas present a service delivery challenge. The Board generally does not object to the annexation of all lands not occupied by regional facilities or located within the Water Conservation Areas, particularly if located in enclaves. Until such time, Broward County is committed to providing municipal-level services to its neighborhoods.

## Broward Legislative Delegation Actions

In 1996, the Broward Legislative Delegation, in cooperation with the Broward County Board of County Commissioners, created the Ad Hoc Committee on Annexation Policy. The Ad Hoc Committee recommended that all remaining unincorporated areas, with the exception of regional County facilities, be annexed into municipalities by 2010. It was recommended that regional County facilities be annexed, if the County and annexing municipality agree to the annexation. Any remaining unincorporated area, with the exception of regional county facilities, would be subject to annexation by the State Legislature.

In 2001, the Broward Legislative Delegation, moved up the target annexation date to October 1, 2005. However, areas that are not regional county facilities remain, including residential communities, such as Broadview Park, Central County, Hillsboro-Pines, Parkland, and Sunrise areas, as well as tribal enclaves, such as the Seminole Area.

## Annexation Laws & Procedures

Laws that pertain to the annexation of land into municipalities, the incorporation of municipalities, the merger of municipalities, and the dissolution of municipalities are found in Florida Statutes, Title XII-Municipalities, Chapter 165-Formation of Local Governments. This is known as the "Formation of Municipalities Act." The purposes of the statute are to:

- allow orderly patterns of urban growth and land use,
- assure adequate quality and quantity of local public services,
- ensure financial integrity of municipalities,
- eliminate or reduce avoidable and undesirable differentials in fiscal capacity among neighboring local governmental jurisdictions,
- promote equity in the financing of municipal services.

Chapter 171, Part I contains the "Municipal Annexation or Contraction Act." The Act provides processes by which any municipality may annex contiguous and compact unincorporated territory or contract its boundaries. Annexations and contractions may occur through a voluntary process or by referendum. Special provisions are included for the annexation of enclaves. The Act also establishes criteria to determine whether annexations or contractions may occur. The Act identifies four criteria as for municipal annexation and contraction as follows:

- Ensure sound urban development and accommodation to growth.
- Establish uniform legislative standards throughout the state for the adjustment of municipal boundaries.
- Ensure the efficient provision of urban services to areas that become urban in character.
- Ensure that areas are not annexed unless municipal services can be provided to those areas.

## Annexation by Referendum

An annexation by referendum, requires the annexing municipality to adopt an ordinance of annexation that shall not become effective until ten (10) days after the voters of the area to be annexed approve a referendum supporting the annexation. The annexing municipality may require a referendum of support

by the voters of the annexing municipality, in addition to the voters of the area to be annexed. In situations where more than 70 percent of the owners of land subject to annexation are not registered voters, such land shall not be annexed unless the owners of more than 50 percent of the land in such area consent to the annexation.

### Annexation by Petition

An annexation by petition or voluntary annexation may occur when real property owners in an unincorporated area petition a municipality to annex such property.

Annexation of Enclaves: Enclaves up to 110 acres in size that are not comprised of undeveloped or unimproved property and are subject to existing or proposed service provisions may be annexed into a municipality in one of two ways:

- Interlocal agreement between the annexing municipality and the county having jurisdiction.
- Municipal ordinance, when a referendum is approved by at least 60 percent of the registered voters, residing within the enclave, when the enclave has fewer than 25 registered voters.

### Annexation Effective Date

The 1996 Florida Legislature adopted a special act (Ch. 96-542, Laws of Florida (LOF), as amended by Ch. 99-447, LOF), which requires that any annexation of unincorporated property within Broward County proposed to be accomplished pursuant to general law first must be considered at a public hearing conducted by the Broward County Legislative Delegation, pursuant to its adopted rules. The annexation is not effective until the 15th day of September following adjournment sine die of the next regular legislative session following the completion of all necessary procedures for annexation. Annexations may also occur by special act of the Legislature.

# Appendix BMSD-F

## BMSD Flexibility and Redevelopment Units

Flexibility Units ("Flex Units") are defined as the difference between the number of dwelling units permitted within a flexibility zone by the Broward County Land Use Plan (BCLUP) and the number of dwelling units permitted within the local government's certified future land use plan map. Additionally, Flex Units include the remaining permitted dwelling units, fixed at the adoption date of the 2017 BCLUP and formerly defined as "Reserve Units" which were equal to two percent (2%) of the total number of dwelling units permitted by the local government's certified future land use plan map.

Redevelopment Units are defined as additional permitted dwelling units equal to three percent (3%) of the total number of dwelling units as established by the adoption of the 2017 BrowardNEXT BCLUP. Local certified land use plans may rearrange the residential densities shown on the Broward County Land Use Plan Map utilizing "flexibility units" and/or "redevelopment units" in accordance with the BCLUP and the rules established within the "Administrative Rules Document: Broward County Land Use Plan." (BCLUP Policy 2.2.3)

Previously, the 1989 BCLUP divided Broward County into approximately 125 Flex Zones, some of which were shared by more than one municipality. The BMSD was divided into 22 Flex Zones. The BCLUP currently recommends that the Flex Zone boundaries be combined in a manner that corresponds with the boundaries of Broward County's 30 municipalities and the BMSD, unless otherwise desired by the local government. Local plans may include smaller Flex Zone geographies, as determined appropriate by the local government.

Flex Zone provisions allow local governments to permit certain types of land uses and/or increase residential units without amending the future land use designation on the BCLUP, subject to a compatibility determination. Municipalities that have fewer than 250 combined "flexibility units" or "redevelopment units" may apply to the Broward County Planning Council for the allocation of "redevelopment units" in allocations of 500 dwelling units, or 10% of the number of dwelling units permitted by the certified municipal land use plan, whichever number is less, certain requirements may be applicable (BCLUP Policy 2.35.1).

For the purpose of organizing the Flex Zones into compact geographic areas, Broward County will combine the BMSD Flex Zones into four zones: North County (Hillsboro Pines and Hillsboro Ranches), Central County, Broadview Park, and Tribal Lands (an enclave of unincorporated tribal lands on the edge of the City of Hollywood and Town of Davie). Reserve and flex units previously associated with the flex zones will be combined for each new zone under "Flexibility Units".

Prior to the adoption of the BrowardNEXT 2017 BCLUP, the BMSD Flex Tables included the Flex Zones depicted in Figure BMSD F-1, below.

Figure BMSD F-1: Pre-2017 Flex Zones

| Flex Zone Number | General Location | Flex Zone Number | General Location |
|---|---|---|---|
| 6 | Deerfield Beach | 58 | South Resource Recovery Facility |
| 7 | Waste Management | 68 | Plantation-West |
| 19 | Florida's Turnpike-Pompano Beach | 75 | Plantation-East |
| 20 | Florida's Turnpike-Fort Lauderdale | 76 | Broadview Park-West |
| 25 | Hillsboro Pines | 77 | Broadview Park-East |
| 27 | Hendrix parcel-East (Wedge) | 81 | Seminole-North |
| 28 | Hendrix parcel-West (Wedge) | 82 | Seminole-South |
| 33 | Florida's Turnpike: Coconut Creek | 101 | Cooper City |
| 36 | Florida's Turnpike-Coconut Creek | 103 | Seminole-West |
| 51 | Central County-Northeast | 113 | Davie |
| 52 | Central County-Southwest | 116 | Southwest Ranches |

Figure BMSD F-2: Proposed Flex Zones from combined existing Flex Zones

| Flex Zone Type | Flex Zone by Location | | | | Total Flex Zones |
|---|---|---|---|---|---|
| Proposed | North County | Central County | Broadview Park | Tribal Lands | 4 |
| Existing Flex Zones to be included in proposed zones | 25, 27, 28, Wedge | 6, 7, 19, 20, 33, 36, 51, 52, 58, 68, 75, 113, 116 | 76,77 | 81, 82, 103 | 22 |

Tables BMSD Flex 1 through 4 contain the aggregated flex and redevelopment units by proposed BMSD Flex Zones (FZ), per the requirements of the BCLUP Administrative Rules Document, Article 3 – Flexibility, Redevelopment Units and Special Residential Facilities, Section 3.6 – Requirements for Submittal of Data from Units of Local Government. Former Flex and Reserve units have been combined under a single "Flexibility Units" category.

## Table BMSD Flex 1: Flex Acres & Reserve Units by Flex Zone-April 2018

| Proposed Flex Zone | Former Flex Zone Numbers | Total Residential Acres | 5% Residential to Commercial Flex Acres | Total Flexibility Units | Industrial Acres | 20% Industrial Flex Acres by Flex Zone |
|---|---|---|---|---|---|---|
| North County | 25, 27, 28, Wedge | 547.77 | 27.64 | 10 | 0 | 0 |
| Broadview Park | 76, 77 | 648.31 | 32.42 | 93 | 0 | 0 |
| Central County | 6, 7, 51, 52, 58, 68, 75, 113, 116 | 535.63 | 26.78 | 154 | 614.73 | 122.95 |
| Tribal Lands | 81, 82, 103 | 7.52 | 0.37 | 1 | 0 | 0 |
| Total All Zones | | 1,739.23 | 87.21 | 258 | 614.73 | 122.95 |

## Table BMSD Flex 2: Residential Acres by Flex Zone

| Flex Zone | Estate (1) | L-2 | L-3 | L-5 | LM-10 | M-16 | MH-25 | H-50 | Irregular | Total | Palm Beach Rural Residential | Total Acres by Flex Zone |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North County | 506.07 | 0 | 40.03 | 0.92 | 0.75 | 0 | 0 | 0 | 0 | 547.77 | 315.97 | 863.74 |
| Broadview Park | 0 | 0 | 0 | 313.23 | 152.42 | 182.66 | 0 | 0 | 0 | 648.31 | 0 | 648.31 |
| Central County | 0.2 | 0 | 18.75 | 305.87 | 165.03 | 45.98 | 0.24 | 0 | 0 | 536.07 | 0 | 536.07 |
| Tribal Lands | 0 | 0 | 0 | 7.52 | 0 | 0 | 0 | 0 | 0 | 7.52 | 0 | 7.52 |
| Total All Zones | 506.27 | 0 | 58.78 | 627.54 | 318.09 | 228.21 | 0.24 | 0 | 0 | 1739.67 | 315.97 | 2055.10 |

## Table BMSD Flex 3: Non-Residential Acres by Flex Zone-July 2018

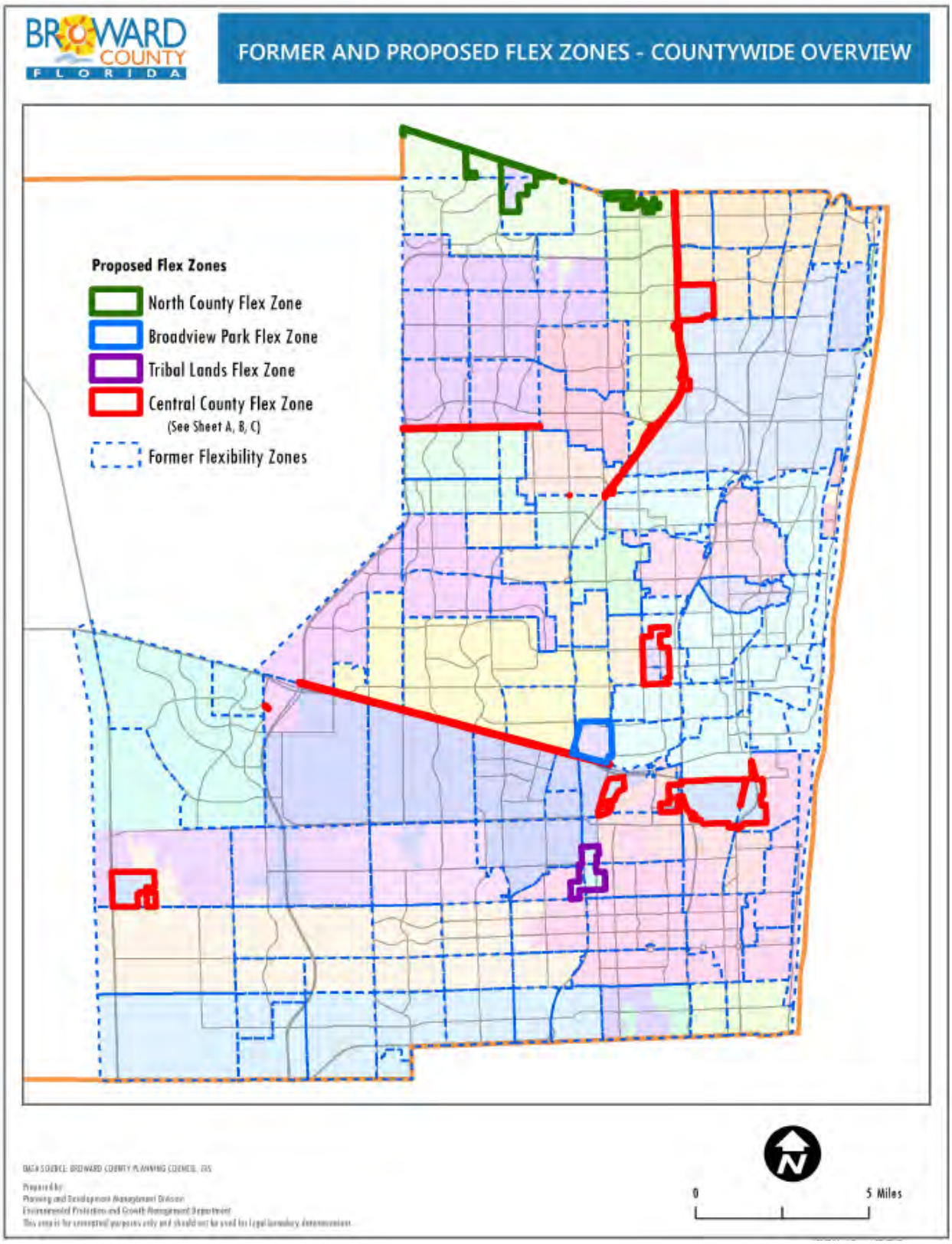
| Flex Zone | C | OP | I | CF | R&O | CR | U | EGF | T | ROW | EC-H | Water | Total Non-Residential by Flex Zone |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North County | 2.41 | 0 | 0 | 0 | 1.08 | 0 | 0 | 0 | 0 | 0 | 0 | 43.35 | 46.84 |
| Broadview Park | 17.39 | 0 | 0 | 1.34 | 0.3 | 0.33 | 0.5 | 0 | 34.9 | 0 | 0 | 25.75 | 80.53 |
| Tribal Lands | 0 | 0 | 0 | 26.44 | 0 | 0 | 0 | 0 | 11.1 | 0 | 0 | 4.53 | 42.07 |
| Central County | 49.9 | 0.41 | 615.17 | 513.43 | 12.64 | 0 | 92.01 | 26.59 | 761 | 72.25 | 0 | 36.52 | 2179.8 |
| Total All Zones | 69.7 | 0.41 | 615.17 | 541.21 | 14.02 | 0.33 | 92.51 | 26.59 | 806.72 | 72.25 | 0 | 110.15 | 2349.24 |

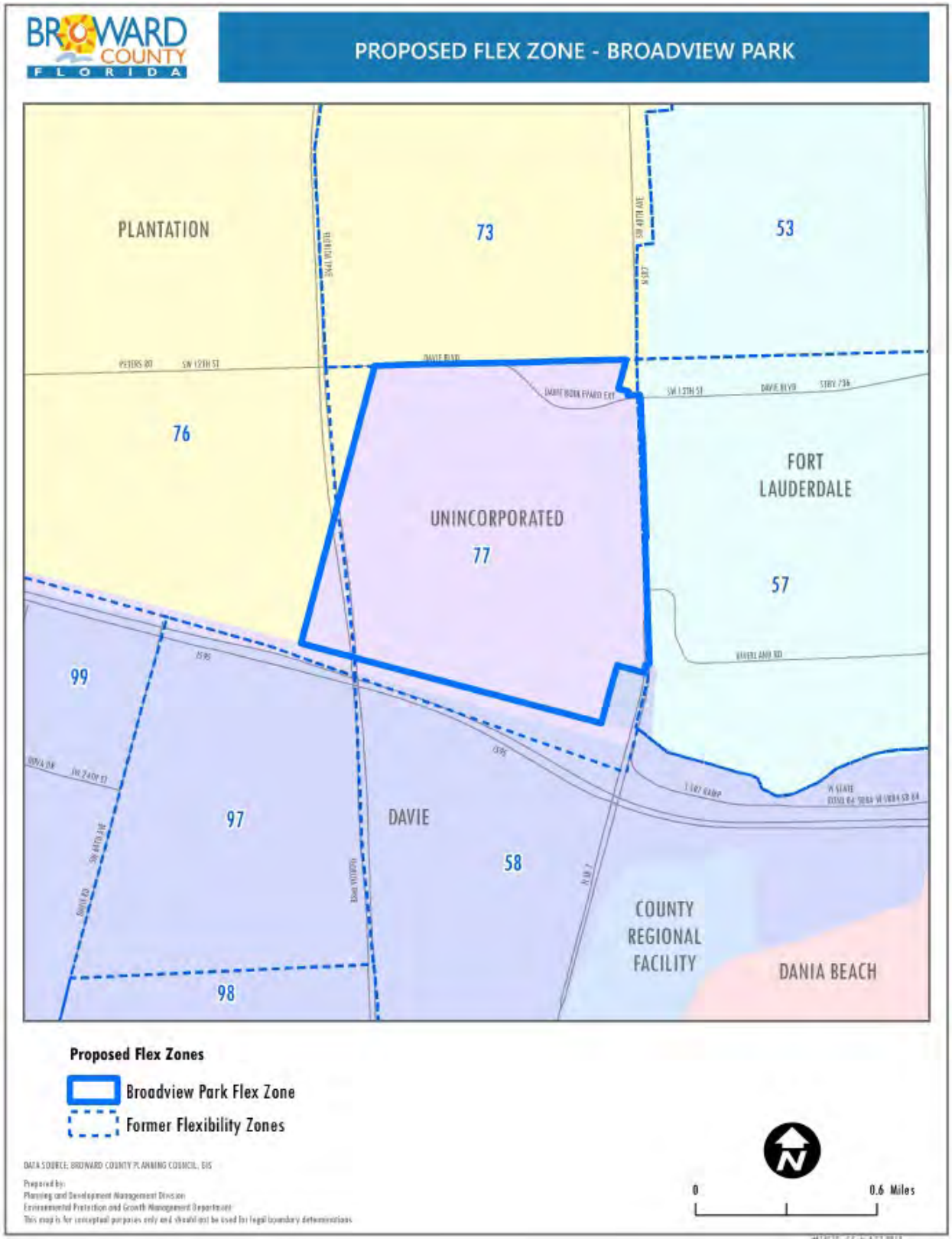
## BMSD Flex Table 4: Residential Units Allowed by Future Land Use Designation-July 2018

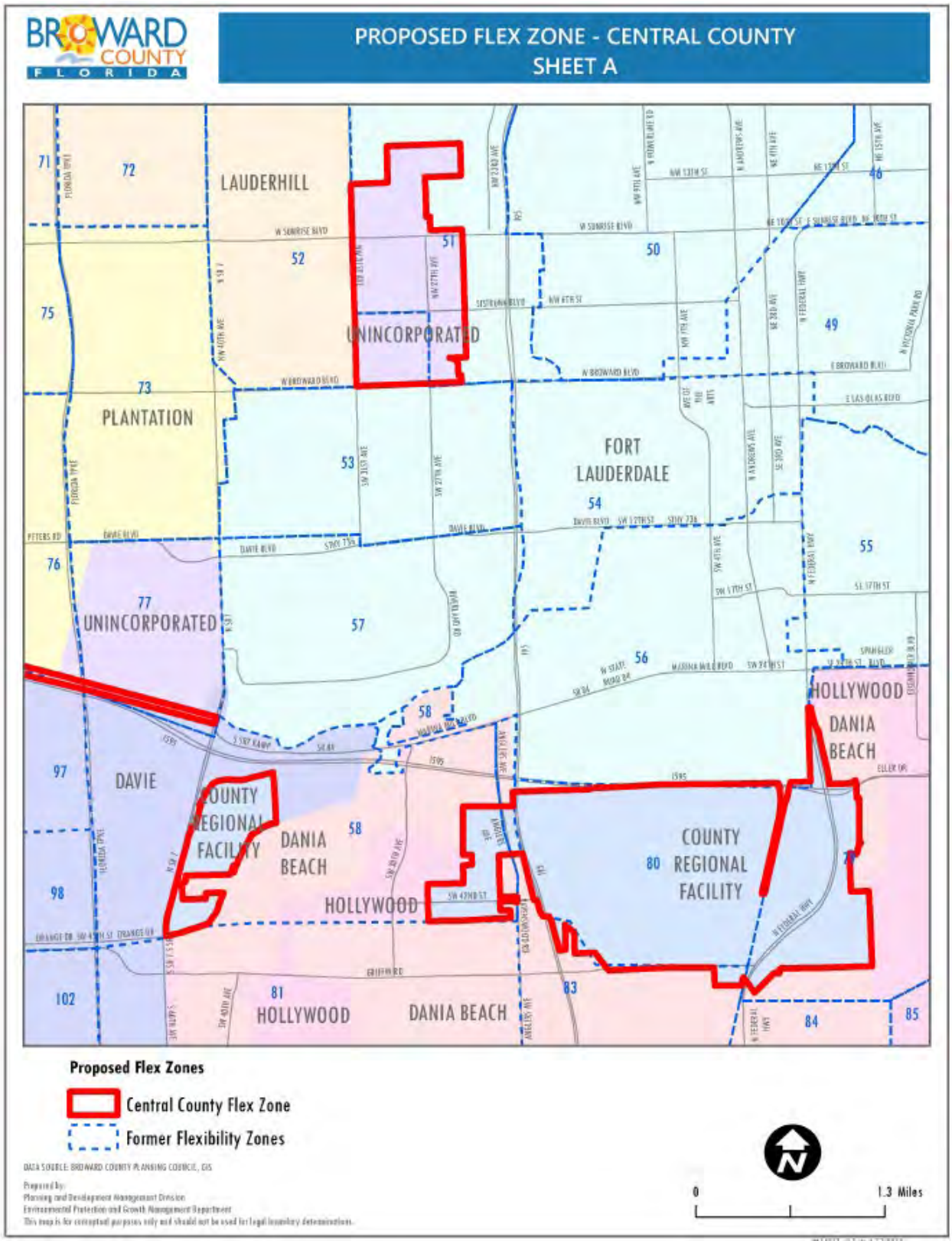
| Flex Zone | Estate (1) | Low (2) | Low (3) | Low (5) | Low-Medium (10) | Medium (16) | Medium-High (25) | High (50) | Irregular | Palm Beach | Total Units by Flex Zone |
|---|---|---|---|---|---|---|---|---|---|---|---|
| North County | 511 | 0 | 120 | 5 | 8 | 0 | 0 | 0 | 0 | 0 | 644 |
| Broadview Park | 0 | 0 | 0 | 1,566 | 1,524 | 2,923 | 0 | 0 | 0 | 0 | 6,013 |
| Tribal Lands | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| Central County | 0 | 0 | 57 | 1,530 | 1,651 | 730 | 6 | 0 | 0 | 0 | 3,974 |
| Total All Zones | 511 | 0 | 177 | 3,138 | 3,183 | 3,653 | 6 | 0 | 0 | 0 | 10,668 |
| | | | | | | | | | | | |

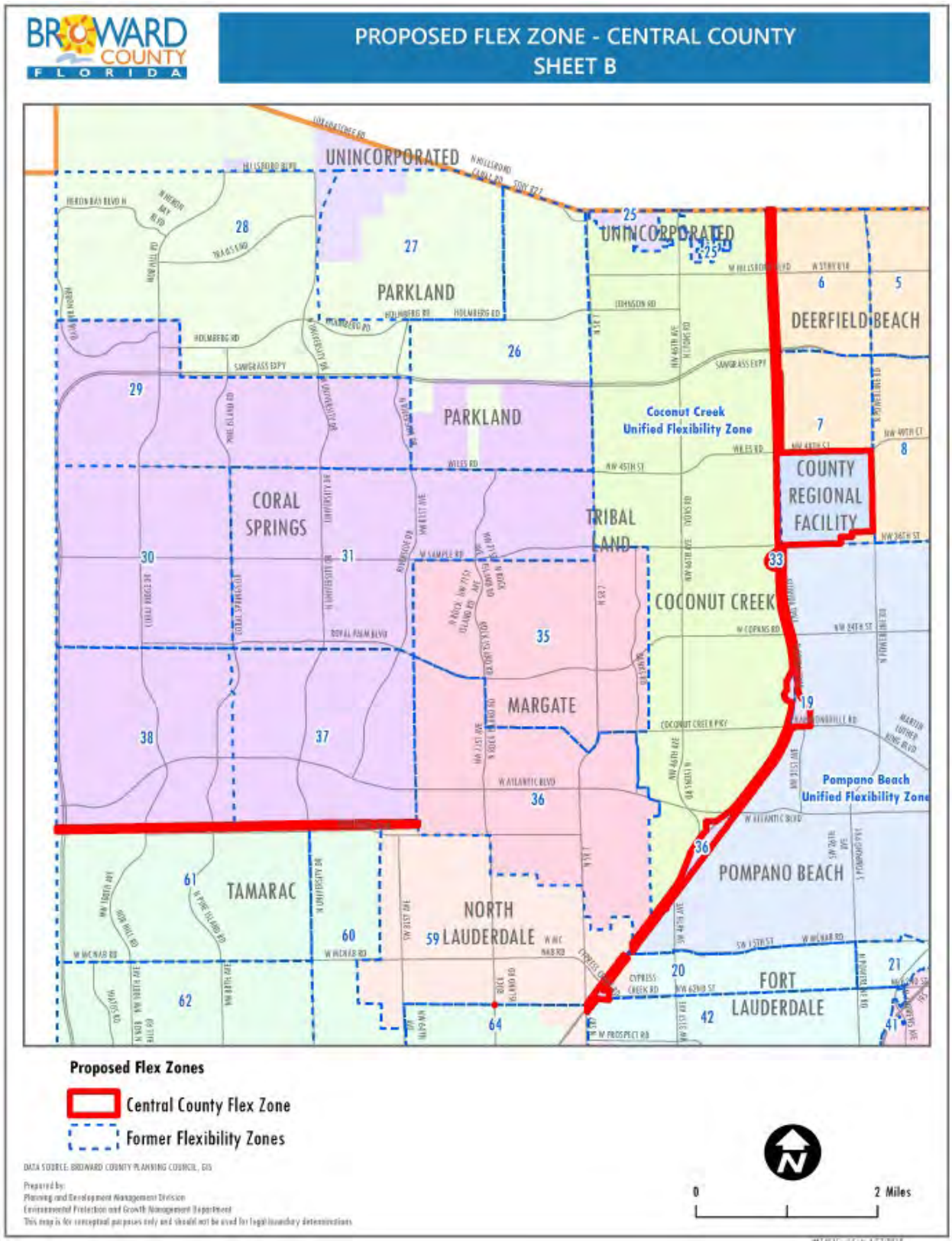
# Proposed Flex Zone Maps

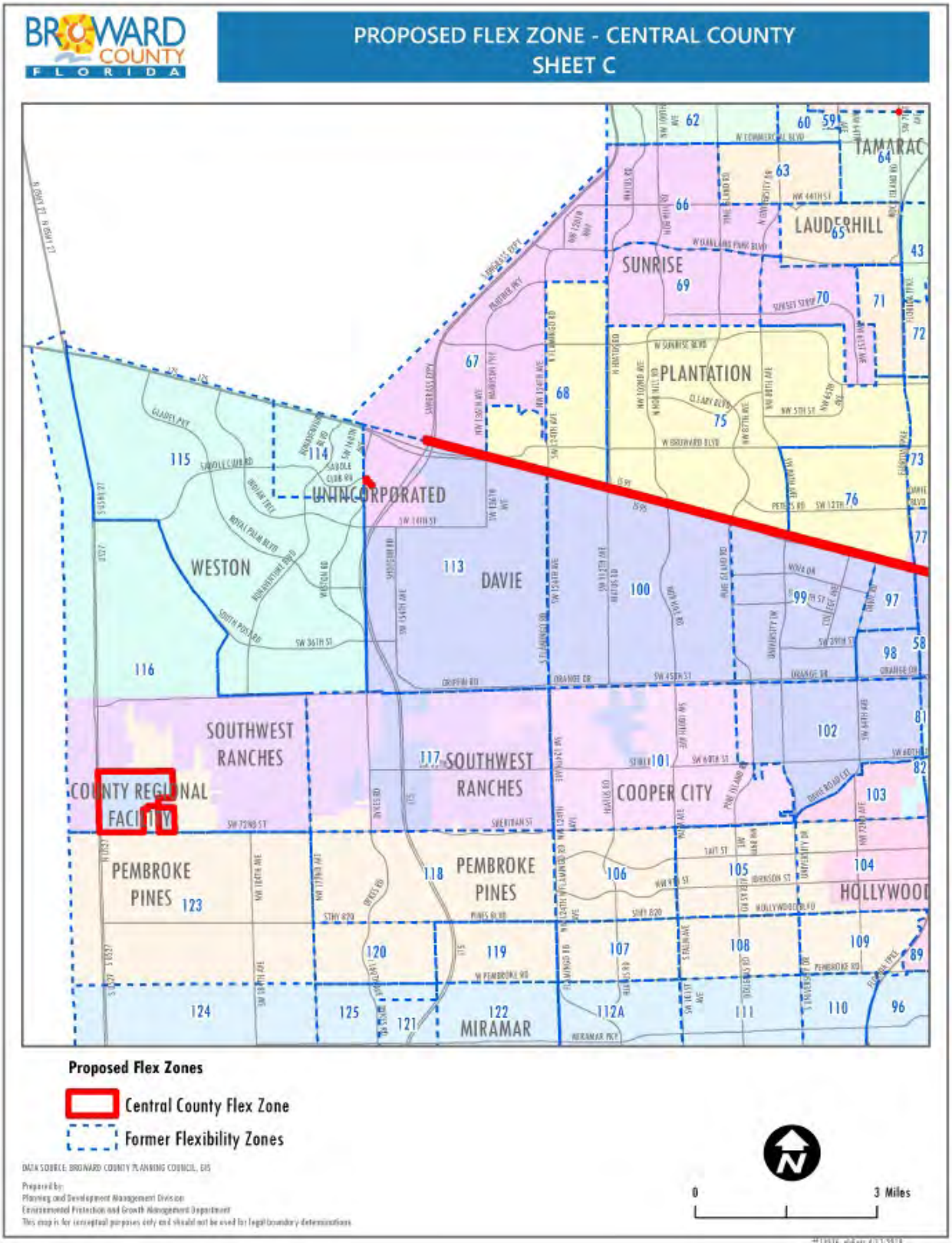
(Maps are for illustrative purposes only)


BROWARD COUNTY FLORIDA
FORMER AND PROPOSED FLEX ZONES - COUNTYWIDE OVERVIEW
Proposed Flex Zones
North County Flex Zone
Broadview Park Flex Zone
Tribal Lands Flex Zone
Central County Flex Zone
(See Sheet A, B, C)
Former Flexibility Zones
N
0
5 Miles


BROWARD COUNTY FLORIDA
PROPOSED FLEX ZONE - BROADVIEW PARK
PLANTATION
73
53
76
UNINCORPORATED
77
FORT LAUDERDALE
57
99
97
DAVIE
58
98
COUNTY REGIONAL FACILITY
DANIA BEACH
Proposed Flex Zones
Broadview Park Flex Zone
Former Flexibility Zones
DATA SOURCE: BROWARD COUNTY PLANNING COUNCIL, BIS
Prepared by:
Planning and Development Management Division
Environmental Protection and Growth Management Department
This map is for conceptual purposes only and should not be used for legal boundary determinations
0
0.6 Miles

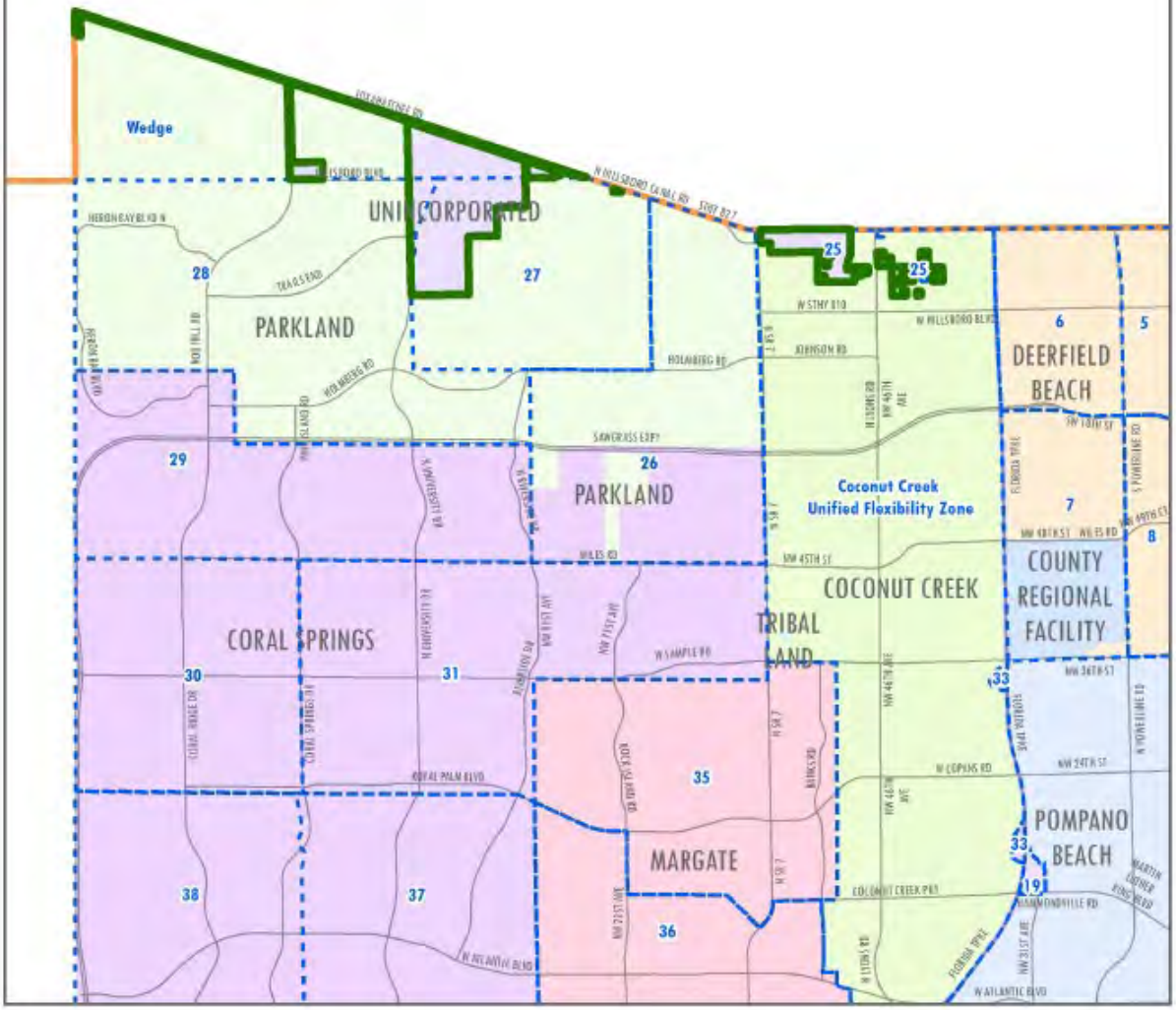

BROWARD COUNTY FLORIDA
PROPOSED FLEX ZONE - CENTRAL COUNTY
SHEET A
LAUDERHILL
UNINCORPORATED
PLANTATION
FORT LAUDERDALE
UNINCORPORATED
DAVIE
COUNTY REGIONAL FACILITY
DANIA BEACH
HOLLYWOOD
HOLLYWOOD
DANIA BEACH
COUNTY REGIONAL FACILITY
HOLLYWOOD
DANIA BEACH
Proposed Flex Zones
Central County Flex Zone
Former Flexibility Zones
DATA SOURCE: BROWARD COUNTY PLANNING COUNCIL, GIS
Prepared by:
Planning and Development Management Division
Environmental Protection and Growth Management Department
This map is for conceptual purposes only and should not be used for legal boundary determinations.
0
1.3 Miles


BROWARD COUNTY FLORIDA
PROPOSED FLEX ZONE - CENTRAL COUNTY
SHEET B
UNINCORPORATED
PARKLAND
UNINCORPORATED
DEERFIELD BEACH
Coconut Creek
Unified Flexibility Zone
PARKLAND
CORAL SPRINGS
TRIBAL LAND
COUNTY REGIONAL FACILITY
COCONUT CREEK
MARGATE
Pompano Beach
Unified Flexibility Zone
TAMARAC
NORTH LAUDERDALE
POMPANO BEACH
FORT LAUDERDALE
Proposed Flex Zones
Central County Flex Zone
Former Flexibility Zones
DATA SOURCE: BROWARD COUNTY PLANNING COUNCIL, GIS
Prepared by:
Planning and Development Management Division
Environmental Protection and Growth Management Department
This map is for conceptual purposes only and should not be used for legal boundary determinations
0
2 Miles


BROWARD COUNTY FLORIDA
PROPOSED FLEX ZONE - CENTRAL COUNTY
SHEET C
TAMARAC
LAUDERHILL
SUNRISE
PLANTATION
UNINCORPORATED
WESTON
DAVIE
SOUTHWEST RANCHES
COUNTY REGIONAL FACILITY
SOUTHWEST RANCHES
COOPER CITY
PEMBROKE PINES
PEMBROKE PINES
HOLLYWOOD
MIRAMAR
Proposed Flex Zones
Central County Flex Zone
Former Flexibility Zones
DATA SOURCE: BROWARD COUNTY PLANNING COUNCIL, GIS
Prepared by:
Planning and Development Management Division
Environmental Protection and Growth Management Department
This map is for conceptual purposes only and should not be used for legal boundary determinations
0
3 Miles

BROWARD COUNTY FLORIDA

# PROPOSED FLEX ZONE - NORTH COUNTY




**Proposed Flex Zones**

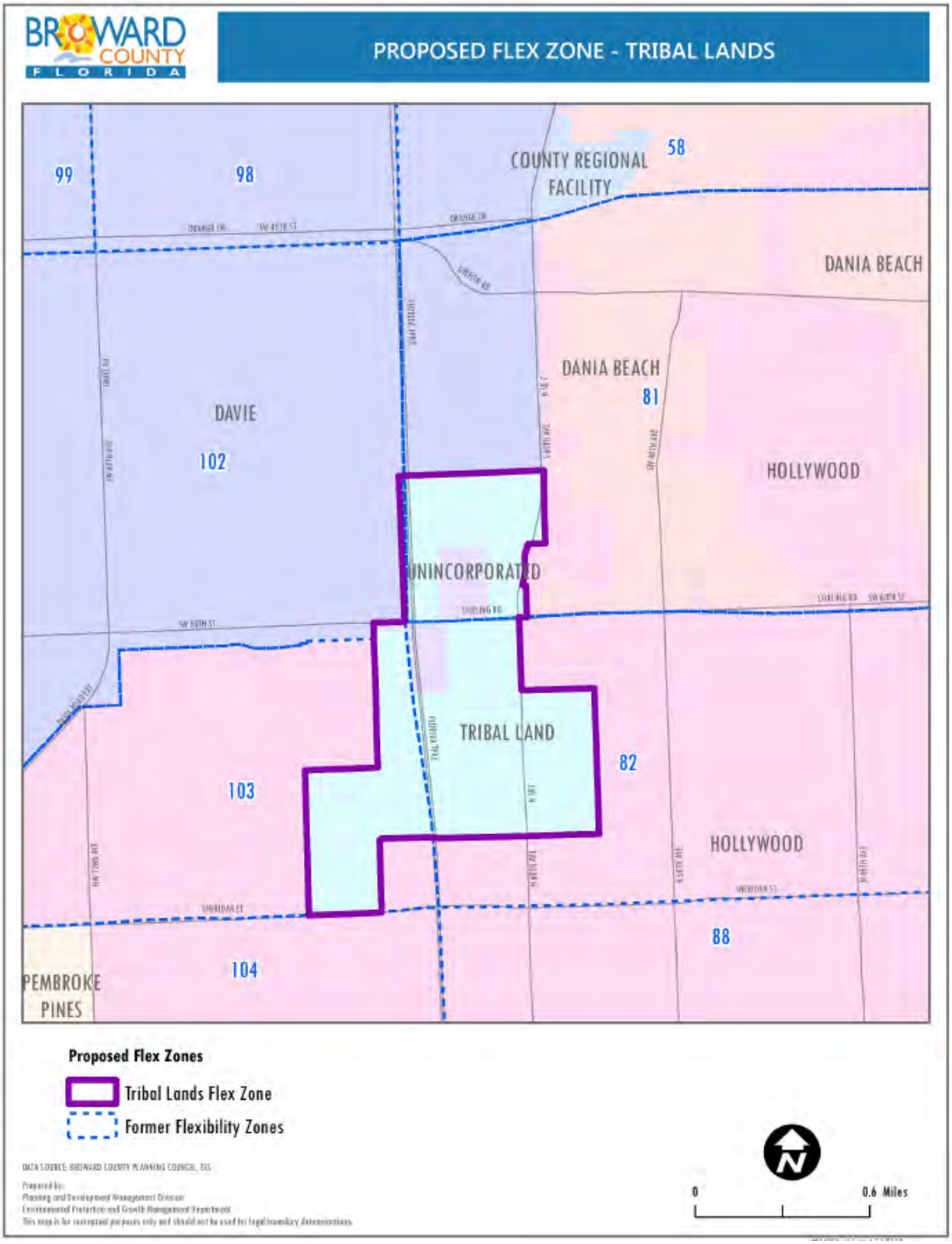
North County Flex Zone

Former Flexibility Zones

DATA SOURCE: BROWARD COUNTY PLANNING COUNCIL, GIS

Prepared by:
Planning and Development Management Division
Environmental Protection and Growth Management Department
This map is for conceptual purposes only and should not be used for legal boundary determinations.

0 2 Miles


BROWARD COUNTY FLORIDA
PROPOSED FLEX ZONE - TRIBAL LANDS
99
98
COUNTY REGIONAL FACILITY
58
DANIA BEACH
DAVIE
102
DANIA BEACH
81
HOLLYWOOD
UNINCORPORATED
TRIBAL LAND
82
103
HOLLYWOOD
88
104
PEMBROKE PINES
Proposed Flex Zones
Tribal Lands Flex Zone
Former Flexibility Zones
0
0.6 Miles

# Appendix BMSD-G

BrowardNEXT2.0 Outreach Efforts

BROWARDNEXT2.0

| BROWARD COUNTY COMPREHENSIVE PLAN OUTREACH | | | |
|---|---|---|---|
| Email | Date Sent | Announcement / Message | Community e-distribution list |
| CCCAB | March 29, 2018 | Review and Comment on the Draft Plan | CCCAB Members |
| Broadview Park Civic Assoc. | March 29, 2018 | Review and Comment on the Draft Plan | Broadview Park Civic Assoc. |
| E-blast | | | |
| BMSD Happenings | May 26, 2017 | Schedule of Workshops | All |
| BMSD Happenings | May 26, 2017 | Schedule of Workshops | Broadview & Central |
| BMSD Happenings | June 6, 2017 | Central County, July 1 & North, June 22 Workshops | Central |
| BMSD Happenings | June 9, 2017 | Central County, July 1 & North, June 22 Workshops | All |
| BMSD Happenings | June 16, 2017 | Central County, July 1 & North, June 22 Workshops | All |
| BMSD Happenings | June 20, 2017 | Central County, July 1 & North, June 22 Workshops | Central & North |
| BMSD Happenings | June 26, 2017 | Central County Workshop- July 1, 2017 | Central |
| BMSD Happenings | November 14, 2017 | Schedule of Workshops | All |
| BMSD Happenings | November 19, 2017 | Schedule of Workshops | All |
| BMSD Happenings | December 1, 2017 | Schedule of Workshops | All |
| BMSD Happenings | December 15, 2017 | Central County Workshop | All |
| BMSD Happenings | February 17, 2018 | Notice of Public Workshop – March 14 | All |
| BMSD Happenings | February 25, 2018 | Notice of Public Workshop – March 14 | All |
| BMSD News | March 9, 2018 | Regional Workshop – March 15 | All |
| BMSD News | March 14, 2018 | Regional Workshop – March 15 | All |
| BMSD News | March 17, 2018 | Review and Comment on the Draft Plan | All |
| Website/Facebook | | | |
| Event Pages and posts | May-Dec 2017 | Each Community Workshop created as individual event and posted on timeline | All |
| BMSD Twitter | | | |
| Tweets | May-Dec 2017 | Each Community Workshop announced repeatedly | All |

| BROWARD COUNTY COMPREHENSIVE PLAN OUTREACH | | | |
|---|---|---|---|
| BMSD Door-to-Door | | | |
| Door-to-Door Residential | May 15 – June 15, 2017 and Nov 20 – Dec 9, 2017 | Canvas Community with workshop notices: Broadview Park, 6/03 &12/2 and Central, 7/01 & 12/16/2017 | Broadview & Central |
| Door-to-Door Business | May 15 – June 15, 2017 and Nov 28– 29, 2017 | OESBD Canvas Businesses with workshop notices: Broadview Park, 6/03 &12/2 and Central, 7/01 & 12/16/2017 | Broadview & Central |
| Broadview Park Meetings | | | |
| Announcement by Dickie Consulting | April 4, 2017 | Broadview Park Civic Association – regular meeting | Broadview |
| Request for additional feedback | June 5, 2018 | Broadview Park Civic Association – regular meeting | Broadview |
| CCCAB Meetings | | | |
| Announcement | May 17, 2017 | Central County Workshop- July 1, 2017 | Central |
| Presentation | August 16, 2017 | Central County Workshop Summary | Central |
| Announcement | November 15, 2017 | Central County Workshop-Dec 16, 2017 | Central |
| Request for additional feedback | May 16, 2018 | CCCAB – regular meting | Central |
| 1-on-1 Meeting with CCCAB Members | | | |
| Ms. Taylor | April 23, 2018 | Conference call | Central/Roosevelt |
| Mr. Curry | April 23, 2018 | GCE, Jo's office | Central/Franklin Park |
| Rev. Scipio | April 23, 2018 | Boulevard Gardens Community Center | Central/Boulevard Gardens |
| Ms. Brihm | April 23, 2018 | Her office | Central/Washington Park |
| Ms. Porter | May 1, 2018 | Delevoe Park | Central/Washington Park |
| 1-on-1 With Broadview President | | | |
| Ms. Fitzgerald | May 1, 2018 | Sunview Park | Broadview Park |

## Presentations and Public Workshops:

2014 & 2015

- 11/24/2014 – Central County Community Advisory Board
- 11/06/2015 – Central County Community Advisory Board
- 1/06/2015 – Broadview Park Civic Association Board

2017

- 6/03 – Broadview Park Community Workshop
- 6/22 – North County Community Workshop
- 7/01 – Central County Community Workshop
- 8/16 – Central County Community Advisory Board
- 12/2 – Broadview Park Community Workshop
- 12/7 – North County Community Workshop
- 12/16– Central County Community Workshop

2018

- 2/23 – Housing Council

- 3/01 – Schools Staff Working Group
- 3/08 – Historic Preservation Board
- 3/09 – Water Advisory Board/Technical Advisory Committee
- 3/14 – Bicycle and Pedestrian Advisory Committee
- 3/15 – Comprehensive Plan Regional Workshop
- 3/28 – Metropolitan Planning Organization (MPO) Technical Advisory Committee
- 3/28 – MPO Citizens Advisory Committee
- 4/11 – Broward County Complete Streets Team
- 4/12 – MPO Board
- 4/26 – Planning Council
- 5/3 – Marine Advisory Committee
- 5/17 – Climate Change Task Force
- 6/7 – Marine Advisory Committee, follow up

## Other Outreach:

- 2/05 – Tweeted to BrowardNEXT- 630 followers
- 2/08 – Emailed Save the Date of Regional Workshop to BrowardNEXT- 1500+ list from PDMD
- 2/22 – Added to the browardnext.org website
- 2/22 – Emailed Regional Workshop to the Metropolitan Planning Organization list
- 2/26 – Tweeted to BrowardNEXT- 630 followers
- 2/27 – Press Release from the Office of Public Communications to the media
- 2/27 – Published in the Sun eNews online newsletter
- 2/27 – Published in the Community newsletter
- 2/28 – Emailed to the Broward Housing Council list (1033 contacts)
- 3/01 – Elements were added to Ecivic for public review, over 248 comments received
- 3/02 – Emailed to Sustainability Stewards list
- 3/05 – Broward.org carousel image and information
- 3/06 – Emailed to All County Advisory Board to forward to their members (Orlando Garcia)
- 3/06 – Emailed to Bicycling and Pedestrian Advisory Committee list (55 contacts)
- 3/07 – Tweeted to BrowardNEXT- 630 followers
- 3/07 – Emailed from the EPGMD to Directors
- 3/07 – Emailed to BrowardNEXT -1500+ list from PDMD
- 3/08 – Emailed to the Metropolitan Planning Organization list
- March – Emailed Regional Workshop announcement to the Climate Change Task Force
- March – Emailed regional workshop announcement the South Florida Regional Planning Council
- March – Publication in the ECounty Line online newsletter
- March – Publication in the Bridges online newsletter

BROWARD COUNTY
FLORIDA

# Capital Improvements Element Support Document

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# LIST OF MAPS



# LIST OF APPENDICES



# LIST OF DEFINITIONS

Ad Valorem Tax – A tax imposed on the value of property.

Appropriation – The legal authorization given by the Broward County Board of County Commissioners (Board) to make expenditures and incur obligations using county funds.

Bonds – Obligations to pay back a specific amount of borrowed funds plus interest payments on specific dates.

Capital Budget – The first year of the capital program which includes capital project appropriations and the revenues required to support the projects.

Capital Improvement – Physical assets constructed or purchased to provide, improve, or replace a public facility and which are typically large scale and high in cost. The cost of a capital improvement is generally nonrecurring and may require multiyear financing. For the purposes of this part, physical assets that have been identified as existing or projected needs in the individual comprehensive plan elements shall be considered capital improvements.

~~Capital Project – A capital project maintains, improves, acquires or constructs a County facility, infrastructure or other asset.~~

Capital Program – The program of~~All~~ capital expenditures planned ~~f~~over the next five-year period, updated annually by the Board, that ~~-years. The program~~ specifies both proposed projects and the funding resources estimated to be available ~~to fund projected expenditures for a five-year period. The program is adopted by the Board annually~~.

Concurrency Fees – Fees collected from land development~~developers~~ for the provision of services ~~subject to state concurrency requirements~~, including school impacts~~sanitary sewer, solid waste, drainage and potable water. Concurrency~~ fees, road impact/ ~~are also collected for~~ transportation fees, and, if platting is required, park impact fees~~improvements, which may vary by type and location of transportation concurrency district~~.

Contingency – Funds set aside for expenses that~~Cost which~~ may arise as a result of unforeseen conditions.

Debt Service – Payments of principal, interest, and ~~issuance~~ costs associated with borrowing funds to pay for capital projects.

Dedicated Revenue – A source of funds which is mandated by law or policy to be used for a specific purpose.

Enterprise Fund – A fund dedicated to a specific operation that is primarily supported by grants, bond proceeds, and~~which pays for the cost of its operations, capital improvements and debt from~~ user fees and does not receive property tax support. County enterprise funds include Water and Wastewater, Aviation, and Port Everglades.

Financially Feasible Five-Year Capital Improvements Program – A five-year capital improvements program~~Means~~ that has sufficient revenues ~~are~~ currently available or that will be available from committed funding sources for the program's first three (3) years or will~~of the schedule or will~~ be available from committed or planned funding sources for years four (4) and five (5).

Fiscal Year (FY) – The annual accounting period for Broward County~~of time in~~ which ~~funds are appropriated and accounted for. The County's fiscal year~~ begins ~~annually~~ on October 1st and ends on September 30th of the next calendar year.

Flexible Revenue – A source of funds which can be used for a variety of purposes and programs and which can be raised or lowered depending on revenue requirements.

Fund – Monies dedicated for a specific purpose ~~set aside~~ and accounted for separately ~~in order to ensure that the monies are spent for a specific purpose or according to legal requirements.~~

Fund Balance – Difference between assets and liabilities in ~~The amount of revenues exceeding expenditures for~~ a governmentgiven fund~~, at the close of a fiscal year which can be carried over to support the fund's budget in the next fiscal year.~~

General Obligation Bonds – Bonds approved by a majority of the voters that are financed with ~~the~~ ad valorem taxes or backed with the "full faith and credit" of the issuing government~~, which must be approved by a majority of the voters in Broward County~~.

Grants – Contributions or gifts of cash or other assets from another government or non-profit organization to be used or expended on a specific purpose, activity or facility.

Impact Fees – Fees assessed for new development projects~~Funds collected by the County from a developer~~ to fund infrastructure required to serve ~~the residents or users of the~~ development, including school impacts~~. Impact~~ fees, road/transportation ~~are adopted by ordinance. The County currently collects~~ impact fees ~~for roads, parks, school facilities~~, and park impact fees. ~~water and sewer infrastructure. (Ch. 163.31801, F.S.)~~

Infrastructure – Any public facility that has a life expectancy of 5 or more years.

~~Infrastructure – Any fixed capital expenditure or fixed capital outlay associated with the construction, reconstruction, or improvement of public facilities that have a life expectancy of 5 or more years, any related land acquisition, land improvement, design, and engineering costs, and all other professional and related costs required to bring the public facilities into service (Ch. 212.055(d)1, F.S.). Facilities in this category include technical structures such as roads, bridges, tunnels, water or wastewater management facilities, and government facilities which serve a public need and purpose.~~

Interest Income – Revenues earned on cash balances within each fund.

Intergovernmental Revenue – See Grants above.

Less Five Percent – RevenuesUnder state statute, revenues are budgeted at 95 percent of anticipated receipts and not including fundexcept for transfers, fund balances, bond issues, and certain selected grants and reimbursements which are budgeted at 100 percent.

Level of Service – An indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. Level of service shall indicate the capacity per unit of demand for each public facility. (Ch. 163.3164(28), F.S.).

Local Option Sales Tax – Up to one percent (1%) tax on sales which must be approved by the voters to fund infrastructure improvements, transit, transportation, or health care.

Operating Budget Impact – The incremental adjustment to an operating budget resulting from the completion of capital improvements. Typically included are the costs to operate and maintain the facility. The impact of the project may also result in savings.

Pay-As-You-Go – A term used to describe the financial approach of funding capital improvements with current resources rather than through bondsborrowing.

Principal – The original amount borrowed through a loan, bond, issue or other form of debt.

Reserves –Funds earmarked An account used to earmark funds to be expended for a specific purpose in the future.

Revenue bonds – Bonds that finance income producing projects and are securedfinanced with charges paid exclusively by athe users of the public improvement or with another specific revenue source, excluding ad valorem taxes.

Revenues – The taxes, fees, charges, special assessments, grants and other funds collected and received by the County in order to support the services provided.

Special Assessments – A compulsory charge levied to made against certain properties located within a certain geographic that defraysto defray part or all of the cost of a specific improvement or service deemed to primarily benefit those properties.

Transfers – The movement of cash or other resources between funds.

Trust Fund – A fund used to account for assets held by a government for individuals, private organizations, other governments, and/or other funds.

User Charges – AThe payment of a fee for direct receipt of a public service by the person or entity benefitting from the service.

Voted Ad Valorem Tax – Property taxes levied to fund the debt service on general obligation bonds, which are approved by a majority of voters.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| BCAD | Broward County Aviation Department |
| CIE | Capital Improvements Element |
| CIP | Capital Improvements Program |
| DEFP | District Educational Facilities Plan |
| FAA | Federal Aviation Administration |
| FLL | Fort Lauderdale-Hollywood International Airport |
| FY | Fiscal Year |
| HWO | North Perry Airport |
| PSFE | Public Schools Facilities Element |

BROWARD COUNTY FLORIDA

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Capital Improvements

## INTRODUCTION

### A. General

Consistent with Florida Statute 163.3177 (3)(a), the purpose of the Capital Improvements Element (CIE) is to;

1. Consider evaluate the need for and the location of public facilities ~~as identified~~ in order to encourage~~other comprehensive plan elements and, as defined in~~ the efficient use of such facilities.
2. Outline principles~~applicable definitions~~ for public facilities construction, extension, capacity increase, and deficiency correction over at least a 5-year period.
3. Estimate~~each type of~~ public facility costs, including ~~to estimate~~ the identification~~cost~~ of when facilities will be needed, the general location of facilities, and projected funding sources.
4. Ensure the availability and adequacy of public facilities to meet established levels of service.
5. Establish a schedule of capital improvements which includes any publicly funded projects of federal, state, or local government, and which may include privately funded projects for which the local government~~County~~ has no fiscal responsibility.
6. Identify as funded or unfunded and prioritize, any projects required ~~to analyze the fiscal capacity of the County~~ to achieve and maintain adopted level-of-service standards.
7. Identify transportation~~finance and construct~~ improvements included in the applicable metropolitan planning organization's transportation improvement program, to the extent that such ~~adopt financial policies to guide the funding of~~ improvements are relied upon~~in a manner necessary~~ to ensure ~~that capital improvements are provided when required based on needs identified in other comprehensive plan elements. This Element also ensures that an adequate~~ concurrency and financial feasibility.
8. Coordinate the capital improvements schedule with the Broward Metropolitan Planning Organization's Long-Range ~~management system is implemented by the County pursuant~~Transportation Plan.

Pursuant to Florida Statute, the CIE must be reviewed annually. Modifications that update the 5-year capital improvement schedule may be accomplished by ordinance and are not considered amendments to the comprehensive plan. 163.3180. ~~The CIE brings together the various infrastructure needs identified in other elements of this Comprehensive Plan along with the County's financial plans for meeting those infrastructure needs. The Element describes~~

~~various improvements for Transportation, including the Transportation Improvement Program (TIP), Potable Water, Sanitary Sewer, Drainage, Recreation, Aviation, Port Everglades, Beach Renourishment, Transit, Community Development and Public School Facilities.~~

The CIE Support Document is divided into four parts. Part I~~, the~~ Introduction, identifies the service area, the planning horizons and defines key terms. Part II, Existing Conditions, addresses the data requirements including~~through~~ a description of existing conditions, ~~including~~ current and projected funding sources, and expenditures. Part III, Needs Assessment provides ~~is~~ an ~~assessment and~~ analysis of existing conditions, ~~along with a~~ discussion of future needs, and existing identification of deficiencies, ~~and~~ Part IV addresses ~~CIE~~ implementation.

## B. Service Area

The planning~~CIE~~ service area is all of Broward County~~varies depending on the program and agency under consideration~~. The regulatory service area is generally confined to the Broward Municipal Services District Areas, including the Water Conservation Areas; however, ~~there are~~ many programs ~~that~~ include the municipalities. ~~The planning service area is all of Broward County.~~

## C. Planning Horizon

This Element includes a financially feasible five-year Capital Improvements Program (CIP) which is the adopted annually by ~~the~~ Broward County Board of County Commissioners (Board). Capital improvements required beyond ~~this~~ five years~~-year program~~ are ~~generally~~ addressed in the various plan elements and will be incorporated into the CIP through~~specifically addressed in the CIE during~~ the ~~required~~ annual update process~~updates~~. Long term planning horizons for the CIE~~this Element therefore~~ correspond with those found in other elements of the Comprehensive Plan.

# EXISTING CONDITIONS

The following sections address revenue sources and funding mechanisms for County expenses, including operating costs, capital projects, and debt service. Existing revenue sources are shown in Table CI-1.~~The County allocates its existing revenue sources for operating expenses, capital (including infrastructure) expenses and debt service expenses. The revenues allocated for capital expenses are generally those restricted to capital projects by legislative mandate, revenues of a non-recurring~~

~~nature and revenues allocated for capital projects based on policy decisions made by the Board. The following sections focus on the revenue sources and funding mechanisms available for infrastructure and/or capital projects. These sources are depicted in Table CI-1.~~

Table CI-1: Existing Revenue Sources, Broward County

| Revenue Sources Allocated for Capital Projects | Revenue Sources Allocated for Operating Budget and Debt Service |
|---|---|
| Ad Valorem Taxes | Ad Valorem Taxes |
| ~~Local Option Gas Taxes~~Bonds | Communication Services~~Local Option Gas~~ Taxes |
| Capital Recovery~~User Fees and~~ Charges | ~~User Fees and Charges~~County Gas Tax |
| ~~Grants~~Communication Services Taxes | ~~Grants~~Electric Franchise Fees |
| Constitutional Gas~~Tourist~~ Taxes | ~~Tourist Taxes~~Electric Utility Tax |
| Electric Franchise Fees~~Utility Tax~~ | ~~Electric Utility Tax~~Fines and Forfeitures |
| Electric Utility Tax~~Franchise Fees~~ | ~~Electric Franchise Fees~~Grants |
| ~~Communication Services Taxes~~Financing/Loans | ~~Communication Services Taxes~~Half Cent Sales Tax |
| ~~Interest Income~~Fund Balances | Interest Income |
| ~~Constitutional Gas Taxes~~Grants | ~~County Gas Tax~~ |
| Impact Fees, including Parks, and Roads | Licenses and Permits |
| ~~Transportation Concurrency Fees~~Interest Income | ~~Half Cent Sales Tax~~Local Option Gas Taxes |
| Local Option Gas Taxes~~Bonds~~ | ~~State Revenue Sharing~~Non-Ad Valorem Assessments |
| ~~Financing/Loans~~Partnership Contributions | Regulatory Revenue |
| ~~Sale of Assets~~Reimbursements | ~~Fines and Forfeitures~~State Revenue Sharing |
| ~~Capital Recovery Charges~~Sale of Assets | ~~Non-Ad Valorem Assessments~~Tourist Taxes |
| ~~Reimbursements~~Tourist Taxes | User Fees and Charges |
| ~~Partnership Contributions~~Transportation Concurrency Fees | |
| ~~Fund Balances~~User Fees and Charges | |

Source: Broward County, Office of Management and Budget, 2018~~7~~

## A. Ad Valorem Taxes

The Board may levy ad valorem taxes up to $10.00 per thousand dollars of taxable value for Countywide purposes, not including taxes levied for bonds approved by the voters. The County currently levies approximately $ 5.4846 per thousand dollars of taxable value. This

includes ~~including~~ $0.1917 for ongoing capital project needs for which there are no dedicated revenue sources. Ad valorem taxes fund certain projects on a pay-as-you-go basis and fund maintenance and replacement costs of existing infrastructure and facilities.

Discretionary Sales Surtax or ~~The inclusion of ad valorem taxes to support the CIP has been done historically to fund certain projects on a pay-as-you-go basis in order to avoid longer-term debt and the costs associated with the debt. During the "great recession" there was a significant decline in the property tax base used to support capital needs which resulted in a significant reduction in the amount of property taxes allocated for capital projects. Over the past few fiscal years, the County tax roll has incrementally recovered to pre-recession levels, which has enabled the County to restore some of the funds needed to adequately maintain the County's infrastructure investments. These additional ad valorem taxes levied for capital projects are allocated primarily for maintenance and replacement of existing infrastructure and facilities and include few if any new facilities.~~

## B. Local Option Sales Tax~~Gas Taxes~~

Chapter 212.055, Florida Statutes allows certain counties, including Broward County, to levy a sales surtax, subject to approval by majority vote of the electorate. In November 2018, Broward County voters approved a 30-year, one (1) cent sales tax for transportation system improvements. Projects funded by the sales tax are intended to reduce traffic congestion, improve roads and bridges, enhance traffic light timing, develop safe sidewalks and bike paths, expand mass transit, full fund special needs/on-demand services, fully fund community shuttles, connect greenways, enhance school safety zones, and fund a variety of municipal transportation projects. The sales tax is expected to generate approximately $357 million in FY 2020. Use of tax proceeds is restricted to planning, development, construction, operation, and maintenance of bus systems, fixed guide-way rapid transit systems, on demand transportation, roads, and bridges.

## C. Fuel Taxes

In addition to state taxes, Broward County levies the following taxes on sales of each gallon of motor and diesel fuel:

1. Ninth Cent Tax: $.01
2. Local Option Fuel Tax: $.06
3. Additional Local Option: $.05

Impact Fees. ~~In 1982 and 1993, the State Legislature gave counties the ability to increase gas taxes by up to twelve cents for transportation expenditures with a majority plus one vote~~

of the County Commission. As of January 1, 2001, Broward County has levied all twelve (12) cents. Revenues from the gas taxes are shared with various municipalities in accordance with interlocal agreements. Revenues had historically been allocated for road and right-of-way construction and improvement, drainage projects and transit. However, the decline in the County's property tax base resulted in a reduction in property tax revenues available for transit services. In order to minimize transit service reductions, local option gas taxes were reallocated to fund ongoing transit services resulting in a significant reduction in the amount of local option gas taxes allocated for capital needs. With the continuing incremental growth in local option gas taxes in FY17, the County was able to restore a small portion of the funds for road maintenance and replacement projects, although it is not anticipated that local option gas tax growth will continue at a rate sufficient to fund the County's road maintenance and replacement needs into the future. In FY18, the gas taxes levied in the 1980s will begin to sunset. It is anticipated that the Board will reauthorize all the local option gas taxes prior to expiration.

## C. Constitutional Gas Taxes

The Constitutional Gas Tax, provided for in Article XII of the State Constitution, is divided into two portions, the 80% portion and the 20% portion. These revenues are allocated for roadway improvement and maintenance projects. As vehicles become more efficient or solar powered, revenues from gas tax are being reduced.

## D. Impact Fees

Impact fees must be spent on facilities, improvements and infrastructure that offset the impact of new developments. For example, impact fees cannot be expended for maintenance items, but they can be spent to enhance an existing facility if it can be shown that expenditure of the fees would increase the capacity or improve the performance of the facility.

The County has assessed park impact fees since 1979. Every residential plat is reviewed and assessed an amount of impact fees according to the number of residents generated by the development for park fees. The number of residents is estimated based on the type of dwelling unit and the number of bedrooms in each unit. In most cases, the developer pays the fees and in some cases County staff requests the donation of land to satisfy the park impact fee requirement.

~~Although assessment of road impact fees also began in 1979, this has been discontinued in most of Broward County, being replaced by a transportation concurrency assessment. In two areas of the County (the Northwest and Southwest concurrency districts), road impact fees are assessed and collected prior to the application for building permits.~~

## ~~E. Concurrency Fees~~

Florida Statutes requires the provision of essential infrastructure, such as sanitary sewer, solid waste, drainage, and potable water services concurrent with the impacts of development. To ensure new construction is supported by essential infrastructure and services, Broward County assesses impact fees for schools, parks, and roads, ~~concurrently~~ with development. ~~Where a proposed development project would reduce the existing level of service, developer must pay concurrency fees to offset the cost of additional public infrastructure. Concurrency fees are also collected for transportation improvements, which may vary by type and location of transportation concurrency district. Like impact fees, concurrency fee collections are directly correlated with the amount of development approved within the County. The revenues from concurrency fees are budgeted for projects in the County's 5-year Capital Program.~~

## ~~F.~~D. Bond Funding

~~The County relies on bonds and other forms of borrowing to fund a portion of its infrastructure and facility requirements. By borrowing, the cost of an improvement is spread out over its useful life, which also ensures those using the improvement share in its costs.~~ The County utilizes general obligation bond and revenue bond financing for large infrastructure projects that are~~when a dedicated revenue source is available to repay the bonds and the project is~~ too costly to fund on a pay-as-you-go basis. ~~The following sections summarize the types of bonds and financing tools that the County utilizes:~~

### 1. General Obligation Bonds ~~(Property Tax Supported Bonds)~~

General obligation bonds are~~A ballot question must be~~ approved by the electorate and paid for through~~a majority of voters in order to issue General Obligation Bonds supported with~~ property taxes. ~~Property taxes levied to support these bonds are not included in the County's ten mill property tax limitation imposed by the Florida Constitution.~~

Broward County voters have authorized the County to issue general obligation bonds on several occasions. Currently, there are two general obligation bonds being supported by voter-. In 1978, voters approved property tax levies, including the Libraries General Obligation Bond and the Parks/Land Preservation General Obligation Bondthe issuance of bonds for parks, libraries, jails, roads, and other government facilities five times. In 1987, voters approved bonds for criminal justice and public safety facilities. In 1989, voters approved bonds to acquire and enhance environmentally sensitive land. In 1999, voters approved a $140 million bond issue for the construction, renovation and acquisition of libraries. Bonds were also approved in 2001 in the amount of $400 million, for the improvement and construction of park facilities and for additional acquisition of environmentally sensitive land and open space.

## 2. Revenue Bonds

Revenue bonds are supported throughwith a pledge of user fees, or revenue sources other than property taxes, such as user fees. Revenue bonds. The County has relied on the issuance of these bonds to fund projects for Aviation, Water and Wastewater, Port Everglades, Water/Wastewater, Courthouse, and Civic Arena facilities. Waste Disposal Facilities and for some general government facilities such as detention and courthouse projects. In an effort to reduce future recurring obligations impacting the County's general fund during the recession, non-recurring fund balances were appropriated for reserves to pay down the debt supported with non-ad valorem resources. Table CI-2 lists the outstanding revenue bonds issued by the County.

### Table CI-2 - Outstanding Long-Term Revenue Bonds, Broward County

| Bonds | Revenue Source | Projects Financed |
|---|---|---|
| 20068 and 2016 Civic Arena Refunding Bonds | Professional Sports Franchise Tax, Professional Sports Franchise Sales Tax Rebate, Guaranteed Rent Payment from Arena Operator | Broward County Civic Arena |
| 2018 Refunding Revenue Note2005 Loan Pool | Non-Ad Valorem Revenues (County is reimbursed by the Arena Operator) | Completion debt for the Broward County Civic Arena |
| 2009 Airport System Revenue and Refunding Bonds | Aviation Revenues | Aviation Facilities |

| Bonds | Revenue Source | Projects Financed |
|---|---|---|
| 2012 Airport System Revenue Bonds | Aviation Revenues | Aviation Facilities |
| 2013 Airport System Revenue Bonds | Aviation Revenues | Aviation Facilities |
| 2015 Airport System Revenue Bonds | Aviation Revenues | Aviation Facilities |
| 2017 Airport System Revenue Bonds | Aviation Revenues | Aviation Facilities |
| 2019 Airport System Revenue Bonds | Aviation Revenues | Aviation Facilities |
| 2008 Port Revenue Refunding Bonds | Port Revenues | Port Facilities |
| 2009 Port Revenue Bonds | Port Revenues | Port Facilities |
| 2011 Port Revenue Refunding Bonds | Port Revenues | Port Facilities |
| 2015 Water and Sewer Revenue Bonds | Water and Wastewater Revenues | Water and Wastewater Facilities |
| 2009 Water and Wastewater Revenue Bonds | Water and Wastewater Revenues | Water and Wastewater Facilities |
| 2012 Water and Wastewater Revenue Bonds | Water and Wastewater Revenues | Water and Wastewater Facilities |
| 2010 Courthouse Bonds | Non-Ad Valorem Revenues | Courthouse Facilities |

Source: Broward County Office of Management and Budget, 2018~~7~~

## G.E. User Fees and Charges

User fees and charges are utilized as both pledges for revenue bond issues and as a direct funding source for less costly capital projects and ongoing maintenance and replacement projects ~~on a pay-as-you-go basis~~.

## ~~H. Intergovernmental Revenues~~

~~The County has received significant support from the federal and state governments for specific capital programs including Aviation, Port Everglades, Beach Renourishment, Transit, Housing~~

and Community Development. A historical view of intergovernmental revenues can be found in Table CI-3.

Table CI-3 – Intergovernmental Revenues for Capital Projects (Historical)
FY 2012-2016, Broward County

| Historical Capital Project Grants | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 |
|---|---|---|---|---|---|
| Aviation | $62,747,202 | $61,225,352 | $91,551,027 | $67,268,599 | $98,880,599 |
| Mass Transit | $25,554,170 | $42,145,065 | $24,458,087 | $33,559,014 | $26,117,723 |
| Beach Renourishment Grants | $387,806 | $121,437 | $18,289,485 | $212,680 | $14,518,098 |
| Community Development | $20,259,284 | $19,522,083 | $14,380,352 | $12,538,171 | $3,900,984 |
| Port Everglades | $381,695 | $0 | $10,611,277 | $10,248,854 | $2,172,356 |
| TOTAL | $109,330,157 | $123,013,937 | $159,290,228 | $123,827,318 | $145,589,760 |

Source: Broward County Office of Management and Budget, 2017

### I. Local Option Sales Tax

Counties have authority to levy additional sales taxes for various purposes, including infrastructure needs if a majority of voters approve a ballot question on the levy of the sales tax. The levy of a local option sales tax (estimated at $330 million annually in FY 2017) would satisfy many of the County's capital needs that cannot be satisfied with current dedicated revenue sources. The Board has expressed interest in initiating a ballot question for a one cent local option sales tax for transportation infrastructure and transit improvements. The local option sales tax would provide the funds needed to improve mobility Countywide through additional transit services, traffic engineering improvements, road improvements, and to maintain the existing roadways and other transportation and mobility systems.

## NEEDS ASSESSMENT

### A. Overview and Capital Improvements Program Preparation

Chapter 20, Part III of the Broward County Administrative Code , Chapter 20, Part III provides for the annual preparation of a capital program by the Office of Management and Budget to prepare the annual capital program for approval by the Board. TheEach year, the Office of

~~Management and Budget, develops a five-year~~ Capital Improvements Program (CIP) ~~which~~ includes proposed revenue sources and appropriations for the next five fiscal years. The first fiscal year is the annual capital budget. Updates address~~update to the CIP reflects~~ changes in priorities, resource availability, ~~budget impacts,~~ project costs, and additions for the fifth program year. Engineering~~The first fiscal year of this five- year capital program is the annual capital budget, which is adopted by the Board in conjunction with the CIP.~~

~~In the past, the County has also undertaken engineering~~ and planning studies are utilized as needed to determine infrastructure needs. ~~Projected levels of population growth, recommended levels of service, sea level rise impacts, financing and financial feasibility are all factors that these various studies and/or plans take into account when recommending various capital needs. Many of these studies and plans require close coordination with, or approval by, external agencies such as the South Florida Water Management District or the Florida Department of Environmental Protection. Presented below is a category and/or agency discussion of issues, identifying as appropriate, the studies and plans they utilize in the Capital Improvements Needs Assessment process.~~

~~1. Aviation~~

1. Aviation

~~The~~ Broward County owns and maintains two airports.~~Aviation Department (BCAD) has adopted Master Plans for the~~ Fort Lauderdale-Hollywood International Airport (FLL) and ~~the~~ North Perry Airport (HWO). The FLL is the primary general aviation airport that serves Broward County and the ranked 19th in the United States in total passenger traffic, with more than 700 daily flights. Flight carriers and destinations change frequently, but Table CI-3 shows that ten passenger airlines currently provide domestic service and 20 airlines provide international service. North Perry Airport is a secondary general aviation airport that serves an important role in relieving congestion at FLL. Major users at HWO include private and charter aircraft carriers, including flight schools, banner towing operators, and news/helicopter operators.

In accordance with federal requirements, the Broward County Aviation Department (BCAD) maintains twenty-year Master Plans for each airport. The ~~current~~ Master Plans are based on ~~Plan update was approved in 2010. This update re-evaluated airport needs for the short term (10 years) and long term (20 years) based on revised~~ Federal Aviation Administration (FAA) ~~aviation forecasts, known as the~~ Terminal Area Forecasts and address airport projects, including facilities, roads, garages, and utilities. The most

recent master plan for FLL was approved in 2010. The most recent master plan for HWO was approved in 2009. Updates. ~~Based on the forecast, the Plan Update indicated phased improvements~~ to both plans were initiated in 2016 and are expected to be completed in 2020. The updates will address continued growth as it relates to air service, general aviation, capacity of airspace, and terminal~~the airfield, terminals~~ and landside ~~systems~~segments of FLL to accommodate passenger enplanements and aircraft operations. The HWO is devoted to the general aviation industry which is for private and light business plane activity. On August 11, 2009 the Board approved the latest update to the HWO Master Plan. The Plan recommends improvements in infrastructure, airfield lighting, and access improvements. The Plan also provides CIP guidance for short, mid, and long-term projects and covers a 20-year horizon.

Table CI-3 – Commercial Airlines Serving Fort Lauderdale-Hollywood International Airport

| | Domestic Airlines | | International Airlines |
|---|---|---|---|
| 1 | Alaska | 1 | AirCanada |
| 2 | Allegiant | 2 | Air Transat |
| 3 | American | 3 | Avianca |
| 4 | Delta | 4 | Azul |
| 5 | Frontier | 5 | Bahamasair |
| 6 | JetBlue | 6 | British Airways |
| 7 | Silver | 7 | Caribbean |
| 8 | Southwest | 8 | Copa |
| 9 | Spirit | 9 | Emirates |
| 10 | United | 10 | IBC |
| | | 11 | JetBlue |
| | | 12 | Norwegian |
| | | 13 | Silver |
| | | 14 | Southwest |
| | | 15 | SkyBahamas |
| | | 16 | Spirit |
| | | 17 | Sunwing |
| | | 18 | Swoop |
| | | 19 | TAME |
| | | 20 | WestJet |

Sources:
http://www.broward.org/Airport/passengers/FLIGHTS/Pages/DomesticInternationalLocations.aspx

http://www.broward.org/Airport/passengers/flights/Pages/InternationalDestinations.aspx

~~Projects and related issues for the FLL and HWO are generally described in the Transportation Element of the Broward County Comprehensive Plan.~~ Projects at both airports are funded largely through state and federal grants, airport user fees, and bonds supported with user fees. Various projects and airport-related issues are generally described in the Broward County Comprehensive Plan's Transportation Element~~In 2016, BCAD began the update of both Airport Master Plans. These updates will complement the continued growth in the volume and composition of demand as it relates to air service, general aviation, and capacity of airspace, terminal and landside systems. The updated airport master plans will be completed in 2019~~.

## 2. Beach Renourishment

Broward County's Beach Management Program replaces critically eroded beach sand, stabilizes beach structures, and utilizes inlet sand bypassing to restore beaches. Beach renourishment needs are determined throughVarious engineering studies that identify cost~~are undertaken at various times and in different parts of Broward County to determine the need for beach renourishment projects. Consulting engineers are hired by the County to refine renourishment costs, determine the quantities of~~ material~~,~~ needed, ~~aid the County in~~ permitting, planning, ~~and~~ construction ~~of the project~~, and ~~perform~~ post-project monitoring requirements. The study recommendations are incorporated into~~data reported in these studies is then used to include a variety of~~ projects in the CIP~~. The current Broward County Beach Management Program is a comprehensive program to replace beach sand where it has critically eroded, to stabilize beaches~~ with funding from~~structures where appropriate, and, by means of inlet sand bypassing, restore the beaches which lack adequate sand due to stabilized inlets. Beach management projects are funded with~~ tourist taxes, and federal, state and municipal funds.

## 3. Transit

The Transportation Element addresses standards for public planning of transit services. Transit~~and associated~~ capital needs are currently funded with Federal Grants and transportation concurrency fees. ~~in~~ Broward County Transit (BCT) plans~~are conducted using two~~ transit services through the~~planning tools: The~~ Transit Development Plan (TDP) and the Comprehensive Operational Analysis (COA). ~~Broward County Transit (BCT) develops the TDP and COA analysis efforts for Broward County.~~ The TDP is a ten-year strategic plan of BCT's~~all~~ projected capital and operating needs ~~for BCT services~~, regardless of funding availability. The~~Annual updates are required by the~~

Florida Department of Transportation (FDOT) requires annual plan updates. ~~for every year between each major TDP. On January 9, 2018, the Board approved BCT's update to the TDP.~~

~~The COA is a short-range transit planning methodology last completed by BCT in 2010. The COA provided a more detailed look at the existing BCT services using intensive on-board and origin-destination surveys of every existing transit route and/or BCT-managed service layer. This data is combined with intensive public involvement and is utilized to recommend route changes designed to improve service efficiency, apply resources where they are most needed, and modernize the route network based upon current and projected conditions within the service area. Future standards for transit services that are part of the Transportation Element emanate directly from the most recently completed TDP, as well as the COA findings. The COA short-range planning analysis is anticipated to be updated in FY 2018/19. Based on the needs assessment the County is developing a sales tax program that will be partially dedicated to support the additional transit needs identified to improve mobility Countywide.~~

The COA and the TDP are prepared within the framework of the Commission goals to "support the development, design and construction of sustainable, multi-modal transportation facilities throughout the County, to meet the demands of residents, travelers, and businesses." The Board approved the most recent update on January 9, 2018. ~~Standards for mass transit services are listed in the Transportation Element. Transit capital needs are currently funded with Federal Grants and transportation concurrency fees.~~

The COA utilizes a short-range transit planning methodology that was last applied by BCT in 2010. The COA provides a detailed appraisal of existing services using intensive on-board and origin-destination surveys of every existing transit route and/or BCT-managed service layer. Based on the COA data, as well as intensive public involvement, service efficiencies and improvements are implemented, such as route changes or increased headways. The next application of the COA short-range planning methodology is anticipated in FY 2018/19. The needs assessment will be used to refine expenditures of the new sales tax program.

## 4. Waste and Wastewater

Water and wastewater planning areis conducted on a 10-year cycle to identify system improvements necessary to accommodate future growth and to address regulatory changes. Comprehensive planning efforts were first initiated in 1988 with the "Water

and Wastewater Master Plan", which was revised in 2004. The Plan addressed the need for facility improvements based upon anticipated build-out conditions in each of the water and wastewater service areas over a 20-year planning horizon.

The ~~Additionally, the "~~Alternative Water Supply ~~Master Plan"~~ and the "Effluent Disposal and Reclaimed Water master plans~~Master Plan"~~ were completed in 2010. These plans identify~~ied~~ treatment plant improvements and/or expansions needed to accommodate the projected population~~based on 2010 Census data~~ and new~~mandated~~ regulatory requirements. The ~~changes. Other recent planning efforts include the "~~Retail Facilities Master Plan~~" which~~ was completed in 2016 to analyze ~~. This plan analyzed improvements within the~~ retail distribution and collection network improvements the through the year 2040. A ~~Future planning efforts include the "~~Regional Transmission System Master Plan effort~~" which~~ is scheduled to begin in 2018.

Broward County CIP incorporates the various master plan recommendations. Projects are funded through~~Based upon the master plans and the levels of service defined therein, the County develops its CIP recognizing costs associated with future growth and regulatory requirements. The CIP forms the basis for the capital budget which will be primarily funded through issuance of~~ water and wastewater revenue bonds and pay-as-you-go funding supported with user fees.

## 5. Parks and Recreation

In 2000, voters approved a $400 million bond ~~issue~~ to preserve undeveloped land and ~~to~~ enhance the County's park system. Two hundred million dollars were allocated to acquire green space, open space, and conservation land. The remaining two hundred million dollars were allocated to upgrade and improve the existing County Park System, provide for municipal park challenge grants, and Swim Central grants. The bond program is in the final stages all ~~of implementation and remaining~~ funds have ~~all~~ been appropriated ~~for projects~~.

## 6. Port Everglades

Port Everglades maintains~~utilizes~~ a five-year Master Plan and ten and twenty-year Vision Plans to guide cost feasible capital development. The ~~To stay~~Port Everglades Master and Vision Plans are updated every two or three years in order to keep current with ~~trends in the~~ global marketplace trends and maximize efficiency. Port Everglades plans~~updates its Master/Vision Plan every two or three years. The Port is proposing~~ to expand its facilities to accommodate~~in advance of~~ projected cargo and cruise volume increases. The 2014 Port Master/Vision Plan identifies~~stresses~~ the need to expand

passenger and cargo for additional berthing capacity. This included which includes new berths, taller cranes, and longer berths to increase passenger and cargo capacity through 2033. The Coastal Management Element'sPort Everglades projects are generally described in the Deepwater Port Component describes the various Port Everglades projectsof the Coastal Management Element. A majority of the projects at Port Everglades are funded with user fees, grants and bonds supported with user fees.

## 7. Transportation

a. Broward Metropolitan Planning Organization. New transportation projects are identified in the Broward Metropolitan Planning Organization's (MPO) may be selected from the Long-Range Transportation Plan (LRTP).) Update which is adopted every five (5) years. Data from the LRTP by the Broward Metropolitan Planning Organization (MPO) and which provides data that is incorporated into the Comprehensive Plan's Transportation Element, as well as of the Capital Improvement Element.

Broward County. The CIP includes new transportationComprehensive Plan. Other projects recommendedare selected from recommendations made by Broward County's Highway Construction Engineering, Highway Bridge Maintenance, and Traffic Engineering Divisions. A in Public Works. When funds are available for new projects, a Transportation Construction Program Committee, comprisedmade up of staff from the Public Works Department and the Office of Management and Budget, convenes and evaluates and prioritizesthe priority and need for selected projects using traffic and level of service data recommended for to prioritize the projects for potential inclusion into the five-year CIP. Transportation projects are funded through

In coordination with the plans of outside agencies, like the Florida Department of Transportation, the Transportation Construction Program Committee determines the highest priority projects based on the project's anticipated impact on the Countywide transportation system. Funding for transportation projects comes from a variety of sources, including federal and state grants, municipal contributions, gas taxes, impact fees and developer contributions. Funds also are provided through proportionate fair share agreement.

## 8. Community Development

The Projects listed in the Community Development portion of the CIE are selected from the Housing Finance and Community Development Division maintains a Five-Year Consolidated and Annual Action Plan (Plan). Projects identified in these plans are incorporated into the CIP. These includeThe Plan identifies various housing, infrastructure and public facilities' needs and priorities. Projects are funded throughout

~~the County. The County is able to address these needs and priorities~~ through a combination of grant funds ~~received~~ from the State and Federal Government, including ~~the~~ Community Development Block Grant (CDBG), ~~the~~ HOME Investment Partnerships (HOME)~~,) program, the~~ Emergency Shelter Grant (ESG)~~,)~~ and ~~the~~ State Housing Initiatives Partnership (SHIP) program funds. Broward County distributes~~. These~~ grant funds ~~are then distributed by the County~~ to participating municipalities, private and non-profit entities, and eligible residents of Broward County through a variety of ~~different~~ application and selection processes.

### 9. Other Projects

Projects without ~~that do not have~~ dedicated funding sources are included in the CIP through the Capital Improvements Needs Assessment process. The process varies slightly for each category of infrastructure, depending on the funding source and the existence of an approved master plan. Several County

~~There are some~~ programs ~~in the County that~~ do not have adopted plans to guide ~~their~~ capital planning projects~~decisions~~. For these programs ~~without master plans~~, the Office of Management and Budget recommends projects for placement in the five-year CIP based on criteria set forth under Policy CI~~I~~.1. 1.

~~Once all recommendations and input are received from other agencies, the Office of Management and Budget develops the Recommended Five-Year CIP, which includes projected revenues and proposed appropriations. The draft program is presented to the County Administrator for review. Once the County Administrator's feedback has been incorporated, the recommended program is then transmitted to the Board for review and adoption public hearing.~~

## B. Fiscal Analysis of Existing Conditions

This section describes the fiscal implications of providing the public facilities and infrastructure required to meet the proposed levels of service for both existing and future developments. This section also discusses ~~the~~ future needs and existing deficiencies related to the Capital Improvements Program, as well as~~of each of the program categories listed in the previous section. All needs and~~ expenditures required to comply with the ~~various~~ goals, ~~policies and~~ objectives, policies ~~found in various elements~~ of the various Broward County Comprehensive Plan elements.

### 1. Broward County's Fiscal Condition

The general financial condition of the County is ~~can be described as~~ sound and recovery ~~is continuing to recover from declining revenues resulting~~ from the recession that began in 2008 continues. The ~~During the recession, the County implemented the reductions necessary to maintain the same non-voted Countywide property tax rate for three years despite the declining tax base and non-property tax revenues, and while attempting to minimize the impact on services to the public. Through incremental increases since the recession, the~~ County tax roll has ~~now~~ reached pre-recession levels, although the increases have not been sufficient to offset the cumulative impacts of inflation and other ~~increases in the~~ cost increases ~~of providing services.~~

The ~~County's current~~ non-voted property tax rate is slightly more than 50% of the statutory cap of 10 mills. The ~~By largely reserving ad valorem tax capacity for operation facilities and programs without other dedicated revenue sources, the remaining~~ property tax capacity is expected to be sufficient to satisfy ~~those~~ needs for the duration of the planning period ~~, depending on the tax policy set by the Board each year.~~ A historical view of non-voted ad valorem tax rates is portrayed below in Table CI-4.

Table CI-4 Countywide Ad Valorem Tax Rates (Excluding Debt Service)

| Fiscal Year | Rate |
|---|---|
| 2008 | 4.8889 |
| 2009 | 4.8889 |
| 2010 | 4.8889 |
| 2011 | 5.1021 |
| 2012 | 5.1860 |
| 2013 | 5.2576 |
| 2014 | 5.4400 |
| 2015 | 5.4584 |
| 2016 | 5.4741 |
| 2017 | 5.4474 |
| 2018 | 5.4623 |
| 2019 | 5.4792 |

Source: Broward County Office of Management and Budget, 20187

## 2. Future Needs and Existing Deficiencies

The County continually maintains or replacesallocates significant resources for maintenance of its capital investments, and in many instances, is facing the need to replace aging facilities and infrastructure. This balancing needs to ensure funds are availableof maintenance and replacement needs, with funding required to maintain the County's current levels of service. This is challenging since the levels, presents an annual property tax funds available for capital projects has declined from $41 million to $35.7 million since FY 2006, in spite of millage rate increases. Ourchallenge when developing the five-year CIP. The CIP may also impact the operating and debt service budgets because in addition to providing the one-time capital investmentsfunding for new facilities require operation, funds must also be identified to operate and maintenance costs. Debtmaintain the new facilities and to pay for debt service costs are incurred for certain large expenditures. The useof that is the source of the funding for the project.

At the current FY 2018 millage rate, property tax funds funding for capital projects is primarily limited to maintenance. Fee supported projects and programs are of existing

~~infrastructure. Annual property tax funding for those capital projects funded with general revenues has declined from $41 million to $30.5 million since FY 2006. For those capital programs supported with fees, projects must be~~ prioritized and phased based on the availability of funds and the ability to adjust fees to pay for ~~meet all needs including~~ ongoing operations, maintenance and debt service costs.

Ongoing challenges ~~also~~ include potential ~~the continued threat of~~ federal and state funding reductions. Many of the County's capital programs depend on these ~~threatened~~ sources including Beach Renourishment, ~~Community Development,~~ Transit, Transportation, Aviation, and Port Everglades.

The five-year program is re-evaluated and refined each year to address these challenges. ~~Difficult choices will continue to be made about re-prioritizing projects and/or raising the revenue necessary to support the highest priority projects. 2040.~~

a. *Aviation.* The Capital Improvements Element Goal, Objectives and Policies include proposed ~~Proposed~~ aviation projects and projected revenues ~~are provided~~ in Table CI-A. Aviation capital projects ~~within the Capital Improvements Element Goals, Objectives and Policies document. To~~ further the Commission's goal to support economic development and improve multi-modal mobility. Planned ~~the FY 2018-2022 aviation capital program includes over $590 million in funding for renewal and replacement,~~ improvements accommodate future growth as indicated in the FAA Terminal Area Forecasts. Projects are funded with grants, airport fees and charges, and bonds supported with airport revenues.

Funded and programmed~~expansion~~ projects include:

1. Upgraded ~~and an improved~~ Airport Access Roadway System,
2. Automated People Mover Circulator,
3. New. ~~Funds are programmed in the adopted CIP program for the construction and design of a brand new~~ Federal Inspection Service (FIS) facility ~~in~~ Terminal 4, ~~T4 Concourse G, the T4~~ Checked Baggage Inspection System (CBIS) ~~Terminal 4,~~
4. ~~),~~ Terminal Connector Bridges between Terminals 1, 2~~T1, T2~~, and ~~T~~3, Taxiway Construction, ~~and~~ Terminal Gate Expansion,
5. ~~Additionally, proposed is the Remote Transmitter/Receiver (~~RTR) Relocation, Architectural ~~s~~Services for the Airport's Master Plan,
6. Land acquisition,
7. ~~construction of a staging lot for Transportation Network Companies,~~ Remote Parking Lot expansion,

8. ~~Expansion, and Rehabilitation of the~~ Rental Car, ~~Garage as wells as the~~ Hibiscus, and Palm garages rehabilitation.
9. ~~Garages. Further proposed is the replacement of forty-seven~~ Passenger ~~B~~Boarding Bridges replacement – 39 bridges.
10. ~~Obsolete and accompanying Ground Power Units as well as the Replacement of obsolete~~ radio equipment replacement to ensure effective communication with the ~~county-wide~~countywide P-25 800 MHz and local government MHz radios.

i. Installation of ~~. Additionally, the FY 2018-2022 CIP includes funding update the CCTV Enterprise system, install~~ new Passenger Screening Lanes in all ~~FLL~~ terminals, ~~, improve the G&G Warehouse, and implement the FLL Security Infrastructure Project as well as the new Integrated Security System. These improvements accommodate future growth as indicated in the FAA Terminal Area Forecasts to balance the airfield with the terminal area and continued passenger growth. This CIP is funded with grants, airport fees and charges, and bonds supported with airport revenues.~~

~~ii.~~ *Beach Renourishment.* The Capital Improvements Element Goal, Objectives and Policies include proposed ~~Proposed~~ beach renourishment projects in Table CI-B. ~~The~~ and projected revenues are provided in Table CI-B within the Capital ~~Improvements Element Goals, Objectives and Policies document. Broward County's~~ Beach Management Program is an ongoing effort to mitigate the natural erosion of beaches. These mitigation efforts help ~~to~~ protect ~~residential and commercial~~ beachfront property, plant and animal habitat, and ~~as well as maintain~~ the vitality of the ~~county's~~ tourism industry. Funds are

b. ~~Funding for beach renourishment has been~~ provided by federal, state, county, and municipal ~~and county~~ governments, including tourist taxes. Beach renourishment involves ~~The County is in~~ the following three major projects:

- ~~design and engineering phase of the~~ Segment III ~~Beach~~Shore Protection Project. ~~The project, which~~ proposes ~~placing to place~~ 980,000 cubic yards of dredged and truck delivered sand on the beaches of Dr. Von D. Mizell-Eula Johnson State Park, Dania Beach, Hollywood Beach, and Hallandale Beach. ~~Design through a combination of truck haul~~ and engineering has begun.
- ~~dredged sand.~~ The Segment II Hot Spots Project. This project includes protection of shorelines and reefs. The shoreline portion of this project, that included ~~Shore Protection Project includes~~ portions of shoreline along Fort Lauderdale, Lauderdale-by-the-Sea, and Pompano Beach. ~~. Construction of the beach project was~~

completed in FY17. The and the artificial reef mitigation component of the project is scheduled for completion in FY18. PostThe Segment II project is currently in the post construction monitoring is ongoing and includes phase, which utilizes physical beach surveys and biological monitoring.
to analyze project performance. Funding is also provided for the Port Everglades Inlet Management Plan. This project involves the mechanicalSand Bypassing Project to mechanically transfer an annual average rate of 50,000 to 80,000 cubic yards of sand annually to the beaches south of Port Everglades, including Dr. Von D. Mizell-Eula Johnson State Park, Dania Beach, Hollywood Beach, and Hallandale Beach. , thereby increasing the sustainability of the beaches south of the Port. Tourist taxes and City contributions provide the funding for the portions of beach renourishment projects that are not funded by the federal and state governments

~~*Transit* Proposed~~

c. *Transit.* The Capital Improvements Element Goal, Objectives and Policies include proposed transit projects in Tables CI-C. Table CI-I generally addresses transportation projects, such as roads maintenance, improvement, and engineering, but also includes fund transfers for transit projects. Table CI-C includes funds from the Federal Transit Administration and Broward County's Transportation Concurrency Fund

Funded programs address bus and vehicle acquisition/replacement/maintenance, infrastructure improvement/maintenance, security, and information technology. Funded projects include the Lauderhill Mall Transit Center and bus stop and shelter improvements.

iii. Broward Municipal Services District. The Capital Improvements Element Goal, Objectives and Policies include proposed transit projects and their projected revenues are provided in Tables CI-C and CI-I within the Capital Improvements Element Goals, Objectives and Policies document. The five-year federally funded transit CIP continues to emphasize replacing and expanding the service life of currently owned buses and other equipment, as well as replacement and maintenance programs for transit facilities. Funds are also provided for bus stop improvements. Additionally, information technology related projects are programmed to increase the efficiency of the operation and the service to the public. Concurrency fees are budgeted in the FY 2018-2022 CIP program to expand the County's fiber network to the Copans Road Transit Facility, for the Miramar Park and Ride project and to provide the County match for competitive grants used to purchase new and replacement buses.

d. ~~*Water and Wastewater and*~~ *Broward Municipal Services District* projects and projected revenues Table CI-D. Projects include Delevoe park restroom and facilities improvements, miscellaneous drainage projects, and community enhancements.

e. Waste and Recycling. The Capital Improvements Element Goal, Objectives, and Policies include proposed waste and recycling projects in Table CI-E. There are not any projects proposed in the current five-year schedule.

~~iv.~~ii. Water and Wastewater. The Capital Improvements Element Goal, Objectives and Policies include proposed water and wastewater projects and projected revenues in Table CI-F. The~~*Projects*~~ Water and Wastewater Services Division implements~~(WWS) is the County agency responsible for implementing~~ the Broward Municipal Services District Neighborhood Improvement Projects and water and wastewater capital programs. ~~Proposed Broward Municipal Services District Projects, and water and wastewater projects and projected revenues are provided in Tables CI-D and CI-F respectively within the Capital Improvements Element Goals, Objectives and Policies document.~~

The Neighborhood Improvement Program was implemented between 1996 and 2017. It included ~~The improvement of neighborhoods in the Broward Municipal Services District continues to be a high priority of the Board. The County has spent~~ more than $752 million in~~for~~ neighborhood infrastructure improvements, including drainage, sidewalks, landscaping, roadways, utilities, and parks. The ~~intended to increase the economic viability and quality of life within the Broward Municipal Services District neighborhoods and provide incentives for municipalities to annex. These neighborhood projects included drainage improvements necessary to alleviate chronic flooding, sidewalk installation, landscaping, roadway and utility improvements, and local parks improvements.~~

~~The Neighborhood Improvement Program encompassed an area the size of a medium city with 9,355 acres, 92,500 people, and 28,555 homes. The~~ improvements included the installation of 295 miles of roadways, 428 miles of sidewalks, and 623 miles of sanitary sewer pipeline. The new sanitary sewer system ~~which~~ will ultimately eliminate~~enable the elimination~~ of 10,607 septic tanks. ~~Construction started in 1996 and was completed in early 2017.~~

NeighborhoodThe FY 2018-2022 capital improvements continue to be a high priority. The program for Water and Wastewater Services capital improvements program funds continues to fund the rehabilitation of existing water and sewer systems, including throughout the utility service area. Significant funding is also provided for improvements to the water and wastewater treatment plants, pump stations, and transmission lines. Projects Water and wastewater projects are primarily funded with utility user fees and bonds to be repaid from user fees.

v.iii. Recreation and Open Space. The*Parks and Recreation.* Proposed Parks and Recreation projects and projected revenues are provided in Table CI-G within the Capital Improvements Element Goals, Objectives and Policies document includes proposed Parks and Recreation projects and projected revenues in Table CI-G. The five-year CIP continues to direct funds towardfocus funding for recurring maintenance and capital replacement projects. Projects are primarily funded through a combination of ad to protect the County's infrastructure investments and maintain park facilities. Impact fees and funds generated from activities at Everglades Holiday Park are programmed to support the Everglades Holiday Park renovation project. Impact fees are also programmed to support the construction of a nature center at Miramar Pineland Park and development of the North Compartment at Vista View Park. Ad valorem tax, user fees, and impact fees. Various projects include playground replacement, sports fields, exhibits, pool repairs, and dock improvements, among others taxes are utilized to fund an ongoing maintenance program that includes the renovation of the Parks Administration Complex and construction of a boardwalk at Deerfield Island.

vi.iv. *Port Everglades.* TheProposed Port Everglades projects and projected revenues are provided in Table CI-H within the Capital Improvements Element Goals, Objectives and Policies document includes proposed Port Everglades projects and projected revenues in Table CI-H. . The FY 2018-2022 Port Everglades CIP focuses on enhancingcontinues to enhance economic opportunity in accordance with Commission goals and the 2014 Port Everglades Master/Vision Plan, including improvements to Midport, Northport, and Southport. The Port Everglades CIP is funded with prior year fund balances remaining from prior years, grants, bondsbond financing, private investments, and Port fees and charges. Key components The FY 2018-2022 capital program is based on the Master/Vision Plan, adopted by the Board in June 2014. Projects in the five-year program are Midport improvements, Northport improvements, Southport Improvements, and Portwide projects. Midport improvements include $30 million for Cruise Terminal 21,

Northport improvements include $95 million for Terminals 2 and 4 parking garages and new bulkheads. Southport improvements include $120 million for turning notch expansion and a container yard. Portwide improvement include $41 million for~~include the Southport Turning Notch and~~ the U.S. Army Corps of Engineers Deepening and Widening project. Other Port capital improvements include $25 million for various projects, such as architectural and engineering services, wayfinding/signage, information technology systems, and art in public places~~Program~~.

The Southport Turning Notch project allows~~will significantly increase cargo capacity and allow for~~ up to five new berths that ~~to be created to~~ accommodate larger cargo ships, thereby significantly increasing cargo capacity. It ~~This project~~ is estimated that~~to provide $10.7 billion annual increase in total~~ economic activity related to the Port will increase by $10.7 billion annually due to the Southport Turning Notch project. The creation of ~~It is also expected to create~~ 3,045 construction jobs in the short term and 5,529 regional jobs (direct, induced, and indirect) by 2031 is expected.

The U.S. Army Corps of Engineers Deepening and Widening Program will deepen the channel to -48 feet +1 foot +1 foot for a total depth of -50 feet. Seaports~~This project is needed to remain competitive with seaports~~ in the sSoutheastern United States ~~that~~ are gearing up for increased activity due to the ~~completed~~ Panama Canal expansion. The deepening and widening project allows~~, as well as to handle larger ships that are currently calling at~~ Port Everglades to remain competitive. Port Everglades also will be able to accommodate heavier loads from larger European ships that~~Europe but~~ are lightly loaded due to draft restrictions. The deepening and widening project~~It~~ is expected to create 4,789 construction jobs in the short term and 1,491 regional jobs (direct, induced, and indirect) by 2035.

~~Other Projects in the five-year program include the expansion of Cruise Terminal 25, widening of Slip 1 for larger petroleum vessels, procurement of three of six low profile super post-Panamax cranes, the addition of an outbound lane for cargo trucks on McIntosh Road, creation of a new neo-bulk storage yard for non-containerized cargo, construction of a new parking garage west of Cruise Terminal 4, and several new bulkheads throughout the Port.~~

~~*Transportation Proposed*~~

f. *Transportation.* Transportation projects are funded by Broward Cunty, as well as the federal government through the Broward Metropolitan Planning Organization. The Capital Improvements Element Goals, Objectives and Policies document includes proposed Broward County transportation projects and projected revenues ~~are provided~~ in Tables CI-L. It also includes proposed Metropolitan Planning Organization Projects in Tables CI-L, CI-M, and CI-~~K through CI-~~N

- Broward County ~~within the Capital Improvements Element Goals, Objectives and Policies document.~~ The Broward County ~~five-year~~ CIP provides funds ~~includes funding~~ for ~~County major~~ road projects, maintenance and improvement projects, and traffic engineering projects, including ~~and contributions to~~ projects managed by other government agencies. Funds originate from the various gas taxes, grants, impact fees, developer contributions, and prior year fund balances.

vii. The roadway network is largely complete; however, ~~Road~~ expansion or improvement projects are funded ~~chosen for inclusion in the five-year program~~ when existing or projected traffic ~~on the road~~ exceeds the adopted level-of-service ~~Comprehensive Plan~~ standard, to relieve ~~if the project relieves~~ an overcrowded segment, or to provide ~~if the segment is~~ a link in the ~~completion of the~~ regional road network. Projects examples include improvements designed to control traffic flow and reduce congestion are implemented, such as installation of ~~Some road improvement projects are completed, or partially funded, by developers to satisfy transportation concurrency requirements within the standard concurrency districts (see Table CI-K). For example, developers have improved intersections by constructing new turn lanes, and/or lengthening existing turn lanes. Impact fees paid by developers partially support projects included in the County's five-year~~ capital program.

~~The FY 2018-2022 CIP provides the funding needed to continue the county Signalization Engineering Improvement (SEI) project. This project includes improvements such as the deployment of~~ fiber optic cable, network equipment, traffic controllers and cabinets, video cameras, and dynamic message signs. Funds continue to be provided ~~improve traffic flow and reduce congestion. Funding is also provided to continue safety improvements~~ for school zones and ~~other~~ pedestrian area safety improvements, such as installation of mast-arm school flashers, flashing devices, and restoration of aging markings and signage. In addition to County funds and impacts fees, projects are funded by developers. Typical developer-funded ~~areas. These~~ projects include intersection improvements,

such as new and/or lengthened turn lanes, located within standard concurrency districts.

- Broward Metropolitan Planning Organization. The Broward Metropolitan Planning Organization's Transportation Improvement Program includes over $5 billion of transportation projects in Broward County. It is authorized by the federal "Fixing America's Surface Transportation Act", enacted on December 4, 2015. It generally addresses:

  Transit capital improvements and operating expenses, including ~~such as the construction of overhead mast-arm school flashers, installation of flashing beacons, restoration of aging marking and signage, and use of solar-powered school flasher devices. Ongoing funding to maintain County roads and rights-of-way is also provided to ensure the County's investments in~~ transportation disadvantaged programs and services~~infrastructure are adequately maintained. In addition to grants and developer contributions, this capital program is funded with gas taxes and fund balances remaining from prior fiscal years.~~

  - Roadway and bike/pedestrian improvements and maintenance.
  - Commuter rail improvements and operating expenses.
  - Airport and seaport improvements.

g. Housing and Community Development. Funds for these projects are included in the operating budget. Table CI-J is being kept as a place holder, should capital funds be included in the future.

Public

~~viii. *Housing and Community Development.* Proposed housing and community development projects are listed in Table CI-J within the Capital Improvements Element, Goals, Objectives and Policies document. Allocation amounts are expected to fluctuate over the next five years in the federal and state grants for Community Development and Housing. These funds are allocated for rehabilitation and construction of housing within targeted areas, and for construction and rehabilitation of public facilities and infrastructure.~~

~~3.~~ Schools and Hospitals. The School Board of ~~Infrastructure needs for~~ Broward County , Florida addresses capital funds for public schools ~~are depicted~~ in its~~the~~ 5-Year District Educational Facilities Plan (DEFP). The DEFP is included~~) located~~ in ~~Appendix K of~~ the Public Schools Facilities Element (PSFE), Appendix K. Independent taxing districts fund both public schools and hospitals. Maps

CI-A and CI-B, located in the Appendix, show the locations). Locations of public schools and hospitals ~~are depicted on Appendix Maps CI-A and CI-B in this document. Additional maps regarding public school facilities can be found within the PSFE. Infrastructure required to support public schools and hospitals is provided in a similar manner to infrastructure required to support private development. Both public schools and hospitals operate under their own independent taxing districts, and thus fund their own infrastructure needs. Other hospitals are privately owned. Impact fees are waived for these uses if they are constructed by public agencies.~~

## IMPLEMENTATION

The capital needs addressed by ~~Tables CI-A through CI-N, which are found with~~ the CIE's Five-Year Schedule of Capital Improvements are documented in the various plan elements. The CIE Goal ~~Goals~~, Objectives, and Policies includes ~~of the Capital Improvements Element of~~ the Five-Year Schedule of Capital Improvements, including ~~Broward County Comprehensive Plan, list~~ the following tables:

- CI-A: Aviation
- CI-B: Beach Renourishment
- CI-C: Transit
- CI-D: Broward Municipal Services District
- CI-E: Waste ~~improvements~~ and Recycling
- CI-F: Water and Wastewater
- CI-G: Recreation and Open Space
- CI-H: Port Everglades
- CI-I: Transportation
- CI-J: Community Development
- CI-K: Broward County Proportionate Fair Share
- CI-L: Broward Metropolitan Planning Organization-Summary by Funding Category
- CI-M: Broward Metropolitan Planning Organization-Summary by Funding Source
- CI-N: Broward Metropolitan Planning Organization-Five-Year Capital Improvements.

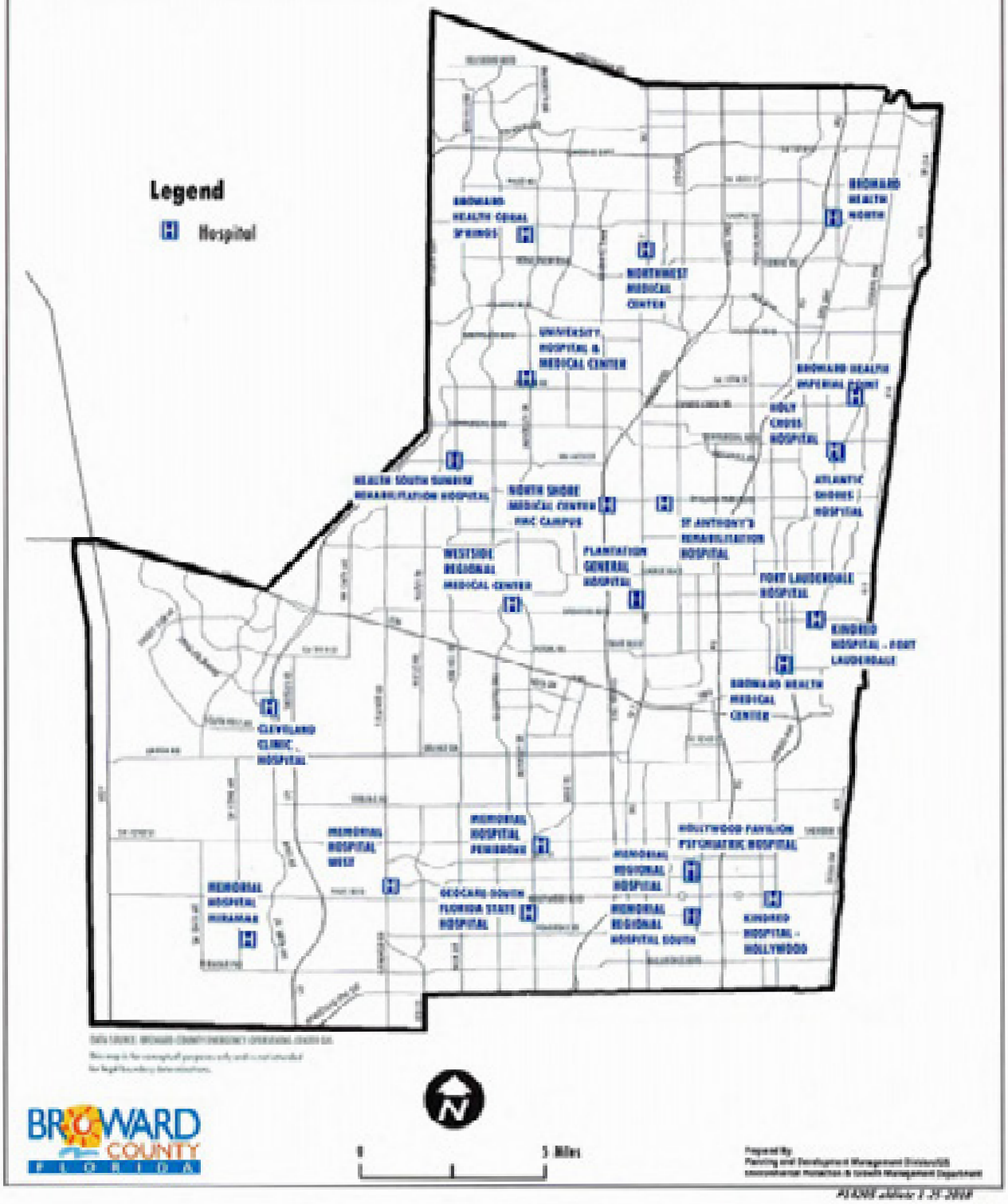
The five-year schedule includes projects and revenues ~~revenue~~ required to ensure ~~attain the goal of providing sufficient~~ infrastructure meets level ~~to meet proposed levels~~ of service standards ~~for new development~~ and satisfies ~~to satisfy~~ existing deficiencies. Pursuant to Chapter 163.3177(3)(b), Florida Statutes, Tables CI-A through CI-N are reviewed, revised and updated annually, ~~to reflect project completions, funding changes and shifting concerns. In addition, through~~ Policy CI 5.5 provides for the School Board of Broward County, Florida's Five-Year District Educational Facilities Work Plan ~~CI4.7 the CIE includes~~ by reference to be annually, ~~the~~ adopted into the Five-Year Schedule of Capital

Improvement by referenceDEFP which lists the improvements and revenues required to meet level of service for public school facilities. The basis for these needs and cost estimates can also be found within the individual elements of the Broward County Comprehensive Plan.

# APPENDIX

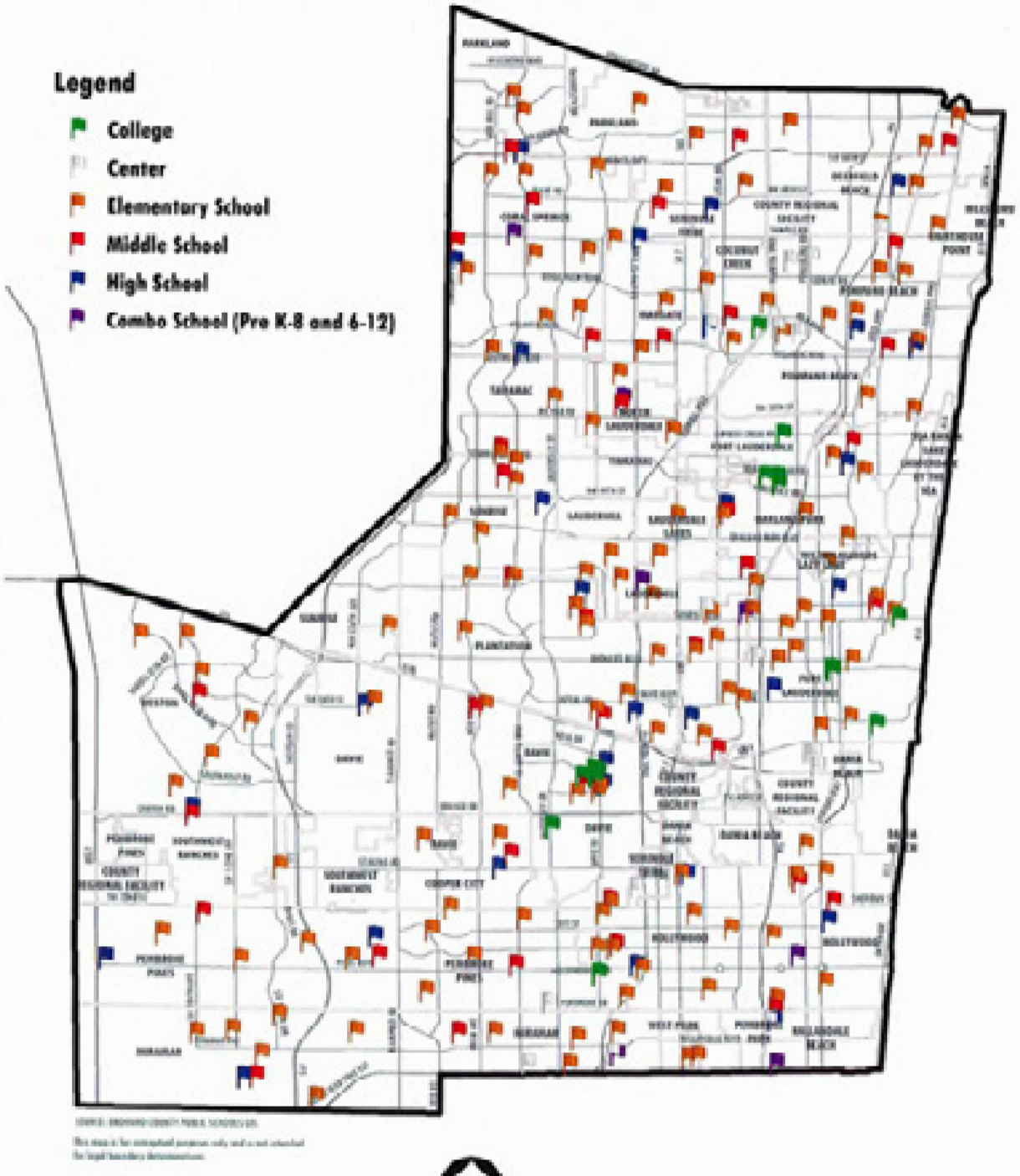
## HEALTH CARE FACILITIES - 2017-18

## MAP CI-1



# MAJOR PUBLIC EDUCATION FACILITIES - 2017-18

MAP CI-2




BROWARD COUNTY FLORIDA

BROWARD COUNTY
FLORIDA

# Climate Change Element Support Document

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Adaptation – Adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects. "Adaptation Planning" is any action or strategy that reduces vulnerability to the impacts of climate change.

Adaptation Action Area – As defined by Senate Bill CS/SB 1122 amendment: "'Adaptation Action Area' or 'Adaptation Area' means a designation in the Coastal Management Element of a local government's comprehensive plan that identifies one or more areas which experience coastal flooding due to extreme high tides and storm surge, and which are vulnerable to the related impacts of rising sea levels for the purpose of prioritizing funding for infrastructure needs and adaptation planning." As further defined in the bill: "as part of this element, a local government that has a coastal management element in its comprehensive plan may develop an adaptation action area designation for those low lying coastal zones which are experiencing coastal flooding due to extreme high tides and storm surge and are vulnerable to the impacts of rising sea level. Local governments that elect to adopt an adaptation action area are encouraged to consider policies within the coastal management element to improve resilience to coastal flooding resulting from high tide events, storm surge, flash floods, storm water runoff and related impacts of sea level rise. Criteria for the adaptation action area may include but not be limited to areas with land elevations below, at, or near mean higher high water, hydrologic connection to coastal waters, and designated evacuation zones for storm surge."

Adaptive Management – A systematic approach for improving resource management by learning from management outcomes. Adaptive management is an iterative approach in which managers, scientists, and stakeholders work together to evaluate a problem, select and implement strategies, monitor conditions, evaluate the effectiveness of the strategies, and adjust future actions accordingly.

Alternative Fuels – A substitute for traditional liquid, oil-derived motor vehicle fuels like gasoline and diesel. As defined by the Energy Policy Act of 1992, "alternative fuels" include: methanol, ethanol, and other alcohols; blends of 85% or more of alcohol with gasoline (E85); natural gas and liquid fuels

domestically produced from natural gas; propane; hydrogen; electricity; biodiesel (B100); coal-derived liquid fuels; fuels, other than alcohol, derived from biological materials; and P-Series fuels.

Aquifer – A natural underground layer, often of sand or gravel, that contains water. The two aquifer systems in Broward County are the Floridan Aquifer and the Biscayne Aquifer. The Floridan extends through the entire state but has varying degrees of permeability. In the north it is shallower and is the principal source of water supply, while in the south it is deeper and more brackish, mostly used for the injection of sewage and industrial waste. The Biscayne Aquifer is the primary source of water for all of Dade and Broward Counties, the southern portion of Palm Beach County, and is transported by pipeline to the Florida Keys. In most places, the highly permeable limestone rocks of the Biscayne aquifer are covered by a thin veneer of porous soil and aquifer water levels rise rapidly in response to rainfall.

Base Finish Floor Elevation Standards (also Minimum Finished Floor Elevations) – A minimum height requirement for the lowest floor of livable space, based on flood zones established by The Federal Emergency Management Agency (FEMA), to be considered during applications for building permits and environmental licenses for new construction and substantial improvements to existing structures.

Beach Nourishment and Re-nourishment – The systematic augmentation by artificial means of the linear width and/or elevation of the beach exposed above the high tide line. Nourishment suggests the first augmentation project; Re-nourishment suggests maintenance projects thereafter.

Biscayne Aquifer – A surficial aquifer system and the main source of water for Broward County. A shallow layer of highly permeable limestone under about 4,000 square miles of South Florida. For more information, see "Aquifer".

Broward County Flood Map – Refers to Broward County's 100-year flood map, describing zones with a flood elevation that has a 1 percent chance of being equaled or exceeded each year.

Carbon Footprint – The total amount of greenhouse gases that are emitted into the atmosphere each year by a person, family, building, organization, or company. A person's carbon footprint includes greenhouse gas emissions from fuel that he or she burns directly, such as by heating a home or riding in a car. It also includes greenhouse gases that come from producing the goods or services that the person uses, including emissions from power plants that make electricity, factories that make products, and landfills where trash gets sent. Personal and household carbon footprints can be estimated using online calculators, while communities and larger institutions may use greenhouse gas emissions inventory methodologies to calculate their carbon footprint. (EPA.gov & coolclimate.berkeley.edu)

Carbon Mitigation Banks (also Carbon Sequestration Markets/Carbon Offset Markets) – In a carbon market, each ton of carbon sequestered (see definition below) is called a carbon credit. Carbon markets provide credible standards by which carbon storage is measured and verified, so that forest landowners may sell these units of sequestration on the open market to companies interested in offsetting their carbon dioxide (CO2) emissions. Currently these markets within the United States are entirely voluntary. While a mandatory national "cap-and-trade" system does not exist for carbon, EPA's Acid Rain Program allows trading to meet SO2 and NOx emissions caps.

Carbon Sequestration and Storage – The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release the oxygen and store the carbon. Fossil fuels were at one-time biomass and continue to store the carbon until burned. Efforts to increase terrestrial carbon sequestration are based on the premise that reforestation adds to the planet's net carbon storage and helps moderate global warming by slowing the growth of carbon emissions in the atmosphere.

Circular Economy (also Industrial Ecology, Cradle to Cradle, or Closed Loop Economy) – Generic terms for an industrial economy that is, by design or intention, restorative and in which materials flows are of two types, biological nutrients, designed to reenter the biosphere safely; and technical nutrients, which are designed to circulate at high quality without entering the biosphere. (ellenmacarthurfoundation.org)

Clean Energy – Any energy source that meets the needs of the present without compromising the ability of future generations to meet their needs. "Clean Energy" is produced from renewable sources using processes that have minimal impact to the environment. Also see renewable energy.

Climate – Long-term weather patterns, and variations in elements such as temperature, precipitation, and humidity attributed to a given location.

Climate Change – Alteration of long term weather patterns that can be identified (e.g. using statistical tests) by shifts in the mean and/or the variability of these properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Article 1 of the UNFCCC defines 'climate change' as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". (IPCC)

Climate Change Action Plan – A comprehensive document that outlines a government's or community's response to climate change, tailored to local circumstances. It typically includes a detailed emission inventory; sets emission reduction goals; discusses potential impacts on resources; identifies

mitigation and adaptation actions or policies which should be adopted; and a method for tracking implementation.

Climate Resilient Community – A geographic location that takes proactive steps to prepare for (i.e. reduce the vulnerabilities and risks associated with) climate change impacts. Also see resiliency.

Climate Variability – Oscillations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability). (IPCC)

Cluster Development – A land use planning technique in which a portion of a site is allowed to be developed at a greater density than would otherwise be allowed, in favor of leaving the rest of the site as open space.

Coastal Buffer Area (also Coastal Buffer Zone) – Is a land area adjacent to a shoreline (coastal) features that is, or will be, vegetated with native shoreline species and which acts as a natural transition zone between the coast and adjacent upland development.

Cogeneration Systems – Electricity generator that recovers and reuses its own waste heat to generate steam that drives auxiliary turbines to produce additional power. Also called total energy system or Combined Heat and Power (CHP) generation.

Community Connectivity (also Street Connectivity) – A system of streets providing multiple routes and connections to the same origins and destinations. Connectivity relates to how an entire area is connected by the street system, not only to the number of intersections along a street segment. A highly connected area includes a system of parallel routes and cross connections, few closed-end streets, many points of access, and narrow streets with sidewalks or off-street paths. Frequent intersections are provided which create a pedestrian scale block pattern.

Critical Facilities – Defined as those structures from which essential services and functions for victim survival, continuation of public safety actions, and disaster recovery are performed or provided. Shelters, emergency operation centers, public health, public drinking water, sewer and wastewater facilities are examples of critical facilities. Though not explicitly included in the definition, supporting life-line infrastructure essential to the mission of critical facilities are also included when appropriate.

Down-Scaled Climate Models – Computer based simulations which take global information on climate response to changing atmospheric composition, and translating it to a finer spatial scale that is more meaningful in the context of local and regional impacts. (IPCC)

Dune – A mound or ridge of loose sediments, usually sand-sized sediments, lying landward of the beach and deposited by any natural or artificial mechanism, which may be bare or covered with vegetation and is subject to fluctuations in configuration and location. (62B.003(17) FAC)

Eco-Industrial Development – Is an emphasis on fostering networks among businesses and communities to optimize resource use and reduce economic and environmental costs. It encompasses a range of approaches including pollution prevention, by-product exchange, green design, life cycle analysis, joint training programs, and public participation.

Energy Efficiency – The ratio of useful energy output of a system, conversion process or activity to its energy input. (IPCC)

Embedded Energy (also Embodied Energy) – Is defined as the energy that was used in the work of making a product. Embodied energy attempts to measure the total of all the energy necessary for an entire product lifecycle. This lifecycle includes raw material extraction, transport, manufacture, assembly, installation, disassembly, deconstruction and/or decomposition.

Erosion Control Line – A delimiter which determines the landward extent of the claims of the state in its capacity as sovereign titleholder of the submerged bottoms and shores of the Atlantic Ocean. (Section 161.151, F.S.)

Florida-Friendly Landscaping™ – A set of nine guiding principles which help protect natural resources and preserve Florida's unique beauty. These nine principles include: right plant, right place; water efficiency; fertilize appropriately; mulch; attract wildlife; manage yard pests responsibly; recycle; reduce storm water runoff; and protect the waterfront. (University of Florida's Florida Yards & Neighborhoods Program)

Food Security – The state achieved when a given population has access to sufficient, safe, nutritious food to maintain a healthy and active life. (World Health Organization)

Green Design Standards – Building codes and architectural and engineering criteria that take energy efficiency, material recycling, zero waste, water conservation and related sustainability issues into account. Green building codes and sustainable design and construction standards are readily being adopted by local and state governments. Examples of some of the most commonly used standards are Leadership in Energy and Environmental Design (LEED), 2012 International Green Construction Code (IgCC), ICC-700 National Green Building Standard, ENERGY STAR versions 2, 2.5, and 3.0, and the 2009 International Energy Conservation Code (2009 IECC). (USDOE Building Energy Codes Program)

Green Infrastructure – Strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations.

Green Roof (also Rooftop Gardens) – Vegetative matter integrated into the cover of a structure to reduce rooftop and building temperatures, filter pollution, lessen pressure on sewer systems, and reduce the heat island effect.

Greenhouse Gas Emissions – Gasses released into the Earth's atmosphere that prevent radiated heat from escaping into space causing a warming the atmosphere and other climate impacts. One major greenhouse gas is carbon dioxide. Combustion of all fuels containing carbon (gasoline, natural gas, coal, diesel, wood, and propane) yield carbon dioxide which in turn absorbs and emits heat in the atmosphere causing global warming.

Heat Island Effect – Localized increase in ambient urban air temperatures resulting primarily from the replacement of vegetation with buildings, roads, and other heat-absorbing infrastructure. The heat island effect can result in significant temperature differences between rural and urban areas and contributes to global warming. (EPA.gov)

Hydrological Modeling – Simplified, conceptual representations of a part of the hydrologic cycle, used for hydrologic prediction and for understanding hydrologic processes.

Infrastructure – Constructed structures which serve the common needs of the population, such as roads, sewers, water treatment plants, and canals.

Infiltration and Inflow – Storm and/or groundwater that enters the sanitary sewer system through holes, breaks, joint failures, connection failures, illegally connected sump pumps, down spouts, and footing drains, and from cross-connections with storm sewers. Most inflow comes from storm water and most infiltration comes from groundwater. High groundwater levels and storm events can contribute to excessive sewer flows.

Leadership in Energy and Environmental Design™ (LEED™) – A rating system developed by the U.S. Green Building Council to verify that a building, home or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. (USGBC.org)

Leadership in Energy and Environmental Design for Neighborhood Development (LEED-NP) – A rating system which integrates the principles of smart growth, urbanism and green building into a national

system for neighborhood design. LEED for Neighborhood Development is collaboration among USGBC, Congress for the New Urbanism, and the Natural Resources Defense Council. (usgbc.org)

Light Detection and Ranging (LiDAR) – An optical remote sensing technology that can measure the distance to, or other properties of, a target by illuminating the target with light, often using pulses from a laser. In practical application, LiDAR is often used to measure land elevation levels.

Local Vulnerability – According to the IPCC, vulnerability is a function of the character, magnitude and rate of climate variation to which a system is exposed; its sensitivity; and adaptive capacity. Exposure is defined as the degree of climate stress upon a particular unit analysis; it may be represented as either long-term changes in climate conditions, or by changes in climate variability, including the magnitude and frequency of extreme events. Sensitivity is the degree to which a system will be affected by, or responsive to climate stimuli, and adaptive capacity refers to the potential or capability of a system to adjust to climate change, including climate variability and extremes, so as to moderate potential damages, to take advantage of opportunities, or to cope with consequences. (IPCC, 2001) (Smith et al., 2001) (Smith and Pilifosova, 2001).

Mandatory Reuse Zones – An area designated by a local government to require water users to connect to a reclaimed water system for irrigation and other non-potable uses.

Master Partnership Agreement with the School Board of Broward County – A contract that allows Broward County and the School Board of Broward County to work together in terms of environmental best practices, academic programs, pollution prevention, air quality educational programs and the NatureScape Broward program.

Mitigation – The actions required to reduce greenhouse gas emissions that contribute to climate change.

Mixed-Use Development – The practice of incorporating more than one land use designation (such as residential, commercial, industrial, office, institutional, and/or recreational) into a single planning location. Can be specific to a single development site (vertical mixed-use), but is more commonly a zoning district that allows for a variety of uses within one district (horizontal mixed-use). Putting different land uses in close proximity to one another is one of 10 Smart Growth Principles.

Multimodal System – A transportation system which offers many different modes of travel and transport options (e.g. pedestrian ways, public transportation, roadways, bikeways, rail, waterways, and aviation) in a connected and efficient manner.

Native Vegetative Communities – Those areas which contain ecological communities, such as coastal strands, oak hammocks, and cypress swamps, which are classified based on the presence of certain soils, native vegetation and animals.

NatureScape Broward – A strategy of landscaping that encourages the use of native plants to create Florida friendly green spaces that conserve water, protect water quality, and create wildlife habitat. Native species are uniquely adapted to South Florida and require little watering and are naturally pest resistant.

Life-Cycle Emissions – The aggregate quantity of greenhouse gases related to the full production, use, and disposal of a product, process, or service. Life-cycle analysis or assessment (LCA) is a technique to assess the environmental aspects and potential impacts, from "cradle to grave", by compiling an inventory of relevant energy and material inputs and environmental releases; evaluating the potential environmental impacts associated with identified inputs and releases; and interpreting the results to help managers and users make a more informed decision.

Priority Planning Area for Sea Level Rise Map – A map in the natural resource map series that identifies areas near tidal water bodies at increased risk of inundation under a two-foot sea level rose scenarios, projected to occur as soon as 2060. (2012 Amendment to Broward County Land Use Plan)

Quality of Life Measures – Standard indicators of the health and well-being of individuals and societies. These include wealth and employment, state of the built environment, physical and mental health, education, recreation and leisure time, and social belonging.

Quality Walking Environments (also Walkability) – The extent to which pedestrian movement is facilitated through readily available safe, connected, accessible and pleasant walkways. Factors affecting walkability include, but not limited to: street connectivity; land use mix; residential density; transparency; place making; mass transit; presence and quality of footpaths; buffers to moving traffic and pedestrian crossings, aesthetics, nearby local destinations, air quality, shade, street furniture, traffic volume and speed, and wind conditions.

Region – A territory characterized by specific geographical and climatological features. The climate of a region is affected by regional and local scale forcing like topography, land-use characteristics, lakes etc., as well as remote influences from other regions.

Renewable Energy – Any form of energy from solar, geophysical or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use. Renewable energy is obtained from the continuing or repetitive flows of energy occurring in the natural environment and

includes low-carbon technologies such as solar energy, hydropower, wind, tide and waves and ocean thermal energy, as well as renewable fuels such as biomass.

Resource Recovery – The process by which materials which still have useful physical or chemical properties after serving a specific purpose are reused or recycled for the same or other purposes, including use as an energy source. (Chapter 403.703(28) F.S.)

Resiliency (also Resilience) – A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment. (National Research Council, America's Climate Choices)

Risk - A combination of the magnitude of potential consequences of climate change impacts and the likelihood that the consequences will occur. (National Research Council, America's Climate Choices)

Salt Water Intrusion – The invasion of fresh surface or ground water by saline water. If it comes from the ocean it may be called sea water intrusion. (EPA.gov)

Sea Level Rise (SLR) – An increase in the mean level of the ocean. Eustatic sea-level rise is a change in global average sea level brought about by an increase in the volume of the world ocean. Relative sea-level rise occurs where there is a local increase in the level of the ocean relative to the land, which might be due to ocean rise and/or land level subsidence. (IPCC)

Southeast Florida – As defined through the Southeast Florida Regional Climate Compact, a four-county region including Broward, Miami-Dade, Palm Beach and Monroe Counties.

Southeast Florida Regional Climate Change Compact – A joint commitment of Broward, Miami-Dade, Palm Beach and Monroe Counties to partner in mitigating the causes and adapting to the consequences of climate change. The compact, which was ratified by all parties in January of 2010, outlines an on-going collaborative effort among the Compact Counties to foster sustainability and climate resilience at a regional scale. (southeastfloridaclimatecompact.org)

STAR Community Index™ – A voluntary rating system for gauging the sustainability and livability of U.S. communities and is modeled on the LEED green building system. (ICLEI Sustainability Planning Toolkit)

Storm Surge – The vertical rise in the still water level near the coast caused by wind stresses on the water surface and low barometric pressure often associated with tropical systems and hurricanes.

Sustainability – Meeting the needs of the present without compromising the ability of future generations to meet their own needs. (UN Commission on Sustainable Development)

Sustainable Community Development – Planning and design which aims to integrate economic, social and environmental objectives in community development.

Sustainable Development Patterns – Land use planning which considers the environmental, economic, and social costs and benefits of location, density, scale, and connectivity of systems, uses, and services. Examples include the promotion of redevelopment in the urban core, more compact development, and increased public transit and transit-oriented development.

Sustainable Sites Initiative™ (SITES™) – Is an interdisciplinary effort by the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center at The University of Texas at Austin and the United States Botanic Garden to create voluntary national guidelines and performance benchmarks for sustainable land design, construction and maintenance practices.

Tidal Flooding – Ponding of water caused by the inflow of sea water onto land or the prevention of storm water runoff in coastal areas caused by high tides.

Urban Canopy (also Urban Tree Canopy) – The layer of leaves, branches and stems of trees that cover the ground of an urbanized area when viewed from above.

Vector-Borne Disease – A contagion that is transmitted to humans or other animals, insects, or other arthropods.

Vital Signs Monitoring Network – A network of basic indicators of climate change as a means of local documentation of long term climate changes with relevance across the Southeast Florida region. This could potentially include: precipitation, saltwater intrusion, air/water temperature and tidal gauge measurements.

Vulnerability – The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity. (National Research Council, America's Climate Choices)

Vulnerable Populations – Any group of people (e.g. low-income residents, the homeless, elderly, physically or mentally disabled, ethnic minorities and recent immigrants), more susceptible to the impacts of a given pressure. A label often evoked in the context of disaster planning and public health.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| AAA | Adaptation Action Areas |
| BC | Broward County |
| BMP | Best Management Practices |
| BMPO | Broward Metropolitan Planning Organization |
| CCTF | Climate Change Task Force |
| FDEM | Florida Division of Emergency Management |
| FDEO | Florida Department of Economic Opportunity |
| FDEP | Florida Department of Environmental Protection |
| FEMA | Federal Emergency Management Agency |
| FS | Florida Statute |
| GHG | Greenhouse Gas |
| ICLEI | Local Governments for Sustainability |
| LEED | Leadership in Energy and Environmental Design |
| LEED-ND | Leadership in Energy and Environmental Design for Neighborhood Development |
| LiDAR | Light Detection and Ranging |
| LMS | Local Mitigation Strategy |
| NOAA | National Oceanic and Atmospheric Administration |
| PPA | Priority Planning Area |
| SITES™ | Sustainable Sites Initiative™ |
| SLR | Sea Level Rise |
| SFRPC | South Florida Regional Planning Council |

| | |
|---|---|
| SFWMD | South Florida Water Management District |
| STAR™ | STAR Community Index™ |
| TOD | Transit Oriented Development |
| USACE | United States Army Corp of Engineers |
| USDOE | United States Department of Energy |
| USDOI | United States Department of Interior |
| USEPA | United States Environmental Protection Agency |
| USGBC | United States Green Building Council |
| USGS | United States Geological Survey |
| VMT | Vehicle Miles Travelled |
| WWS | Water and Wastewater Services |

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Climate Change

## INTRODUCTION

### A. General

The purpose of the Climate Change Element (CCE) is to provide a planning framework for addressing the economic, environmental, and social impacts of climate change. A Countywide strategy, based on local vulnerability and consistent with regional efforts, the CCE aims to mitigate the causes, and address the local implications, of global climate change. In doing so, Broward County moves one step closer to building a greener, more sustainable and climate resilient community.

Broward County recognizes the widespread international scientific consensus that climate change is occurring, and that GHG emissions, primarily from the burning of fossil fuels, may be a contributing cause. Furthermore, the County understands that our region, Southeast Florida, is extremely vulnerable to sea level rise and other climate change impacts. Because of these global and local realities, Broward County has made reducing carbon emissions and protecting and preparing residents, businesses and natural resources from the unavoidable consequences of climate change a priority.

In 2007, the Broward County Board of County Commissioners (Board) adopted Resolution 2007-391 to reduce greenhouse gas emissions in Broward County and to support the U.S. Mayors' Climate Protection Agreement. In 2008, the Board passed Resolution 2008-442 to create the Broward County Climate Change Task Force (Task Force) to develop and advise on the implementation of strategies to mitigate the causes and adapt to the consequences of climate change. The policies in the CCE are an extension of the 126 recommendations developed by the Task Force. These recommendations are detailed in the report "Climate Change Action Plan – Local Strategy to Address Global Climate Change" (CCAP) which was approved by the Board on November 16, 2015.

One of the high-ranked recommendations in the CCAP and the 2011 Evaluation and Appraisal Report (EAR) was to develop and include a Climate Change Element into the Broward County Comprehensive Plan to provide for a sustainable environment and to reflect the best available data and strategies for adapting to future climate change impacts.

### B. Service Area

The planning area for the CCE is the geographic extent of Broward County. The regulatory service area is generally confined to the BMSD; however, some programs that relate to natural resources, water resources and flood control include a greater geographic scope. In these cases, a broader planning and regulatory approach is taken. Broward County encourages municipalities to incorporate these or other climate change policies into their planning and regulatory framework.

### C. Planning Horizon

The CCE uses multiple planning horizons to achieve the goal of a sustainable and climate-resilient community. The CCAP is meant to be simple and clear to support implementation. There are two overarching goals for this plan:

1. Mitigate the effects of climate change by reducing GHG emissions by 2% per year by 2020, ultimately leading to a total 80% reduction by 2050, and

2. Increase the resilience of our community to the effects of climate change.

Most of the policies in the CCE focus on steps that need to be taken in the short-term, with the County's long-term trends and needs in mind. The CCE also acts as a framework; one that can be added to or amended as new data and examples of best practices become available.

## DATA AND ANALYSIS REQUIREMENTS

### A. Greenhouse Gas (GHG) Emissions

Global warming and climate change are driven by the amount of GHG like carbon dioxide ($CO_2$) in the atmosphere. Human activities such as the burning of fossil fuels and changing of land use patterns are increasing GHG concentration, thereby trapping more of the sun's radiant heat in the atmosphere and amplifying the natural greenhouse effect. The National

Oceanographic and Atmospheric Administration (NOAA) reports that atmospheric carbon dioxide ($CO_2$), has risen from about 340 parts per million (ppm) in 1981 to 402 ppm in 2016, fueling global warming and climate instability. The Intergovernmental Panel on Climate Change (IPCC) reported in 2007 that the warming of the climate system was unequivocal. That same year, the U.S. Supreme Court deemed greenhouse gases in the atmosphere a threat to the public health and welfare of current and future generations and mandated the U.S. Environmental Protection Agency (EPA) to regulate the emissions of these six gases under the Clean Air Act: carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$).

## 1. Regional GHG Emissions Inventory

Broward County, as part of the Southeast Florida Regional Climate Change Compact, recognizes not only the profound effects GHG has on our global weather and climate (and our responsibility to reduce our contribution to that trend), but also the unique vulnerability of our region to the various local impacts resulting from climate change, many of which we have already begun to experience. In response, Broward and the other Compact Counties have begun to assess the scope and source of GHG emissions in our region. A Regional Greenhouse Gas Emissions Inventory was completed in 2011 (Appendix CC-A) which provides a profile of emissions sources across the region and establishes an emissions baseline for which future studies can compare.

The regional emissions assessment tracked the six internationally recognized greenhouse gases regulated under the Kyoto Protocol, listed above, for the residential, commercial, industrial, and transportation sectors. The six gases are measured using equivalent carbon dioxide units, or $eCO_2$, a commonly used method for comparing different greenhouse gases in similar terms. This standard is based on the Global Warming Potential (GWP) of each gas. As shown in the chart below, methane is twenty-one times more powerful than carbon dioxide in its capacity to trap heat, so one metric ton of methane emissions is equal to 21 metric tons of $eCO_2$. Converting emissions to equivalent carbon dioxide units allows for the results to be aggregated and compared more uniformly across geographical areas or sectors.

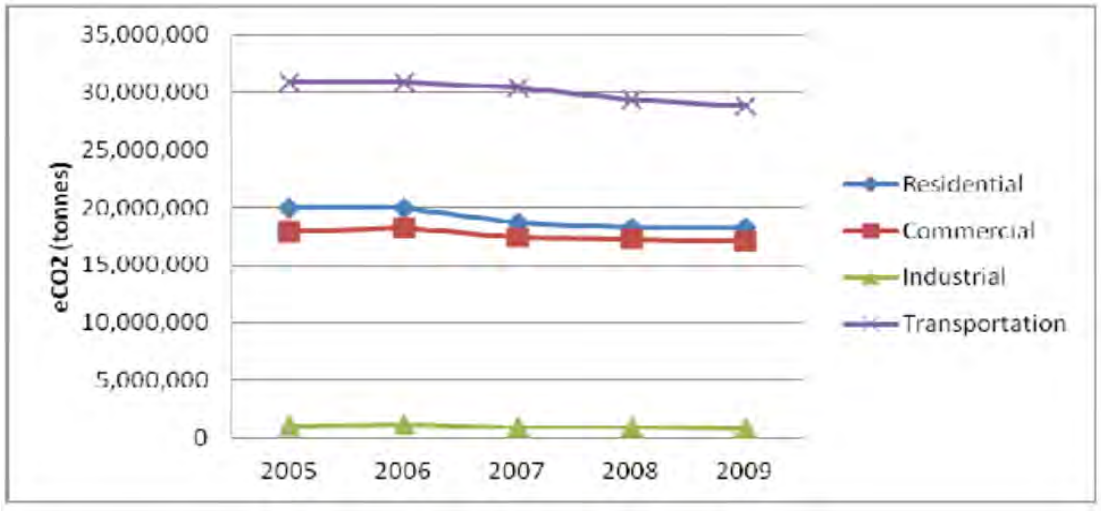
## Table CC-1
## Global Warming Potential (GWP) of Six Major Greenhouse Gases

| Greenhouse Gas | Chemical Formula | Global Warming Potential |
|---|---|---|
| Carbon Dioxide | $CO_2$ | 1 |
| Methane | $CH_4$ | 21 |
| Nitrous Oxide | $N_2O$ | 310 |
| Hydrofluorocarbons | Various | 43-11,700 |
| Perfluorocarbons | Various | 6,500-9,000 |
| Sulfur Hexafluoride | $SF_6$ | 23,900 |

Source: Southeast Florida Regional Climate Compact – Regional GHG Emissions Inventory

Sector-based analysis was performed as part of the regional inventory, an approach which provides results that is useful to local governments for policy making and project management. Emission inventories provide information that can inform and guide local reduction efforts and serve as a reference point to compare and measure the effectiveness of these strategies over time.

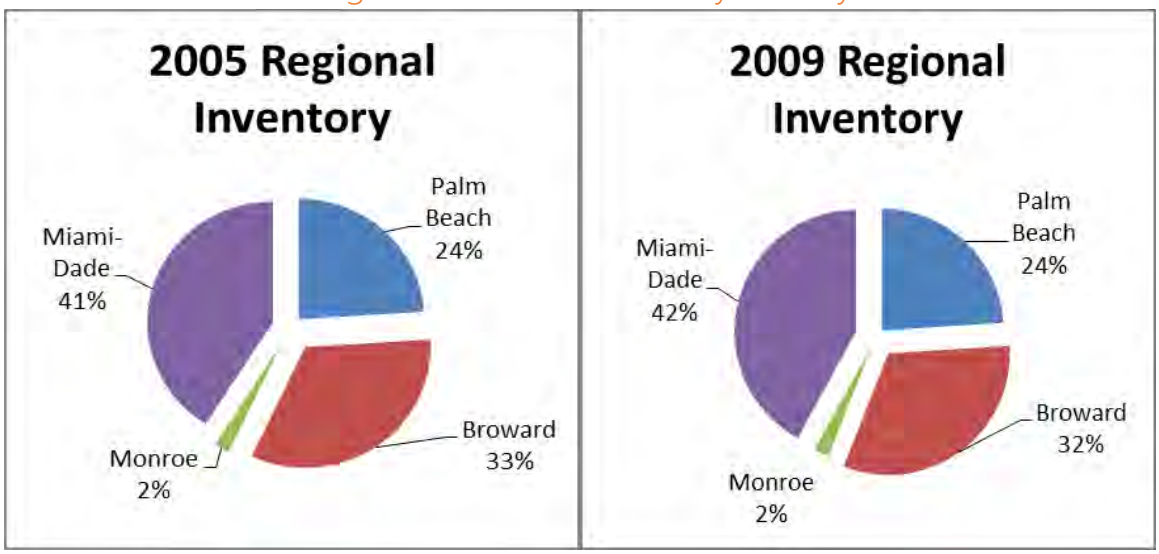
## Figure CC-1
## Regional GHG Emissions by Sector 2005 – 2009




Source: Southeast Florida Regional Climate Compact – Regional GHG Emissions Inventory

The Regional GHG Emissions Inventory focused on emissions from the built environment and transportation sectors. Results found that emissions from the Transportation Sector accounted for 44% of total regional emissions in 2005 and 45% in 2009. This rate is higher than the national average, suggesting a need for local reduction strategies to focus on this area. Electricity and natural gas consumption within the Residential Sector contributed 29% of the Region's overall emissions in 2005 and 28% in 2009. Strategies to advance renewable energy and improve energy efficiency and conservation would help to reduce the $eCO_2$ emissions contributions from this sector.

Figure CC-2
Regional GHG Emissions by County



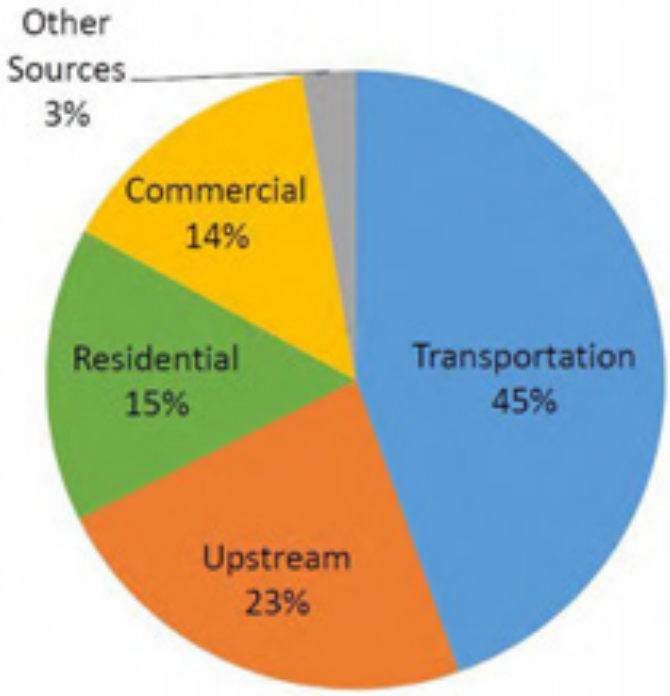

Source: Southeast Florida Regional Climate Compact – Regional GHG Emissions Inventory

Broward County's contributed roughly a third of the regional GHG emissions during the 2005 – 2009 study period. This number is consistent with Broward County's population relative to the region: 1.7 of the 5.6 million people in Southeast Florida live in Broward County. As such, Broward County recognizes its responsibility to assess and mitigate local contribution to global climate change as part of the regional Compact.

## 2. Broward Community Wide GHG Emissions Inventory

In 2016, Broward County set a county-wide greenhouse gas emissions reduction goal of 10% by 2020 and 80% by 2050, compared to 2007 levels, with a commitment to regularly monitor and track progress of programs and initiatives that contribute to the ultimate reaching of these goals. The 2016 Broward County Community Wide Greenhouse Gas Emissions Inventory (CC-B) provides emission inventories for 2011 through 2014, updates the 2007, 2009 and 2010 baseline inventory, and projects emissions to 2050. The community-wide inventory analyzes emissions within the Residential, Commercial, Industrial, Transportation, Waste, and Other sectors.

Figure CC-3
2011-2014 Broward County Community-Wide GHG Emissions Percentage by Sector




Source: Broward County Community-Wide Greenhouse Gas Emissions by Sector 2011-2014 (2016)

Table CC-2
2011-2014 Broward County GHG Emission Sectors and Sources

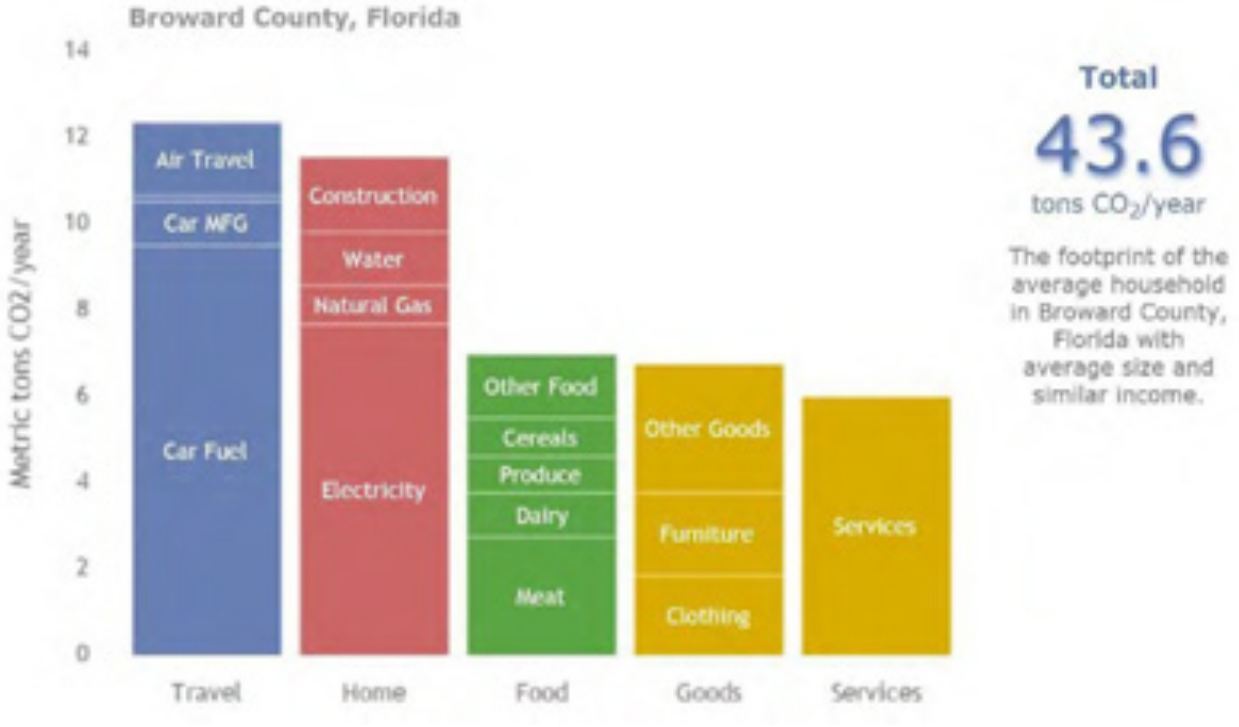
| GHG Emission Sector | GHG Emission Sources |
|---|---|
| Residential Buildings | Electricity – Florida Power and Light<br>Natural Gas – TECO People's Gas<br>Natural Gas – Florida City Gas<br>Natural Gas – City of Sunrise |
| Commercial Buildings | Electricity – Florida Power and Light<br>Natural Gas – TECO People's Gas<br>Natural Gas – Florida City Gas<br>Natural Gas – City of Sunrise |
| Transportation and Mobile Sources | On Road Passenger and Freight Vehicles<br>Airports (FLL, FXE, HWO, PMP)<br>Broward County Transit Buses<br>Broward County Community Buses<br>Tri-Rail Commuter Rail and Connector Buses<br>Amtrak Passenger Rail<br>CSX and Florida East Coast Freight Rail<br>Off Road Equipment and Mobile Sources<br>Port Everglades (*inventory in development*) |
| Upstream Impacts of Activitiies | Primary Fuels Used for Electricity Generation<br>Electricity Transmission and Distribution Losses<br>Natural Gas Production and Transport<br>Transportation Fuel Production and Transport |
| Other Sources | Municipal Solid Waste<br>Industrial Buildings<br>Wastewater Treatment<br>Agricultural Livestock |

Source: Broward County Community-Wide Greenhouse Gas Emissions Inventory for 2011-2014 (2016)

From 2011 through 2014, the total annual GHG emissions in the community varied between 24.85 and 25.59 million tonnes of carbon dioxide equivalent (Mt $CO_2e$). Table

CC-2 summarizes the sectors and sources included in the inventory. In addition, three sectors not included in previous inventories were analyzed in this inventory: wastewater, agriculture, and the upstream impacts of energy production, transport and distribution. Due to the minimal quantity of GHG emissions from solid waste, industrial buildings, wastewater, and agriculture compared to other major emission sectors, these sectors were grouped into an "Other Sources" category of GHG emissions.

Figure CC-4
Average Annual Household Consumption Based GHG Emissions in Broward County




Source: Broward County Community-Wide Greenhouse Gas Emissions Inventory for 2011-2014 (2016)

## 3. Broward County Government Operations GHG Emissions Inventory

Figure CC-4 shows that the foods, goods, and services consumed by Broward County households produce almost half of total annual household GHG emissions (45.3%), or 19.8 tonnes of $CO_2e$. The annual carbon footprint of household food consumption (7.0 t of $CO_2e$) or household goods (6.7 t of $CO_2e$) was almost equal to the impact of household electricity use (7.7 t of $CO_2e$). The consumption-based life cycle GHG emissions shown in Figure CC-4 are primarily determined from a top down approach, using household spending and econometric models to calculate GHG emissions from

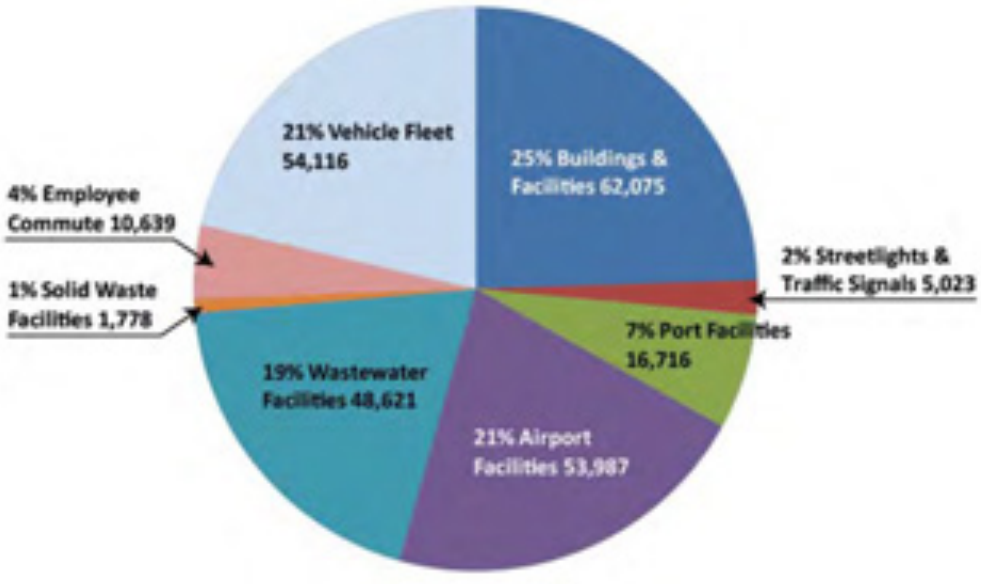
various economic sectors. The consumption-based emissions shown in this figure indicate that household consumption in Broward County is responsible for a significantly larger quantity of GHG emissions than is typically stated in geographic based inventories. This suggests that a large portion of Broward County household consumption emissions are "exported" to other areas of the U.S. and internationally. In addition, local communities should broaden their GHG reduction efforts beyond buildings and transportation, to address the additional impacts of household consumption of food, goods, and services.

In FY 2011, Broward County's government operations carbon footprint was 250,255 tonnes $eCO_2$. A net reduction of 5,781 tonnes of $eCO_2$ emissions from 2010 levels was achieved as a result of energy efficiency measures and improved operational practices.

The Broward County Climate Change Government Operations Workgroup meets monthly to identify potential emission reduction actions, propose implementation of selected actions, and share progress made. In 2011, Broward County government agencies reported 58 GHG emission reduction measures being employed. A detailed description of each measure, its cost savings and environmental benefits, are included in the Broward County Government Operations Climate Change Fourth Annual Progress Report (Appendix CC-C).

Figure CC-5

Broward County FY2011 Government Operations GHG Emissions by Source




Source: Broward County Government Operations Climate Change 4th Annual Progress Report (2012)

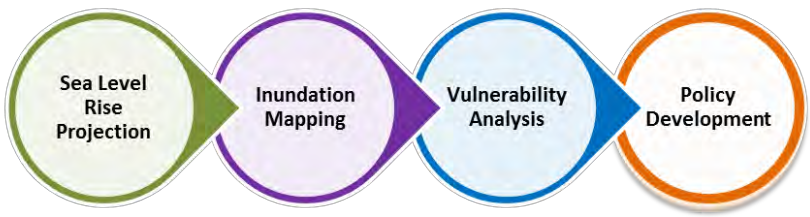
The County's commitment to reduce GHG emissions is important for several reasons. First reducing emissions may help to reduce some of the physical risks associated with climate change impacts, of which, South Florida is already beginning to feel the effects. Employing GHG reduction measures early on also avoids certain economic risks, as future strategies are likely to be more drastic (and thus more expensive). Finally, considering projections (such as future demands on resources, emissions projections, and impact scenarios) in the County's long-term planning and capital improvement decisions, is imperative in order to guide community development and protect public and private long-term investments.

## B. Assessing the County's Vulnerability to Sea Level Rise

Broward County is home to over 1.9 million people and part of the subtropical region known as Southeast Florida. With populous coastal communities, porous geology and low topography, the County is particularly vulnerable to the effects of climate change, especially sea level rise. Broward County, as a member of the Southeast Florida Regional Climate Change Compact, has made projecting sea level rise, mapping inundation scenarios, assessing local vulnerability and responding to shared challenges a high priority.

In October of 2009, Broward County hosted the first Southeast Florida (SE FL) Regional Climate Leadership Summit. Following the summit's call to action, the four counties of Southeast Florida (Monroe, Miami-Dade, Broward and Palm Beach) signed the Southeast Florida Regional Climate Change Compact (Compact) to work cooperatively to address climate concerns in the region. One of the first things the Compact Counties committed to work on together was creating a single sea level rise (SLR) projection for the region. Local scientists specializing in the areas of sea level rise and climate change were invited to participate with Compact Counties and partnering agency staff in a Regional Climate Change Compact Technical Ad hoc Work Group (Work Group) to accomplish this task.

Figure CC-6
The Science Supporting Adaptation Planning



## 1. Sea Level Rise Projection

Developing a unified SLR projection for the SE Florida region was the first step to understanding potential vulnerabilities of the region and provides a basis for adaptation planning. The Unified Sea Level Rise Projection for Southeast Florida (CC-D) is intended to be used for planning purposes by the Compacts Counties in order to identify infrastructure and resources at risk, develop strategies to address this risk and build climate-resiliency and adaptation capacity into the community.

### Figure CC-7
### Unified SE Florida Sea Level Rise Projection (2016)

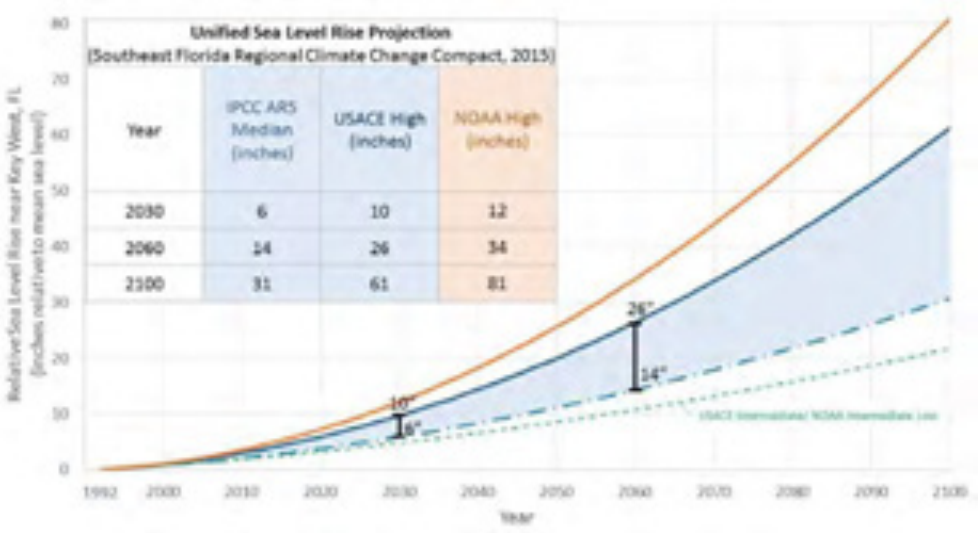



Figure CC-7 shows the Unified Sea Level Rise projection for Southeast Florida, which projects the anticipated range of sea level rise for the region from 1992 to 2100. The projection highlights three planning horizons.

Figure CC-7: A Unified Sea Level Rise Projection for Southeast Florida (2016). These projections are references to mean sea level at the Key West tide gauge. The projection includes three global curves adapted for regional application: the median of the IPCC AR5 RCP8.5 scenario as the lowest boundary (blue dashed curve), the USACE High curve as the upper boundary for the short term for use until 2060 (solid blue line), and the NOAA High curve as the uppermost boundary for medium and long-term use (orange solid curve). The incorporated table lists the projection values at years 2030, 2060 and 2100. The USACE Intermediate or NOAA Intermediate Low curve is displayed on the figure for reference (green dashed curve). This scenario would require significant

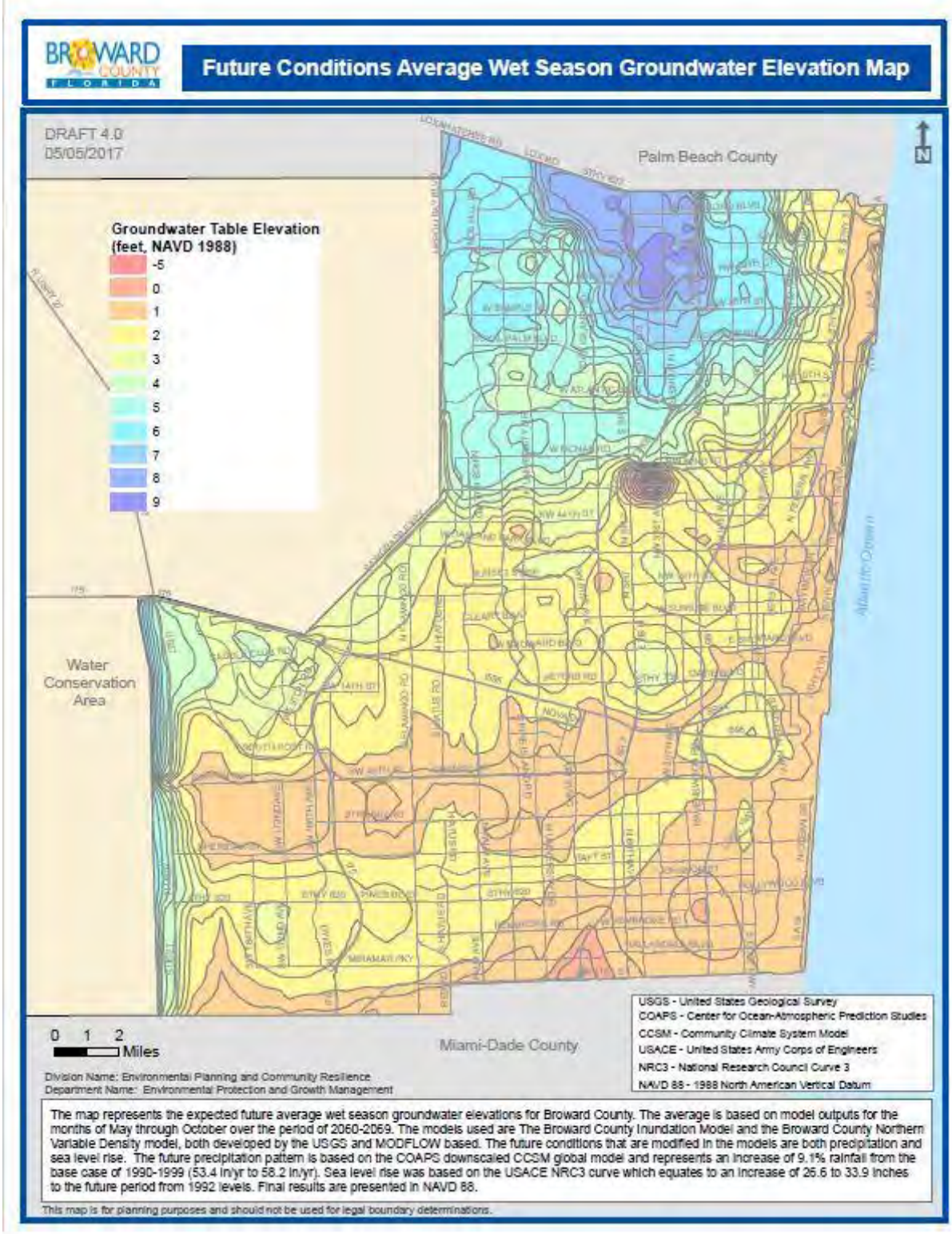
reductions in GHG emissions in order to be plausible and does not reflect current emissions trends.

1. Short term, by 2030, sea level is projected to rise 6 to 10 inches above 1992 mean sea level,
2. Medium term, by 2060, sea level is projected to rise 14 to 34 inches above 1992 mean sea level,
3. Long term, by 2100, sea level is projected to rise 31 to 81 inches above 1992 mean sea level.

The titles of the global mean sea level rise curves were retained for simplicity of referencing source, but the curves have been adjusted from the global projections to reflect observed local change. The projection consists of the NOAA High Curve, the USACE High Curve (also known as the NOAA Intermediate-High) and the median of the IPCC AR5 RCP8.5 scenario, with specific guidance as to how and when they should be used in planning.

1. The lower boundary of the projection (blue dashed line) can be applied in designing low risk projects that are easily replaceable with short design lives, are adaptable and have limited interdependencies with other infrastructure or services.
2. The shaded zone between the PCC AR5 RCP8.5 median curve and the USACE High is recommended to be generally applied to most projects within a short-term planning horizon. It reflects what the Work Group projects will be the most likely range of sea level rise for the remainder of the 21st Century.
3. The upper curve of the projection should be utilized for planning of high risk projects to be constructed after 2060 or projects which are not easily replaceable or removable, have a long design life (more than 50 years) or are critically interdependent with other infrastructure or services.

# Figure CC-8
## Future Conditions Average Wet Season Groundwater Elevation Map



To ensure the resiliency of current and future infrastructure investments, it is necessary to modernize many aspects of regional planning and licensing requirements. With the influence of climate change, and the impacts of sea level rise in particular, it is no longer prudent to rely solely upon historic and current environmental conditions as the basis for infrastructure planning, design and permitting.

To further resilience planning in Broward County, in November 2015, the Board accepted the Updated Regional Sea Level Rise Projection (2015) of the Southeast Florida Regional Climate Change Compact and directed staff to use the updated projection as the basis for sea level rise adaptation planning. This action reflected the recognized vulnerability of both coastal and inland areas to the impacts of rising seas, including increased coastal flooding, changes in groundwater levels, and reduced capacity of gravity-dependent storm water systems.

In 2017, the Board directed the Environmental Protection and Growth Management Department (EPGMD) to develop maps future conditions showing groundwater, flooding due to sea level rise, and increased rainfall. Using these Future Conditions maps, infrastructure investments can be designed to be resilient.

The first regulatory map of the series, effective July 01, 2017, is the Future Conditions Average Wet Season Groundwater Elevation Map (Map CC-1). It constitutes an important step in formally addressing future flood risk in the design and licensing of surface water management systems in Broward County, and strengths storm water permitting requirements for new developments and major redevelopments. The calculated average groundwater elevation is based on model outputs for the months of May through October over the period of 2060-2069. The models used are The Broward County Inundation Model and the Broward County Northern Variable Density model, both developed in partnership with the United States Geological Survey (USGS). The future conditions that are modified in the models are both precipitation and sea level rise. The future precipitation pattern is based on the Center for Ocean-Atmospheric Prediction Studies (COAPS) downscaled Community Climate System Model (CCSM) global model and represents an increase of 9.1% rainfall from the base case of 1990-1999 (53.4 inches/year to 58.2 inches/year). Sea level rise was based on the United States Army Corps of Engineers (USACE) National Research Council Curve 3 (NRC3) curve which equates to an increase of 26.6 to 33.9 inches to the future period from 1992 levels.

The second map of the series, currently being developed, is the Future Conditions 100-yr Flood Elevation. It recognizes need for progressive building requirements that will deliver flood protection for the duration of the investment, including under future climate conditions and changes in sea level. While the FEMA FIRMs will continue to reflect flood risk under current conditions, it is expected that as these maps are updated in ensuing years, the flood elevations will again begin to proximate those of the more forward-looking community flood map. As such, it is fully anticipated that the Broward County 100-year Flood Elevation Map may undergo future adjustments as trends in sea level and flood condition warrant.

## 2. Inundation Mapping

The Compact Counties, along with the South Florida Water Management District (SFWMD), the National Oceanographic and Atmospheric Administration (NOAA) Coastal Services Center, and other experts from local universities and federal partners, came together in 2011 to form the Southeast Florida Regional Climate Change Compact Inundation Mapping and Vulnerability Assessment Work Group (work group). The goal of the work group was to create a regionally-consistent methodology for inundation mapping and vulnerability analysis suitable for South Florida. Each of the compact counties used the agreed upon methodology, and layers provided by SFWMD, to map vulnerability at the one-, two- and three-foot sea level rise scenarios. Results of this analysis are compiled in the report: Analysis of the Vulnerability of Southeast Florida to Sea Level Rise (CC-E). The inundation maps below show areas potentially vulnerable under 1, 2, and 3-ft sea level rise scenarios for Broward County.

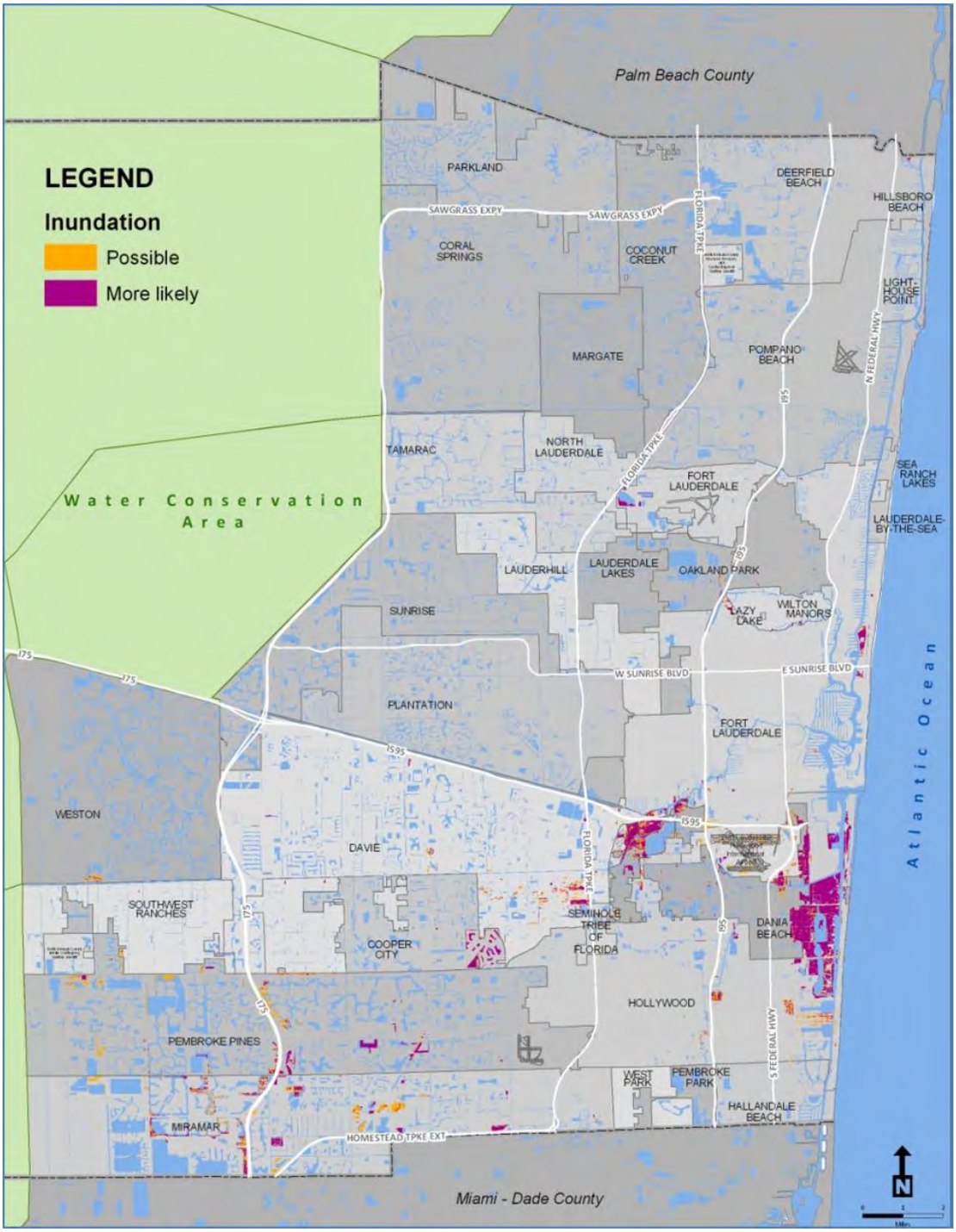
In the simplest terms, the inundation maps identify land at elevations below sea level, or potentially below sea level within a certain timeframe. Based on the Unified Sea Level Rise Projection, the one-foot SLR scenario could occur from 2040 – 2070, the two-foot scenario from 2060 – 2115, and the three-foot scenario from 2075 – 2150.

The level of certainty in the tidal surface and elevation data used for the projection is presented on each map. Areas shaded in pink are considered "more likely" and have a 75-100% certainty of the location having an elevation below sea level at high tide for the given scenario. Areas shaded in yellow are considered "possibly" inundated and have a 25-74.9% certainty level. These numbers are important for understanding the level of confidence achieved by the current data.

The maps highlight areas located near Broward County's coastline, tidal waterways and in the southwest urban core. Inland areas identified as vulnerable are low lying areas which may be of future concern for storm water management but are less likely to be affected by sea level rise in the immediate future because, hydrologically, they are not directly connected to tidal waters.

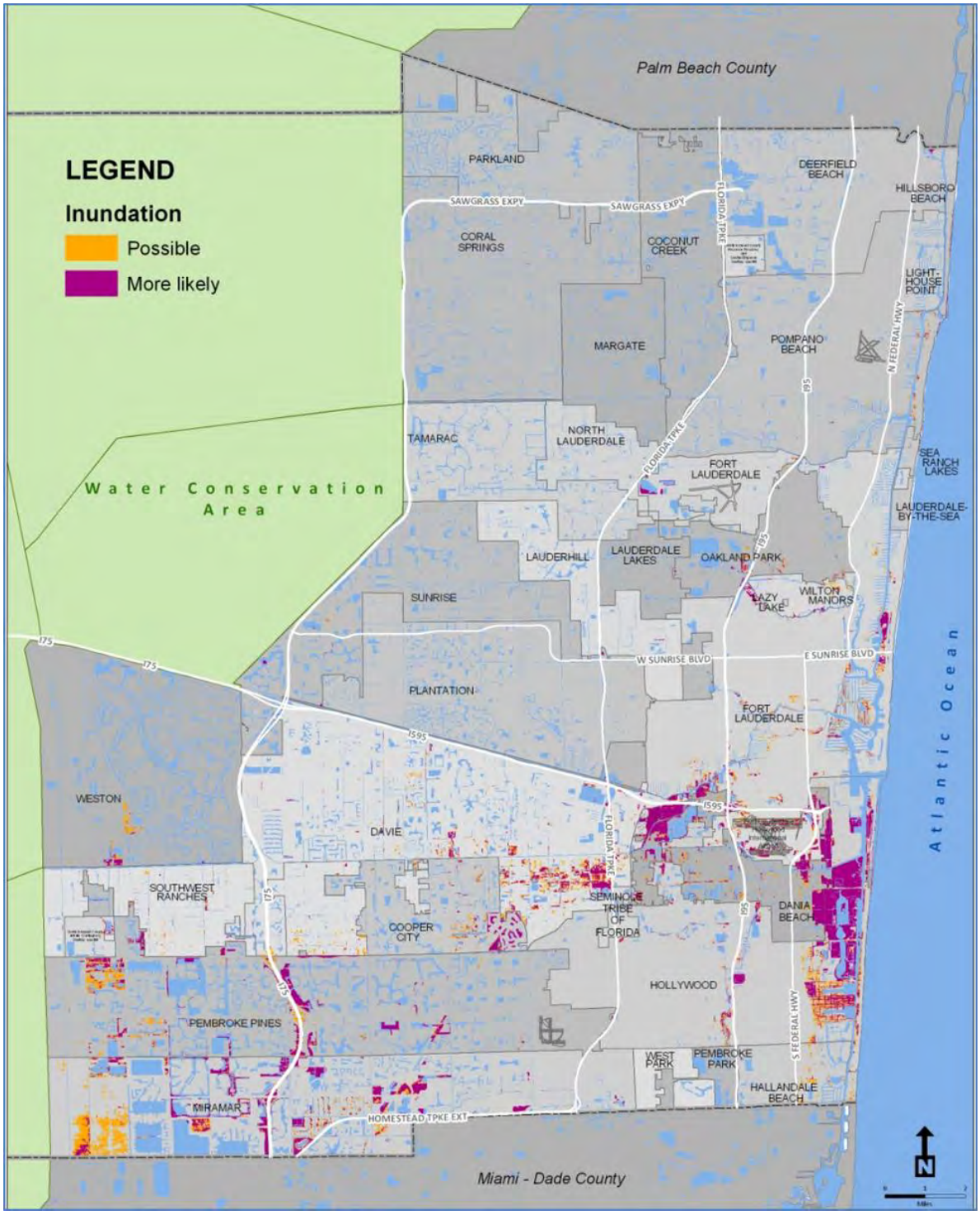
A more detailed description of the methodologies and results of the vulnerability analysis are offered in the next section.

## Figure CC-9
## Inundation Map for Broward County, One-Foot Sea Level Rise Scenario




Source: Analysis of the Vulnerability of Southeast Florida to Sea Level Rise (2012)

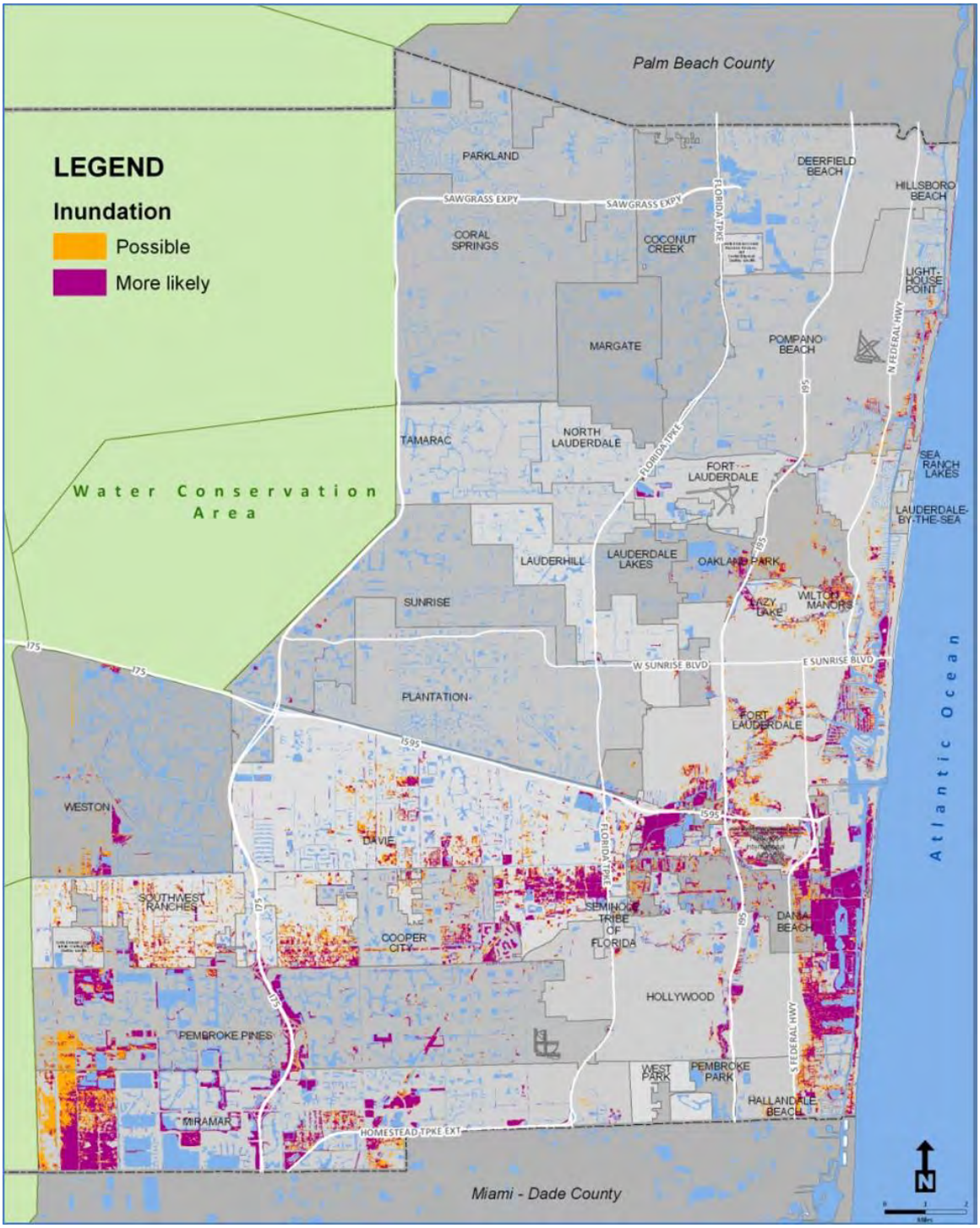
Figure CC-10
Inundation Map for Broward County, Two-Foot Sea Level Rise Scenario




Source: Analysis of the Vulnerability of Southeast Florida to Sea Level Rise (2012)

Figure CC-11

Inundation Map for Broward County, Three-Foot Sea Level Rise Scenario




Source: Analysis of the Vulnerability of Southeast Florida to Sea Level Rise (2012)

## 3. Vulnerability Analysis

Each of the four compact counties took the inundation layers created by the SFWMD (using the commonly agreed to parameters and data sources developed by the work group) to perform vulnerability analysis for their jurisdiction. The information within the tables below is derived from the analysis completed by Broward and the Compact Counties and is intended to be used for planning purposes. The vulnerability analysis is specifically useful for identifying infrastructure at risk and developing adaptation strategies to reduce these risks.

### 1. *Property and Land Uses at Risk*

Significant vulnerabilities were identified through the analysis. The current taxable value of property vulnerable in Broward County at the one-foot scenario was $403-828 million. At three-foot sea level rise, properties valued at $6.9-12.1 billion were impacted. Regionally, the upper estimate of taxable property values vulnerable to sea level rise ranges from more than $4 billion at the one-foot scenario, to over $31 billion at the three-foot scenario.

Table CC-3
Analysis of Affected Property Values in Broward County

| Level of Inundation | Estimated Range of Taxable Value |
|---|---|
| One-Foot | $ 403 – 828 Million |
| Two-Foot | $ 1.8 – 3.8 Billion |
| Three-Foot | $ 6.9 – 12.1 Billion |

Source: Analysis of the Vulnerability of Southeast Florida to Sea Level Rise (2012)

Under a one-foot sea level rise scenario, 1.3% of the County is impacted with conservation lands being the major land use type inundated. At the two-foot scenario, 3% of the land is impacted with Electrical Generation Facilities among the top ranked impacted. At the three-foot scenario, 7% of the total land mass of the County is impacted including 28% of the agricultural lands and 10% of transit-oriented development. For the complete list of Future Land Use categories analyzed as part of the regional vulnerability analysis, see pages 74-76 of Appendix CC-E.

## Table CC-4
## Impact of Sea Level Rise on Land Uses, One-Foot

| Land Use | More Likely (acres) | Possible (acres) | Total Inundation (acres) | Total Coverage (acres) | Percent Inundation of that Land Use |
|---|---|---|---|---|---|
| Conservation Land/ Open Space & Recreation* | 1,172.78 | 285.86 | 1,458.64 | 20,703.96 | 7.0% |
| Commercial/Industrial** | 329.12 | 185.99 | 515.11 | 49,010.83 | 1.1% |
| Residential*** | 689.02 | 461.21 | 1150.23 | 140,441.55 | 0.8% |
| Utilities / Transportation**** | 318.76 | 225.04 | 543.80 | 58,968.14 | 0.9% |
| Agricultural / Rural***** | 9.07 | 55.57 | 64.64 | 44,382.94 | 0.1% |

*- Combination of Conservation – Natural Reservations; Recreation and Open Space; and Commercial Recreation categories in SE Florida Regional Compact Report. April 2011
**- Combination of Local Activity Center; Regional Activity Center; Employment Center – High; Industrial; Office Park; Commercial; and Employment Center – Low categories.
***- Combination of Low-3 Residential; Residential Irregular Areas; Estate-1 Residential; Low-5 Residential; Low-Medium-10 Residential; Medium-16 Residential; Medium-High-25 Residential; and High-50 Residential
****- Combination of Electrical Generation Facility; Transportation; Utilities; Transit Oriented Corridor; Right of Way; Community Facilities; and Transit Oriented Development
*****- Combination of Agricultural; Rural Estates; and Rural Ranches

Source: Analysis of the Vulnerability of Southeast Florida to Sea Level Rise (2012), as presented in the Broward County Emergency Management DRAFT Enhanced Local Mitigation Strategy (eLMS) (2012). Coverage of Future Land Use was provided by the Broward County Planning Council, most recently updated September 28, 2010.

## Table CC-5
## Impact of Sea Level Rise on Land Uses, Two-Foot

| Land Use | More Likely (acres) | Possible (acres) | Total Inundation (acres) | Total Coverage (acres) | Percent Inundation of that Land Use |
|---|---|---|---|---|---|
| Conservation Land/ Open Space & Recreation | 1,335.27 | 777.86 | 2,113.13 | 20,703.96 | 10.2% |
| Commercial/Industrial | 1,179.61 | 709.14 | 1,888.75 | 49,010.83 | 3.9% |
| Residential | 856.77 | 468.51 | 1,325.28 | 140,441.55 | 0.9% |
| Utilities / Transportation | 1,304.53 | 791.65 | 2,096.18 | 58,968.14 | 3.6% |
| Agricultural / Rural | 340.69 | 348.51 | 689.20 | 44,382.94 | 1.6% |

Source: Same as Table CC-4.

Table CC-6
Impact of Sea Level Rise on Land Uses, Three-Foot

| Land Use | More Likely (acres) | Possible (acres) | Total Inundation (acres) | Total Coverage (acres) | Percent Inundation of that Land Use |
|---|---|---|---|---|---|
| Conservation Land/ Open Space & Recreation | 2,783.22 | 1,371.80 | 4,155.02 | 20,703.96 | 20.1% |
| Commercial/Industrial | 3,792.42 | 2,307.04 | 6,099.46 | 49,010.83 | 12.4% |
| Residential | 2,681.70 | 1,791.22 | 4,472.92 | 140,441.55 | 3.2% |
| Utilities / Transportation | 2,259.90 | 1,057.42 | 3,317.32 | 58,968.14 | 5.6% |
| Agricultural / Rural | 1,489.43 | 836.72 | 2,326.15 | 44,382.94 | 5.2% |

Source: Same as above Table CC-4.

## 2. *Natural Systems at Risk*

Almost 80% of the lands affected regionally in the one-foot sea level rise scenario are conservation lands. Coastal wetlands show the greatest vulnerability. Low lying natural systems of buttonwood, mangrove, scrub mangrove, herbaceous coastal saline wetlands and freshwater wetlands are significantly impacted in all three SLR scenarios mapped through the regional vulnerability analysis. While many of these habitats can tolerate frequent short-term inundation by salt or brackish water, longer periods of inundation and deeper submersion levels could cause significant impacts to these systems.

In Broward, more than 25% of our 4,090 acres of Conservation Lands are at risk of inundation under the three-foot sea level rise scenario. The habitats with the largest extent of acres vulnerable to inundation are wetland hardwood forests and vegetative non-forested wetlands.

Table CC-7

Natural Areas Vulnerable to Sea Level Rise in Broward County

| Habitat Type | Total Acres | Acres Inundated at 1 ft. SLR | Acres Inundated at 2 ft. SLR | Acres Inundated at 3 ft. SLR | Percent Inundation at 1 ft. SLR | Percent Inundation at 2 ft. SLR | Percent Inundation at 3 ft. SLR |
|---|---|---|---|---|---|---|---|
| Wetland Hardwood Forests | 5,577.71 | 1,701.19 | 2,100.76 | 2,812.20 | 30.50 | 37.66 | 50.42 |
| Vegetated Non-Forested Wetlands | 6,341.78 | 607.94 | 1,211.92 | 1,864.77 | 9.59 | 19.11 | 29.40 |
| Upland Hardwood Forests | 3,492.33 | 195.63 | 468.42 | 917.17 | 5.60 | 13.41 | 26.26 |
| Upland Mixed Forests | 1,170.52 | 59.02 | 176.58 | 302.19 | 5.04 | 15.09 | 25.82 |
| Herbaceous (Dry Prairie) | 13,197.03 | 194.45 | 670.25 | 2,732.86 | 1.47 | 5.08 | 20.71 |
| Upland Shrub and Brushland | 1,231.69 | 21.92 | 83.80 | 203.52 | 1.78 | 6.80 | 16.52 |
| Wetland Coniferous Forests | 397.51 | - | 5.24 | 7.86 | - | 1.32 | 1.98 |
| Upland Coniferous Forests | 425.07 | 1,36 | 2.28 | 3.58 | 0.32 | 0.54 | 0.84 |
| Wetland Forested Mixed | 131.39 | - | - | - | - | - | - |

Source: Analysis of the Vulnerability of Southeast Florida to Sea Level Rise (2012). Land Cover/Habitat Type is represented in acres, based on spatial data provide by the South Florida Water Management District. Data dated 2004. This table is condensed to only show the habitat types which represent natural systems.

### 3. *Infrastructure at Risk*

Critical infrastructure, such as roadways, power plants, ports and airports, landfills, hospitals and schools were reviewed as part of the regional vulnerability assessment. Some physical infrastructure in Broward County is at risk beginning at the one-foot scenario.

a) Power plants properties in Broward County were found to be vulnerable under the one-foot SLR scenario.

b) A percentage of both Port Everglades and the Fort Lauderdale-Hollywood International Airport (FLL) are at elevations below sea level. Most of these areas are coastal wetlands, existing storm water management ponds and ditches.

c) While railroads were not particularly vulnerable, many roads were; especially low volume roads and parking areas. The miles of roads vulnerable increased by a magnitude at each scenario with almost 300 miles of roads inundated at 3 feet of sea level rise.

d) While no wastewater facility appears to be impacted at the one-foot sea level rise scenario, the Hollywood and Ferncrest facilities were among the most vulnerable at the two- and three-foot scenarios.

e) Landfills were primarily impacted in retention or natural areas surrounding the property.

f) Only two of 26 hospitals showed any inundation up to two-foot of sea level rise with no building infrastructure affected.

g) While only one school property was affected and only at the three-foot scenario, roadways near many school are low lying and may result in access issues.

h) Since most emergency shelters are in schools, they were not impacted.

i) Evacuation Routes to and from the barrier islands are vulnerable due to bridges being inaccessible from local roadway inundation.

j) Impacts to coastal marinas remain a concern.

### 4. *Water Supply and Drainage Infrastructure at Risk*

Climate change will impact the quality and quantity of our water supply, shorten the lifespan of water and wastewater infrastructure, and exacerbate current drainage and flood control challenges. Changing precipitation patterns and rates of evapotranspiration are expected to produce more frequent and severe droughts, while more intense storm events will tax water management systems. Sea level rise will compound the effects of these impacts and pose new challenges. Drinking water

supplies are threatened by saltwater intrusion and increases in groundwater levels reduce the discharge potential of our water management systems.

Additionally, sea level rise from climate change is threatening the Florida Everglades, the backbone of our natural resource system. Restoration of the Everglades is critical for improved delivery and distribution of water flow to meet the future needs of both the natural and urban environments. Restoration would also increase both the resilience and adaptability of this freshwater community to climate change issues.

Given these challenges, practical solutions are needed to address the impact of climate change on our future water supply. The Southeast Florida Regional Climate Change Action Plan recommends that regionally coordinated research, policies and programs focus on:

a) finding solutions to consistently maintain high quality and adequate water supplies for all local communities;

b) strategies to reduce the cost and energy demands of alternative water supplies;

c) consideration of future conditions with respect to the placement of infrastructure; and

d) investing in new and upgraded infrastructure to maintain current levels of drainage and flood control.

Map CC-5, below shows the status of Broward County wells regarding saltwater intrusion due to potential sea level rise. In this map, high vulnerability structures are red, medium vulnerability are orange, and low vulnerability are green.

Figure CC-12
Saltwater Intrusion Line and Saltwater Monitoring Wells in Broward County

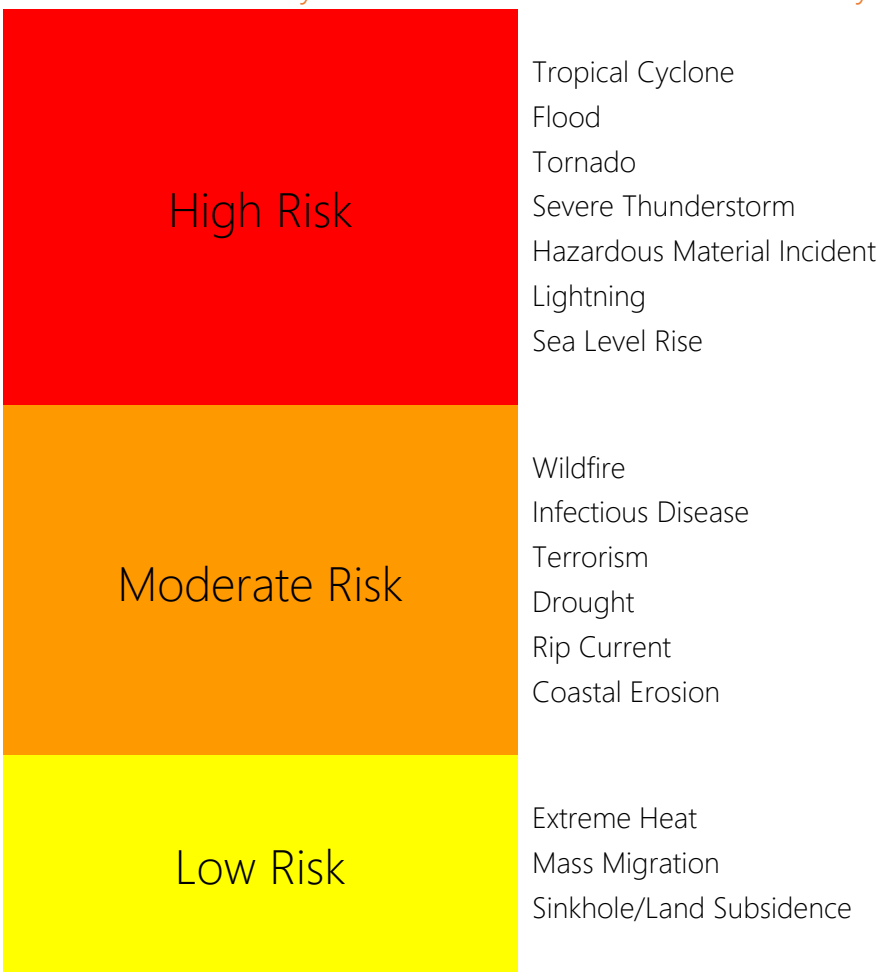

Source: Environmental Protection & Growth Management Department (2014). Saltwater Intrusion Line and Saltwater Monitoring Wells in Broward County, Broward County Water Resources Fact Book.

## C. Other Local Impacts of Global Climate Change

Sea level rise is just one of many possible impacts our community will face because of changing climate conditions. Changes in temperature and evapotranspiration, rainfall patterns and the occurrence of extreme weather events are also likely. Impacts are also multi-directional and interdependent, making predictions highly challenging. For instance, some impacts have cascading effect, the way sea level rise exacerbates coastal erosion, reduces drainage capacity (which can cause inland flooding), and accelerates salt water intrusion into our drinking water

supply. Extreme weather is hard to predict but shifts in the timing and length of seasons is impacting local wildlife health and food production. Additionally, the frequency of tropical storms and hurricanes is expected to decrease, but the intensity of these weather events is predicted to increase. Similarly, while projections for average precipitation vary greatly, changes in the intensity and timing of rainfall is likely to lead to increased incidents of both flooding and drought.

Table CC-8
Summary of Climate Risk for Broward County




Source: Broward County Emergency Management, Enhanced Local Mitigation Strategy (June 2012)

## 1. Impacts to Natural Resources and Green Infrastructure

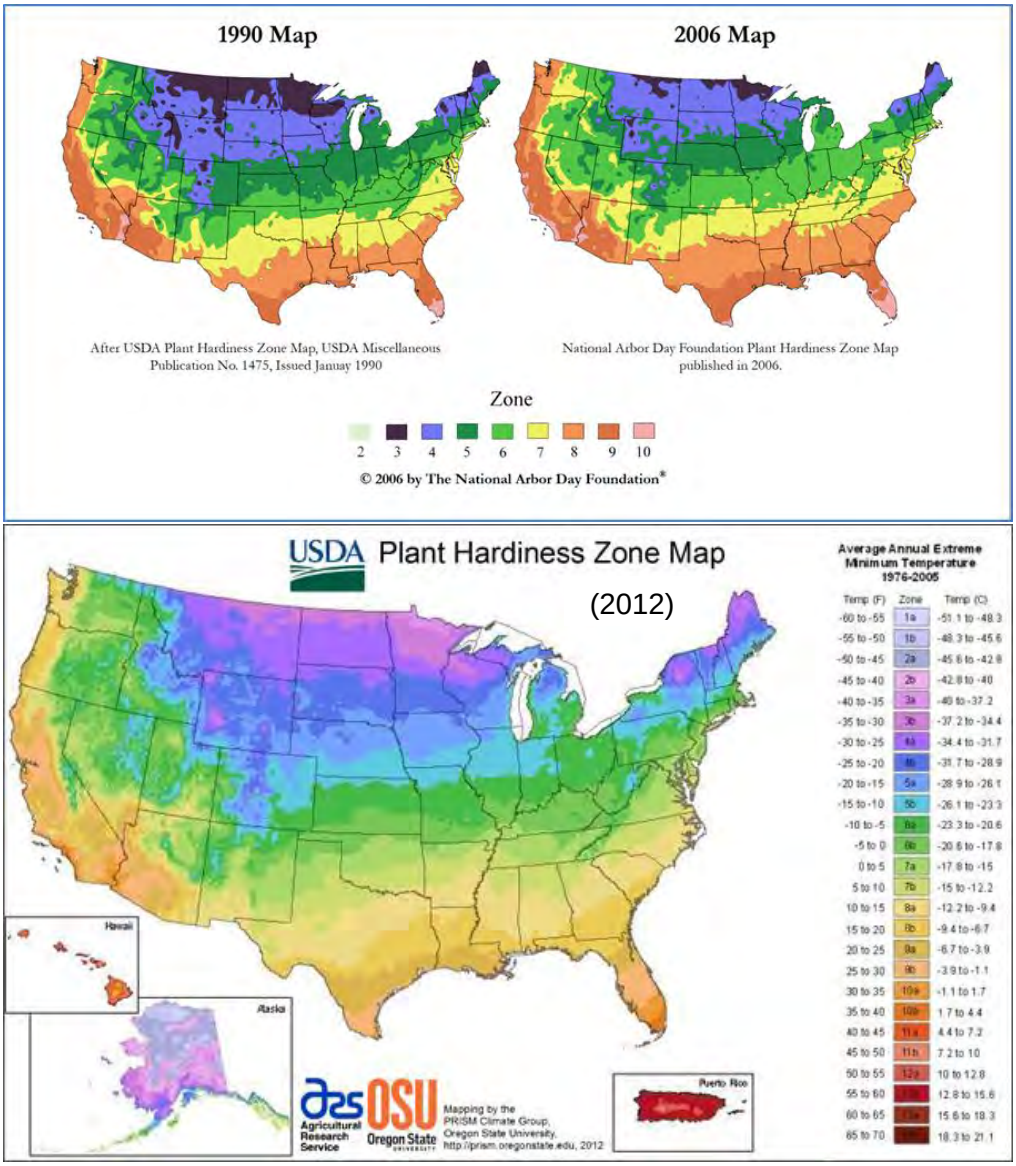
Broward's numerous natural resources will be impacted by rising sea level, but also from other climate change impacts, such as increasing temperatures, storm surge, coastal erosion, and more extreme weather patterns. A brief discussion of the expected impacts on our coral reefs, beaches, wetlands, and other natural areas is offered below.

Increasing ocean temperatures and acidification are already threatening the largest coral reef barrier system in the United States. Our coral reefs protect Southeast Florida's coasts and beaches, are a major tourist attraction, acts as a nursery for many commercially valuable fish species, and provide habitat for endangered sea turtles. The reefs also provide an economic benefit to the region on the magnitude of approximately $1 billion in income, $2.3 billion in sales tax, and 40,000 jobs (Broward County EAR Major Issues Chapter 3).

The Florida Department of Environmental Protection has estimated that 21.3 of the 24 miles of Broward County's beaches are critically eroded. According to a 1997 study, Broward's beaches protect over $4 billion in upland property, structures, and infrastructure. They also contribute $548 million annually to Broward County's economy, attract 7.2 million visitors a year, create 17,700 full-time jobs, and add $1.4 billion to County property values. Broward's beaches provide numerous environmental benefits as well, as the primary nesting grounds for threatened and endangered sea turtles and important habitat for a number of plant and animal species. Climate change is expected to affect future coastal erosion rates due to changes in future sea levels and increased coastal storm intensity.

Two-thirds of Broward County is within the Everglades ecosystem. This natural system is threatened by changing climate which will allow increasing success of exotic floral and faunal species such as Maleleuca and the Burmese Python. Changing temperatures are causing migrating species and their food supply to shift out of phase. An increase in wildfires and droughts are predicted and habitat regions are expected to shift to the north as temperatures climb.

## Figure CC-13
## 1990 Hardiness Zones vs. 2006 Hardiness Zones vs. 2012 Hardiness Zones




Source: Arbor Day Foundation http://www.arborday.org/media/map_change.cfm

Comparing 1990 USDA hardiness zones, 2006 arborday.org hardiness zones and 2012 USDA hardiness zones illustrates the trend of plant regimes shifting north due to a warming climate.

Climate change will cause habitat evolution and species succession. Broward County will need adaptive management approaches to address these impacts. Adaptive management approaches for natural systems and green infrastructure will be needed

in the future to deal with habitat evolution, species succession and other resulting issues from a changing climate.

The Green Infrastructure Map Series was developed to support planning and coordination regarding the enhancement of resources within Broward County. Each map in the series can be used separately or as a group to measure and compare environmental and green infrastructure markers. The maps engage policy makers and program managers to help identify focus areas and opportunities for collaborative programming, and guide policy and planning.

The map series allows for a visual display of information from solar installations, light at night pollution, water reuse capacity, and food deserts to more traditional aspects of green infrastructure such as urban forests, natural lands, and coastal dunes.

## 2. Public Health, Emergency Preparedness and other Social Considerations

Climate instability is currently being experienced around the globe. In 2010-2011, the northeast United States experienced one of the snowiest winters on record. South Florida has seen record rainfalls as well as record droughts in the past few years. Average global temperatures in April 2016 were the highest temperature departure for April since global records began in 1880. Overall, 13 of the 15 highest monthly temperature departures in the record have all occurred since February 2015.

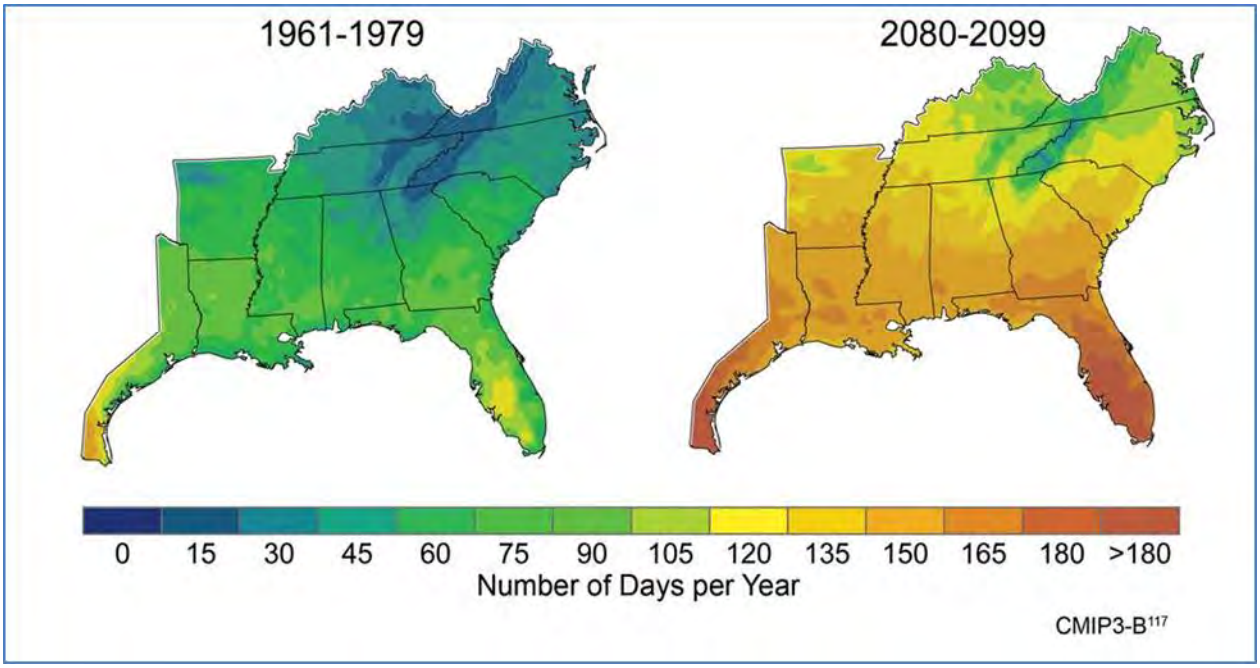
According to the 2012 Enhanced Local Mitigation Strategy for Broward County, extreme heat presents a significant life and safety threat to Broward County's population.

*"Extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and that last for an extended period of time. Health risks from extreme heat include heat cramps, heat fainting, heat exhaustion, and heat stroke. According to the National Weather Service, heat is the leading weather-related killer in the United States and during the ten-year period between 1993 and 2002 killed more people than lightning, tornadoes, floods, and hurricanes combined. The elderly and the ill are most at-risk, along with those who exercise outdoors in hot, humid weather."*

Map CC-7 show high heat days, where temperatures exceed 90°F. During the 1960s and 70s, Broward County averaged 60-90 high heat days per year. However, by the end of this century, projections show there will be 165-80 high heat days. Much of the southern United States is projected to have more than twice as many days per year

above 90°F by the end of this century. According to the projection by the U.S. Global Change Research Program, South Florida will gradually shift from an average of 60 days a year when the thermometer exceeded 90°F to nearly 180 days of +90°F by the end of the century.

Figure CC-14
Number of Days with High Exceeding 90°F




Source: U.S. Global Change Research Program, Global Climate Change Impacts in the United States, 2009 Report.

Broward County has a large number of seniors who are particularly susceptible to the effects of extreme heat. While most studies have focused on the impacts of isolated extreme heat events, such as large-scale urban power loss following a hurricane or tropical storm, the effects of more chronic long-term temperature trends on public health have yet to be studied in full. Impacts to natural systems, water quality, food systems, vulnerable populations (as well as youth and users of alternative forms of transportation and pedestrian ways), and other potential impacts of rising sea and land temperatures need to be assessed as changes in local temperature trends occur.

The connection between public health and climate change planning is becoming clearer. Climate change impacts relating to the social sphere include the spread of

vector-borne diseases, extreme and prolonged heat waves, air pollution, wildfires, and resource scarcity. Beyond the prevention of disease, the public health arena can be a key player in making progress towards reducing these vulnerabilities and making our community more climate resilient.

Planning more walkable/pedestrian friendly communities helps to reduce Vehicle Miles Travelled (VMT), which reduces GHG emissions and air pollution, gets people outside and more active, and improves community vitality and health. Reducing health disparities among the poor and typically marginalized populations will improve the entire community's ability to fight against vector-borne illnesses, which may spread at higher rates through new climate regimes and increased human migration around the globe. Promoting local agriculture reduces the carbon footprint of our food because distribution distances are reduced, but also improves our ability to manage local food supply as energy and water demands shift with a changing climate, a term known as food security.

Climate change affects emergency management. One of the Technical Advisory Committees (TACs) for the Broward County Emergency Management Division's Long-Term Recovery and Redevelopment Strategy (LTRRS) is tasked to consider Environmental Preservation and Climate Change Adaptation. The TAC recognizes the numerous ecological services our region's ecosystems provide to our residents, visitors, and business community, and considers environmental restoration critical to restoring the quality of life and economic livelihood of the County after a disaster.

Additionally, the Broward County 2012 Enhanced Local Mitigation Strategy (eLMS) includes a new subsection on climate change and sea level rise in the Risk Assessment chapter, and utilizes wind, flood, and sea level rise hazard risk information in a new Economic Vulnerability chapter. Analysis concludes that the County is likely to continue to be vulnerable to sea level rise, with the level of impacts being moderate to severe.

Besides the addition of sea level rise/climate change as a hazard, the Enhanced LMS has made the following connections and commitments to link emergency management and planning or climate change:

1. Takes into consideration the effects of climate change on other risks evaluated, such as future flood conditions, drought, wildfire, coastal erosion, storm surge and hurricane wind speeds;

2. Supports the Climate Change Government Operations Group on 16 actions that overlap with hazard mitigation from the 2010 Climate Change Action Plan;

3. Commits to reinforce the Climate Change Task Force's Adaptation Action Areas for long term planning; and

4. Incorporates consideration of sea level rise and climate change in criteria used in the Loss Estimation Tool (LET), which helps measure cost-effectiveness and screen potential mitigation projects for FEMA mitigation programs.

The eLMS is an example of how the County is working to integrate hazard mitigation into comprehensive planning and capital improvement planning. The County's Emergency Management Division, Risk Management Division and Government Operations Climate Change group are working collaboratively to better include hazard mitigation into annual decisions about county growth, investment and redevelopment. Climate change adaptation planning is an inherent part of that very discussion, as long-term recovery and community resiliency have similar goals and are often seen as two sides of the same coin.

## D. Response Options: Mitigation and Adaptation

Prudent public and private investments today will reduce future costs and risks. Mitigation to reduce GHG emissions is important because:

- it reduces physical risks associated with climate change,
- it avoids higher costs and economic risks in the future, and
- it promotes investment in resilient capital improvements.

Unfortunately, climate change impacts, especially sea level rise, are already occurring in our County, making adaptation efforts also necessary. Critical public infrastructure including beaches, roadways and especially storm water drainage treatment and conveyance systems have already begun to show vulnerabilities to the current rate of rise of sea level, extreme rainfall and seasonal high tides. Coastal communities have begun to seek infrastructure improvements to address mounting drainage concerns. The predicted accelerated rate of sea level rise will further exacerbate the impact of saltwater intrusion on our source of drinking water and on coastal habitats. Climate-related challenges currently exist suggesting action to address these issues is needed today. (CCAP)

The County has invested in developing the research tools and multi-jurisdictional partnerships needed to develop and harness best available science for the basis of sound climate change

strategies, policies and programs. Greenhouse gas emissions inventories tell us which sectors and activities have the greatest local contribution to global warming, and assist in tracking the effectiveness of emissions reduction strategies. Sea level rise projections help us to envision our community's future, in order to make informed long-term land use decisions. Vulnerability analysis is especially crucial in identifying areas of particular concern where adaptation measures need to be considered in order to protect residents, public and private investments, and our shared natural resources. Areas identified as having increased vulnerability should be prioritized for capital improvements and progressive policies that provide both short-term long-term benefits. These tools cannot tell us where to strike the balance between providing protection today and building climate resilience for tomorrow. What it can do is provide critically needed information, science based on best available data and local realities. This information serves as the basis for the creation of sound and multi-beneficial policies that reduce our contribution to global warming, reduce current vulnerability and risk, and prepare our community for projected impacts.

The State has also provided guidance on climate change planning and has provided for a new tool in the adaptation planning toolbox. Last year, the Florida Legislature amended state law, through Senate Bill CS/SB 1122, to provide for a definition of Adaptation Action Areas (AAA) as an optional component of Local Comprehensive Plans for those low-lying coastal zones that are experiencing coastal flooding due to extreme high tides and storm surge, and which are more vulnerable to the impacts of rising sea level. It further specifies that local governments which adopt an AAA designation may consider policies within the Local Comprehensive Plan to improve resilience to coastal flooding resulting from high-tide events, storm surge, flash floods, storm water runoff, and related impacts of sea level rise. Subsequent to state legislative action, the concept of AAA designations moved to the federal level and members of Congress have since requested the definition of AAA in federal law to provide for appropriations for adaptation planning and infrastructure needs in designated areas.

# IMPLEMENTATION

## A. Authority

Article I of Broward County's Charter, Section 1.04 (P), Environmental Statement, describes Broward County Government's duty to enact policies which protect citizens' rights to a sustainable environment while encouraging a stewardship of natural resources, as approved by the voters on November 4, 2008.

In 2007 the Board adopted Resolution 2007-391 to reduce GHG emissions in Broward County and to support the U.S. Mayors' Climate Protection Agreement. In 2008 the Board passed Resolution 2008-442 to create the Broward County Climate Change Task Force (Task Force) to develop and advise on the implementation of strategies to mitigate the causes and adapt to the consequences of climate change. On May 4, 2010 the Board approved the 126 recommendations developed by the Task Force, detailed in the Broward County Climate Change Action Plan – Addressing our Changing Climate (CCAP) (Appendix CC-F) and authorized implementation of the plan to the extent possible.

Many of the policies in the Climate Change Element are rooted in the recommendations provided by the Task Force and approved for implementation by the Board. One of the high-ranked recommendations in the CCAP was to develop and include a Climate Change Element into the County Comprehensive Plan to provide for a sustainable environment and to reflect the best available data and strategies for adapting to future climate change impacts.

## B. Programs

This section describes some of the programs and initiatives Broward County and its municipal, regional, state and federal partners will utilize to implement the goals, objectives and policies presented in this Element. While some of the policies will require the creation of new initiatives and partnerships, many of the policies refer to existing programs and efforts which have, or have the potential to, make significant progress towards the goals of a sustainable and climate resilient community. As they relate to the recommendations in the Broward County Climate Change Action Plan, the Broward County Climate Change Task Force will track progress and provide guidance on the implementation of the policies put forth in this Element.

*Broward County Environmental Planning and Community Resilience Division (EPCRD)*

Responsible for ensuring the protection, preservation, and enhancement of Broward County's diverse natural resources and dependent ecosystems through coordinated management efforts, planning, monitoring, project implementation, and outreach activities. These efforts are administered through the Division's five program areas:

### 1. Water Resources Policy and Planning

Coordinates county-wide water quality initiatives and water resource management activities. Planning efforts consider multiple challenges, including future water availability, ocean outfall legislation, and climate change impacts such as increased saltwater intrusion and increased risk of flooding. Outreach and education is advanced through the Broward Water Conservation and Incentives Program, NatureScape

Irrigation Service, and NatureScape Broward programs. Advanced hydrologic modeling and research is used to analyze future conditions, guide development of alternative water supplies, and help identify climate change adaptation strategies.

## 2. Beach and Marine Resources

Responsible for coral reef management, beach erosion control, and the protection of sea turtles

and manatees. Preservation of our coral reefs and marine ecosystems are heavily dependent on the adaptive capacity of these systems to climate change. With coral populations already compromised by the influences of pollution and disease, marine resources managers are tasked with the challenge of identifying and implementing strategies for reducing these stressors and increasing ecosystem resiliency to the additional pressures from climate change, such as increasing ocean temperatures and ocean acidification.

The Beach Program is responsible for restoring and maintaining the County's publicly-accessible beaches to provide adequate storm protection, sea turtle nesting habitat, and recreational opportunities. Beach management efforts are also challenged by the effects of climate change. Rising sea level and more intense tropical events will enhance the rate of additional beach erosion and likely necessitate more frequent beach nourishment projects. Recognizing the importance of the County's beaches to protecting coastal infrastructure, Broward County has committed to maintaining its beaches as an important climate adaptation strategy.

## 3. Land Stewardship

Ensures compliance with land management plans and grant agreements supporting the "Partners in Preservation" and "Parks for People" programs. Natural lands and green spaces purchased through the most recent Land Preservation Bond Program reflect a $200 million investment in green infrastructure. Although the total monetary value is not known, Broward's publicly- and privately-owned landscaping is an important part of our urban forest, providing natural and quality of life benefits relating to community health, maintaining and improving property values, storm water management, windstorm impact mitigation, reduction of heat island effects, shading to reduce energy use, carbon sequestration, support of migratory birds and other natural and wildlife benefits. A recently completed Natural Lands Inventory will aid urban reforestation

efforts and the identification and prioritization of sites for additional ecological enhancement.

## 4. Energy and Sustainability

Plays a central role in addressing climate change in Broward as part of the County's commitment to build climate resiliency into local programs and long-term plans.

Since 2008, the Energy and Sustainability Program within EPCRD has substantially advanced the County's climate mitigation and adaptation goals by:

1. Leveraging Energy Efficiency and Conservation Block Grant (EECBG) funds,
2. Tracking progress on the implementation of the County's Climate Change Action Plan (CCAP),
3. Advancing various aspects of the Southeast Florida Regional Climate Change Compact (Compact), and
4. Coordinating activities with local, national and international institutions for the creation of best available information for adaptation planning and decision-making. This broad collaboration encourages the pooling of resources and expertise in pursuing effective climate change strategies.

In 2013, Broward County participated in a year-long Pilot Program to test the new national rating system for sustainability called STAR (Sustainability Tools for Assessing and Rating communities). Reporting over 500 initiatives throughout the community, Broward County successfully became the first 4-STAR Rated County in the Country on Feb 11, 2014. STAR has broadened how we view sustainability in Broward to include all aspects of the community well-being, economy, and environment. After the assessment, the County highlighted Light in the Community: reducing light pollution and light trespass in STAR's Built Environment Goal Area as one of seven critical areas for focused attention and improvement.

The Natural Night Sky Initiative was created to develop standards and practices to effectively, efficiently, responsibly illuminate Broward County. By adopting best practices for illumination, Broward County ensures that lighting enhances safety, is efficient, and reduces light pollution through standardized policies and codes.

Light pollution wastes an astonishing amount of energy, thereby wasting taxpayer money and exacerbating our contribution to climate change. More than one-third of

all outdoor lighting in the U.S. is wasted by poorly aimed or unshielded outdoor lighting, which equate to $3.3 billion of energy lost to sky glow each year, and the release of an extra 21 million tons of carbon dioxide per year (which would require the planting of 875 million trees annually to mitigate). Smart lighting, on the other hand, increases safety for drivers and pedestrians by reducing hazardous glare and increasing visibility, ultimately creating the most comfortable and safe spaces for our community.

In fact, all plants and animals depend on Earth's daily cycle of light and dark rhythm to govern life-sustaining behaviors such as reproduction, nourishment, sleep and protection from predators. In this way, light pollution is negatively impacting the health and resilience of our wetland habitats, sea turtles nesting and hatchling success, migratory birds, insects, pollinators, and other wildlife.

In 2015 Broward's Environmental Planning and Community Resilience Division began educating the public on light pollution and create spaces to dialogue with local planners, architects, recreation managers, and others on the benefits of reducing excessive or misplaced light. Support for Night Friendly Lighting policies and standards is documented in the 2015 Municipal Green Initiatives Survey and has been demonstrated by municipal and community involvement in a multiple Sustainability Stewards events and workshops since 2015.

In 2016, Light at Night was included in the Broward County Green Infrastructure Map Series, a project which won a 2016 NACo Achievement Award.

In 2017, a Sky Quality Monitoring Program was launched, installing Sky Quality Meters at parks, libraries, and other county-owned facilities throughout the community, to access Broward County's night sky quality and measure progress in reducing light pollution over time. Most recently, on October 11th, the Sustainability Stewards of Broward meet at Fern Forest to choose locations for the remaining sky quality meters, compare municipal lighting codes, and identify best practices for utilization community-wide.

Broward County's energy and sustainability initiatives and regional approach to climate mitigation and adaptation planning have received national recognition and accolades for innovative and forward-thinking approaches to addressing South Florida's vulnerability to climate change.

### 5. Environmental Monitoring

The Environmental Monitoring Laboratory provides program managers with data needed to formulate management decisions and policy recommendations and supports the County's regulatory programs and enforcement activities. The environmental laboratory collects, maintains, and interprets data from our coastal, marine and freshwater systems for the purpose of informing program staff, influencing policy, and assessing the effectiveness of program efforts. Groundwater wells monitored by the laboratory complete a regional data set and serve to document migration of the saltwater front in the Biscayne Aquifer. This data is critical in modeling response of this front to changing environmental and operational influences, including sea level rise, changing precipitation patterns and rates of evapotranspiration, wellfield modifications, and water management operations. The County's environmental laboratory could also provide the necessary agency participation and support for the establishment of a regional Vital Signs Monitoring Network, as recommended in this Broward County Climate Change Element and in the Southeast Florida Regional Climate Change Compact Action Plan. The goal of this monitoring network would be to identify and track the basic physical indicators of climate change specific to natural systems and the urban environment as regionally consistent documentation of long-term climate changes with relevance across Southeast Florida.

## *Other Broward County Programs and Collaborative Initiatives which may be useful in the implementation of the Climate Change Element*

### 1. Advanced Hydrologic Modeling with USGS

In specific support of the County's climate adaptation planning efforts, EPCRD has secured cost share support from the U.S. Geological Survey (USGS) to develop a climate/storm water vulnerability model that will provide a comprehensive assessment of the climate related impacts of sea level rise and increased intensity of storms on water management infrastructure and practices in coastal and inland Broward County. As part of this 4-year project, the County's integrated surface and groundwater model will be coupled with variable density flow and transport models and down-scaled climate models to evaluate the projected impacts of climate change to vulnerable coastal and inland areas to identify and test various adaptation strategies necessary to maintain current levels of flood protection. The results of this project are expected to guide future adaptation strategies and investments in infrastructure recognized to enhance the resiliency of the Broward community to climate change.

## 2. Southeast Florida Regional Climate Change Compact

The Southeast Florida Regional Climate Change Compact represents a joint commitment of Broward, Miami-Dade, Palm Beach and Monroe Counties to work collaboratively to address the regional challenges and threats associated with global climate change. The Compact was ratified in January 2010 after its introduction at the 2009 Southeast Florida Climate Leadership Summit, coordinated by EPCRD and hosted by Broward County. The Compact commits the Counties to work on federal and state climate policies and joint advocacy in Tallahassee and Washington, DC on climate policies related to the shared challenges of climate change. Accomplishments include a regional GHG emissions inventory, a unified sea level rise projection for the region, development of regionally-consistent methodologies for inundation mapping and vulnerability assessment, joint policy positions on climate change and the development of a Regional Climate Change Action Plan (Appendix CC-G).

## 3. Climate Change Government Operations Work Group

The Broward County Climate Change Government Operations Workgroup focuses on identifying opportunities across Broward County agencies to reduce carbon emissions from County government activities. The Workgroup includes representatives from many County agencies, organized into committees in the areas of buildings/infrastructure, waste, transportation, natural systems and policies. Initial activities included review of government operations in the context of carbon emissions, setting of an emissions reduction goal and development of a baseline governmental greenhouse gas emissions inventory. The Workgroup Steering Committee meets monthly to identify potential emission reduction actions, propose implementation of selected actions and share progress made.

## 4. School Board of Broward County

Since 2007, Broward County has partnered with the School Board of Broward County to actively promote water conservation and environmental stewardship through the County's NatureScape program. Today, more than 40% of Broward's schools are Certified Schoolyard Habitats, over 25% of the student body is active in outdoor learning, and 110 teachers have completed Habitat Steward Training and are implementing environmental curriculum with their students. Teachers and students also take the "Earth Hero Pledge", were they learn about waste reduction and recycling, water conservation and the use of native plants, energy conservation and the

connection with climate change, land stewardship, walking and biking and other ways to positively impact their environment.

Beyond the numerous benefits of education, the partnership has also made significant physical progress on making the schools' properties more sustainable. Thirty-five learning gardens have been created on middle school campuses, which contributed to the School District recently achieving certification as the largest certified school district in the nation by the National Wildlife Federation. The program has also helped save over 166 million gallons of water on school properties though irrigation assessments, and plants approximately 700 native trees and shrubs at middle schools every year.

## 5. The Southeast Florida Regional Partnership (SFRP)

Funded through a grant from the US Department of Housing & Urban Development's Sustainable Communities Initiative, the Partnership is a collaboration of more than 200 public, private, and civic stakeholders from the Southeast Florida 7 county region (Monroe, Miami-Dade, Broward, Palm Beach, Martin, St. Lucie and Indian River). Spearheaded by the South Florida and Treasure Coast Regional Planning Councils, the Partnership has united to leverage resources and coordinate strategic long-term planning to drive competitiveness and prosperity for the region. A plan called Seven50 ("seven counties, 50 years") is being developed to help ensure socially inclusive communities, a vibrant and resilient economy, and stewardship of our fragile ecosystem. The plan will aim to improve the quality of life for the over six million residents in the seven-county region by developing strategies for: greater opportunities for sustained job creation, access to affordable housing, a better menu of transportation options, and more people-friendly, environmentally-friendly places to live. The plan is intended to be a blueprint for growing a more prosperous, more desirable Southeast Florida during the next 50 years and beyond.

## 6. Interagency Coordination

The creation of a sustainable, climate resilient community takes many hands. In truth, almost every governmental agency, municipality, business, and resident will play a role. GHG emissions do not stay within jurisdictional boundaries. Neither do climate change impacts. Our community will have to work together in order to create the economically and environmentally resilient future we envision through this Element.

While it is impossible and impractical to list every potential partner in this endeavor, below is a list of some of the agencies expected to take a major role in helping to move the goals and objectives of this Element forward.

### Broward County:

1. Environmental Protection and Growth Management Department
2. Transportation Department
3. Public Works Department
4. Aviation Department
5. Port Everglades Department
6. Parks and Recreation Division
7. School Board of Broward County
8. Broward County Water Advisory Board
9. Broward Metropolitan Planning Organization
10. Broward County's 31 municipalities
11. Broward Municipal Services District

### Regional Agencies:

1. The South Florida Water Management District
2. The South Florida Regional Planning Agency
3. South Florida Regional Transportation Authority
4. The Southeast Florida Regional Partnership (Seven50)

### State and Federal Partners:

1. Florida Department of Environmental Protection
2. United States Geological Survey
3. Florida Department of Transportation
4. Florida Department of Economic Opportunity
5. Florida Division of Emergency Management
6. National Oceanic and Atmospheric Administration
7. U.S. Department of Energy
8. U.S. Army Corps of Engineers

### Other

1. Local institutions of higher learning (FAU, FIU, Nova, BC, UM)
2. Public Health Agencies
3. Professional and not-for profit organizations (SGP, USGBC, BAPA, CLEO)

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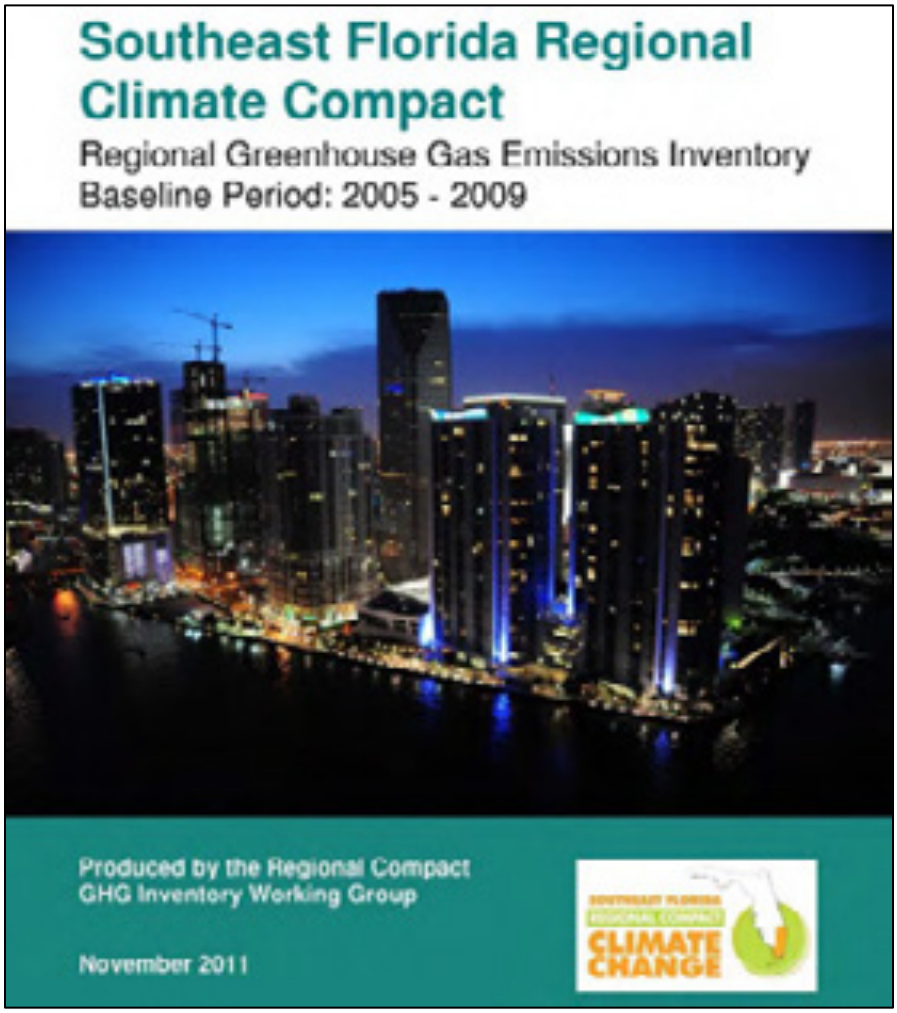
# APPENDICES

## Appendix CC-A

## Southeast Regional Climate Change Compact Regional Greenhouse Gas Emissions Inventory

## 2011

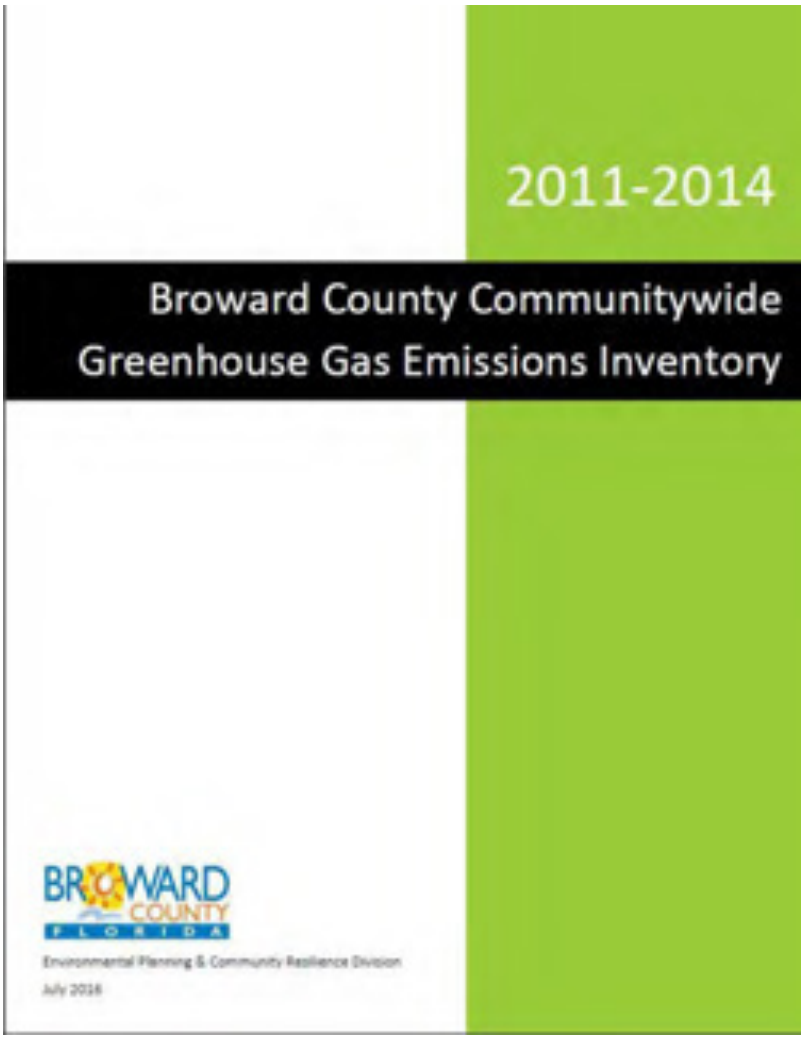



Appendix CC-A can be found by clicking the hyperlink:
Southeast Florida Regional Climate Compact

# Appendix CC-B

## Broward County Communitywide Greenhouse Gas Emissions Inventory

## 2016




Courtesy of Environmental Planning & Community Resilience Division, Appendix CC-B can be found by clicking on the hyperlink: Broward County Communitywide Greenhouse Gas Emissions Inventory

# Appendix CC-C

# Broward County Government Operations Climate Change 4th Annual Progress Report 2012

BROWARD COUNTY GOVERNMENT OPERATIONS

CLIMATE CHANGE

FOURTH ANNUAL PROGRESS REPORT

May 1, 2012

## Introduction

On June 24, 2008, the Broward County Board of County Commissioners (Board) accepted the Broward County Government Operations Climate Change Report. The Report summarized early voluntary greenhouse gas (GHG) reduction actions implemented by the County from 1997 through 2007, and reiterated the County's GHG emission reduction goal of 7 percent below 1997 levels by 2015. On June 9, 2009, June 15, 2010, and May 13, 2011, the Board accepted subsequent Government Operations Progress Reports that described GHG reduction actions Broward County Government implemented during 2008, 2009, and 2010, respectively. Broward County government agencies exceeded annual reduction goals each of these years.

In FY2011 (October 2010 – September 2011), Broward County government agencies achieved a net reduction of 5,781 tonnes of GHG emissions from FY2010 levels. This is equivalent to the annual GHG emissions from 1,114 passenger vehicles.

This fourth annual progress report, developed by the Broward County Climate Change Workgroup (Workgroup), describes measures Broward County Government implemented during FY2011, and progress toward achieving the GHG reduction goal.

Greenhouse gases are typically expressed in terms of carbon dioxide equivalents ($eCO_2$). A tonne of $eCO_2$ is equal to the emissions from the combustion of 112 gallons of gasoline.

Broward County Government operations FY2011 carbon footprint is 250,255 tonnes $eCO_2$ (Figure 1). To meet the established 2015 GHG emission reduction target of 222,099 tonnes, Broward County government must reduce an additional 28,156 tonnes $eCO_2$ from 2011 emission levels (Figure 1, page 2). This represents an average annual reduction of 7,039 tonnes.

## 2011 Highlights

Broward County government agencies reported 58 GHG emission reduction measures in FY2011; 10 more than the previous year. A detailed description of the measures, cost savings, environmental benefits, and results are included in this report's APPENDIX. The estimated GHG emissions reduction from the ten quantified measures totals 2,026 tonnes $eCO_2$, which resulted in an estimated annual cost saving of $555,160. The following are a few highlights of significant measures implemented:

**Heating Ventilation and Air Conditioning (HVAC) Chiller Replacements at North Mass Transit and Central Homeless Assistance Center:** The electricity use prior to the HVAC upgrades was 988,344 kWh and after, it decreased to 869,743 kWh, a difference of 118,601 kWh annually. This is equivalent to 71 tonnes $eCO_2$ and an annual cost savings of $11,860.



**Mini-hybrid Engineered Machined Products (EMP) Retrofits on BCT buses:** The Transit Division retrofitted mechanically/hydraulically driven cooling system components on 47 county buses with electrically powered devices in order to achieve fuel savings and reduce GHG emissions. EMP retrofits reduce the horsepower draw on the engine, thus improve fuel economy by a minimum of 5 percent. Collectively, the units reduced $eCO_2$ emissions by 498 tonnes, a cost savings of $170,511.

**Recycling in County Facilities:** During FY2011, approximately 1,469 tons of office paper, magazines, newspapers, file folders, cardboard, and food and beverage containers were recycled in County



administrative facilities, including the airport connection center, and parks. By recycling these materials, the County saved more than $143,299 through avoided disposal. This represents a GHG reduction of 4,721 tonnes which is equivalent to the emissions of 530,281 gallons of gasoline consumed.

## A Word on Greenhouse Gases

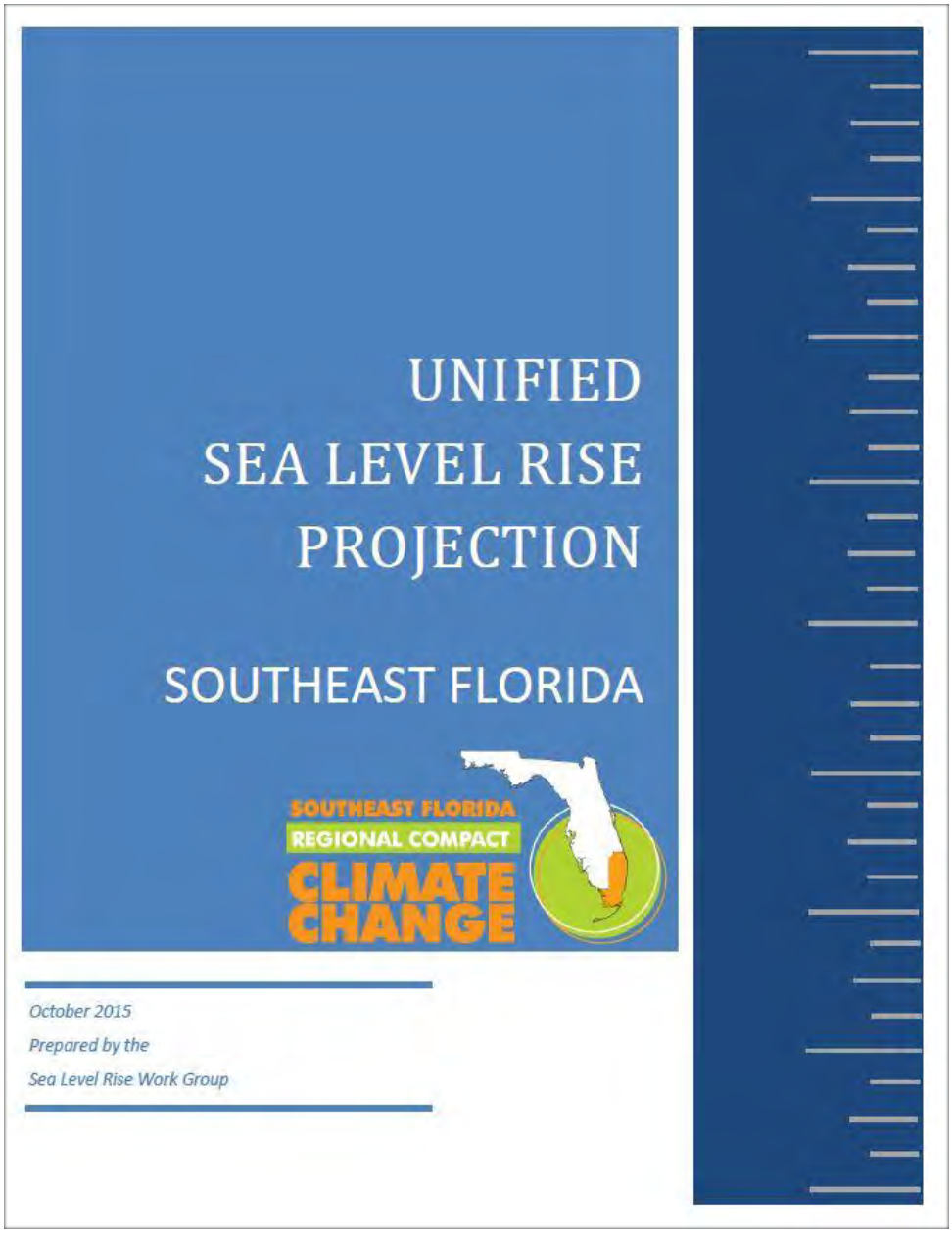
Burning of fossil fuels is the primary source of GHG emissions. A key element of any GHG reduction program is the quantification of GHG emissions and reduction measures. The International Council for Local Environmental Initiatives' 2009 Clean Air Climate Protection software was used to calculate the GHG generated by energy use, fuel use, and solid waste. FY2011 GHG emissions from Broward County Government operations are shown below.

Broward County's Government operations FY2011 carbon footprint is 250,255 tonnes $eCO_2$, a net reduction of 5,781 tonnes $eCO_2$ compared to FY2010. Approximately 74 percent of the emissions are generated by electricity use at Port Everglades, the Fort Lauderdale-Hollywood International Airport, Wastewater Services, Streetlights and other County facilities; a net decrease of

# Appendix CC-D

## Unified Sea Level Rise Projection for Southeast Florida

## 2015



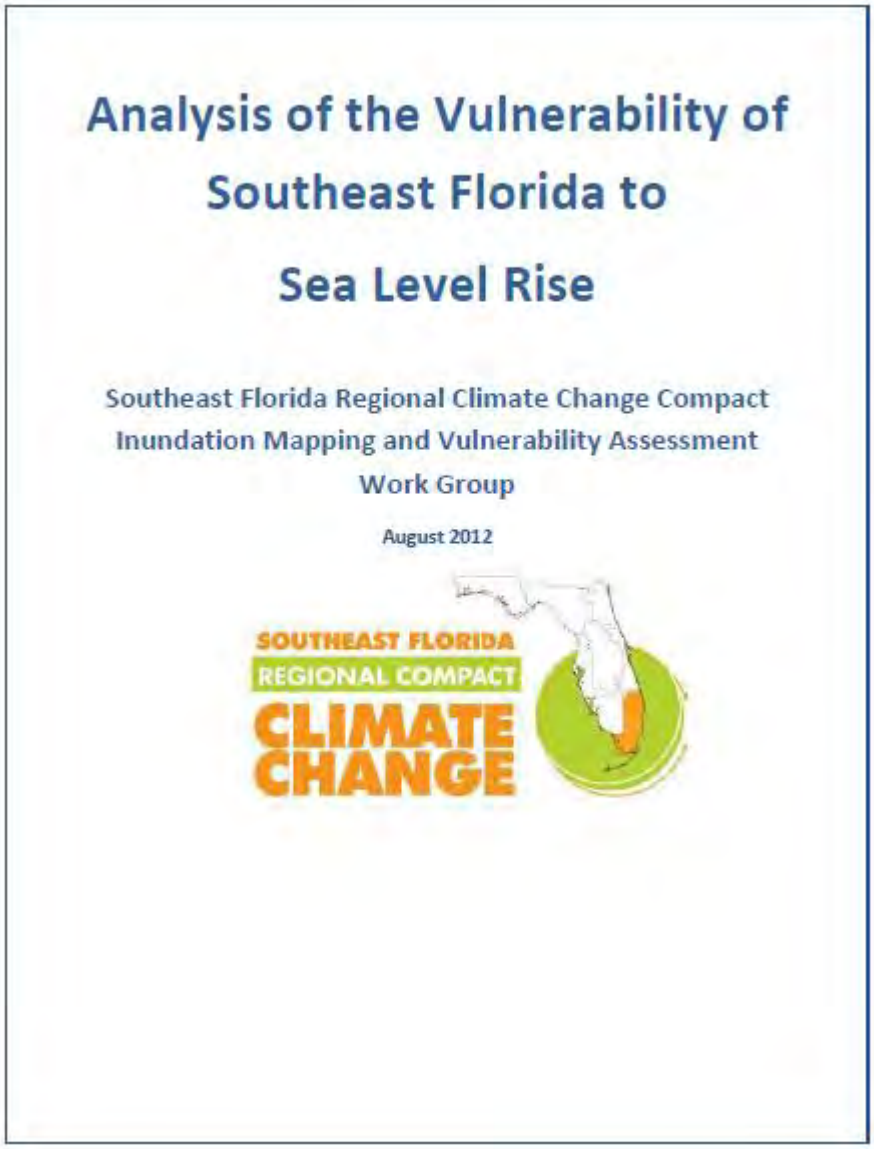

Appendix CC-D can be found by clicking the hyperlink:

Unified Sea Level Rise Projection for Southeast Florida

# Appendix CC-E

## Analysis of the Vulnerability of Southeast Florida to Sea Level Rise

## 2012



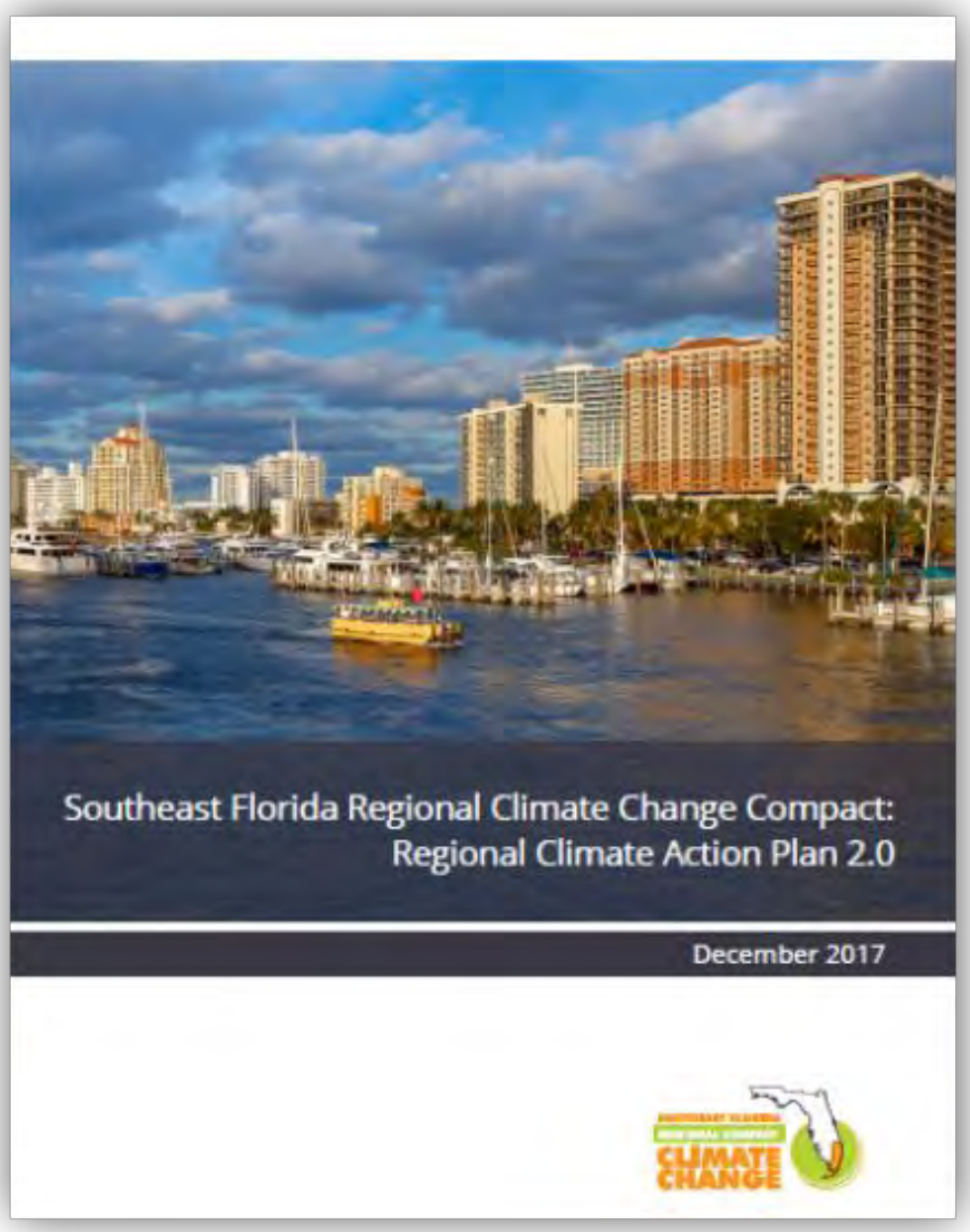

Appendix CC-E can be found by clicking the hyperlink:

Analysis of Vulnerability of Southeast Florida to Sea Level Rise

# Appendix CC-F

# Regional Climate Action Plan 2.0

# 2017

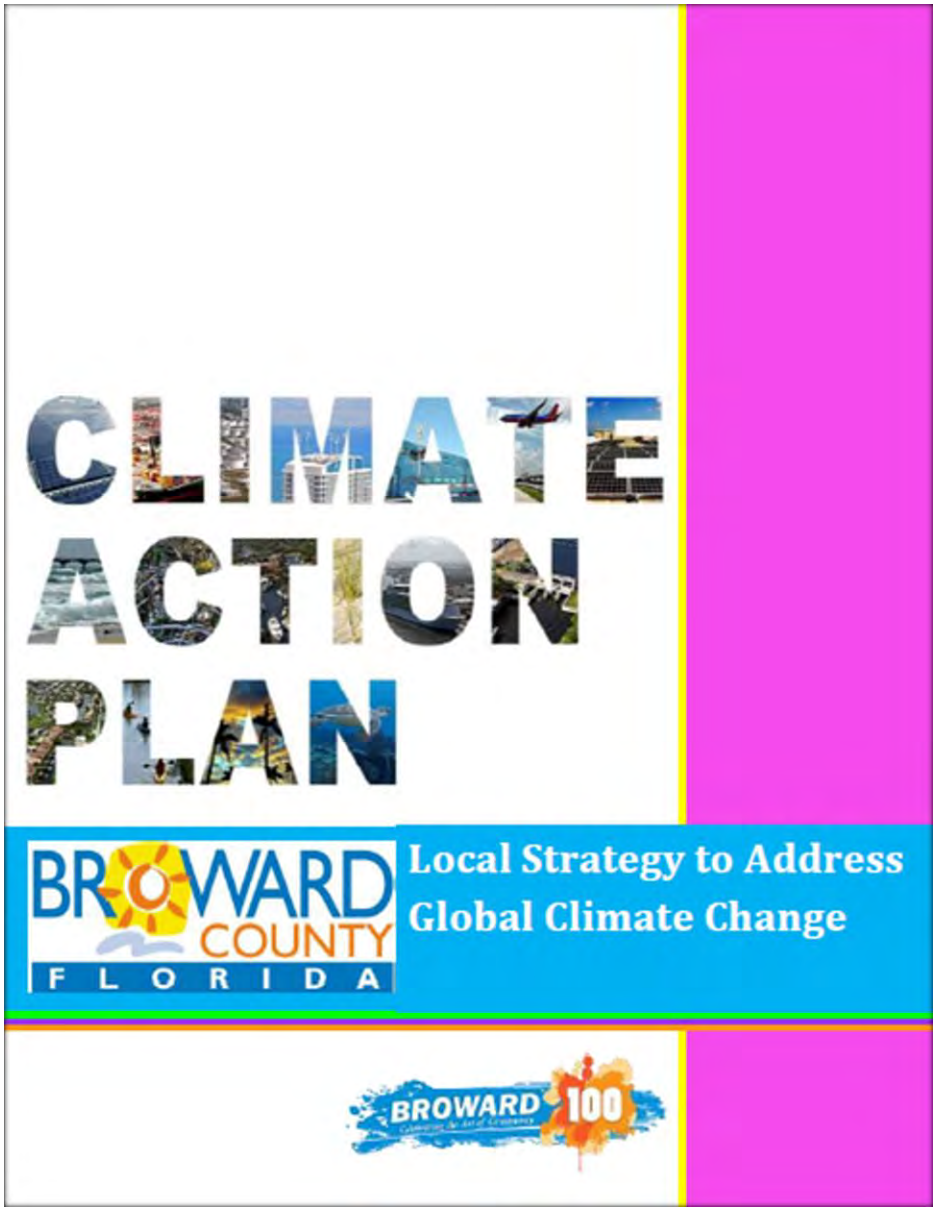



Appendix CC-F can be found by clicking the hyperlink: Regional Climate Action Plan 2.0

# Appendix CC-G

## Broward County Climate Change Action Plan

## 2015




Appendix CC-G can be found by clicking the hyperlink: Broward County Climate Action Plan

BROWARD COUNTY
FLORIDA

# Coastal Management Element Support Document

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Beach – means the zone of unconsolidated material that extends landward from the mean low water line to the place where there is marked change in material or physiographic form, or to line of permanent vegetation, usually the affective limit of storm waves. "Beach," as used in the coastal

management element requirements, is limited to oceanic and estuarine shorelines (Broward County Land Use Plan, 2017).

Beach Nourishment and Renourishment – The systematic augmentation by artificial means of the linear width and/or elevation of the beach exposed above the high tide line. Nourishment suggests the first augmentation project; Renourishment suggests maintenance projects thereafter (Section 161.021, Florida Statutes).

Coastal Planning Area – An area that encompasses all of the following: water and submerged lands of oceanic water bodies or estuarine water bodies; shorelines adjacent to oceanic waters or estuaries; coastal barriers; living marine resources; marine wetlands; water-dependent or water related facilities on oceanic or estuarine waters; or public access facilities to oceanic beaches or estuarine shorelines; and all lands adjacent to such occurrences where development activities would impact the integrity or the quality of the above (FEMA).

In Broward County, the Coastal Planning Area is the land and water eastward of the westward right-of-way of U.S. 1.

Coastal Construction Control Line (CCCL) – means the line established by the Florida Department of Natural Resources after a determination, through comprehensive engineering study and topographic survey, that the establishment of such control line is necessary for the protection of upland properties and the control of beach erosion, pursuant to Section 161.053, Florida Statutes (Broward County Land Use Plan, 2017).

Coastal High Hazard Area – An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources (FEMA)

The evacuation zone for a category 1 hurricane as established in the regional hurricane evacuation study applicable to the local government. Broward County has identified its Coastal High Hazard Area as the land and water eastward of the Atlantic Intracoastal Waterway to the Atlantic Ocean. Map WM-7 of the BrowardNEXT map series illustrates the Coastal High Hazard Area as Evacuation Zone A.

Coastal or Shore Protection Structures – Shore-hardening structures, such as seawalls, bulkheads, revetments, or rubble mound structures which are intended to protect other structures from wave and hydrodynamic forces, or erosion control structures, which are intended to prevent erosion, such as groins, breakwaters, and aggregates of materials other than natural beach sand used for

beach or shoreline protection and other structures which are intended to prevent erosion or protect other structures form wave and hydrodynamic forces including beach and dune restoration (EPD, BRD).

Dune – A mound, bluff or ridge of unconsolidated sediment, usually sand-sized sediment, lying upland of the beach and deposited by any natural or artificial mechanism, which may be bare or covered with vegetation and is subject to fluctuations in configuration and location. Types of dunes include:

a) "Primary dune" is a significant dune which has sufficient alongshore continuity to offer protective value to upland property. The primary dune may be separated from the frontal dune by an interdunal trough; however, the primary dune may be considered the frontal dune if located immediately landward of the beach.

b) "Reconstructed dune" is a man-made dune feature that has a sand filled geotextile container as its core that is continuously covered with a minimum of three feet of sand, meets the specific design and siting criteria of this chapter, is contoured to minimize erosive effects, and is vegetated with native beach-dune plants.

c) "Significant dune" is a dune that has sufficient height and configuration or vegetation to offer a level of protection to the beach-dune system (62B-56.020 (16) FAC).

Erosion – The wearing away of land or the removal of consolidated or unconsolidated material from the beach-dune system by wind, water, or wave action. Erosion includes:

a) Landward horizontal movement of the line of mean high water or beach-dune system profile; and,

b) Vertical lowering or volumetric loss of sediment from the beach-dune system or the offshore profile (62B-56.020 (16) FAC).

Erosion Control Line – The line determined in accordance with the provisions of Sections 161.141-.211, F.S., and recorded pursuant to Section 161.181, F.S., in connection with beach restoration projects. Where established, an erosion control line represents the landward extent of the claims of the state in its capacity as sovereign title holder of the submerged bottoms and shores of the Atlantic Ocean, the Gulf of Mexico, the Straits of Florida, and the bays, lagoons, and other tidal reaches thereof (62B-41.002 (15) FAC).

Estuary – A semi-enclosed, naturally existing coastal body of water which has a free connection with the open sea and within which seawater is measurably diluted with fresh water derived from riverine systems (Section 373.403, Florida Statutes).

Hurricane Vulnerability Zone – The areas (hurricane evacuation areas and mobile home parks) delineated by the regional or local evacuation plan as requiring evacuation (EMD).

Littoral Drift – Process whereby perpetual wave action transports sand in a longshore direction along the coastline.

Living Marine Resources – Oceanic or estuarine plants or animals. Such as mangroves, seagrasses, algae, coral reefs, and other marine habitat; fish, shellfish, Crustacea and fisheries; and sea turtles and marine mammals.

Marine Habitat – Areas where living marine resources naturally occur, such as mangroves, seagrass 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, nearshore mineral deposits, and offshore sand deposits. (Broward County Land Use Plan, 2017).

Public Access – means the ability of the public to physically enter or use recreation sites including beaches and shores (Broward County Land Use Plan, 2017).

Revegetated Dunes – Those dune areas that, for a variety of reasons, have previously been denuded of associated dune vegetation or are artificially elevated regions of the beach usually associated with beach renourishment projects; both types are sometimes artificially or naturally revegetated with pioneer zone plant species such as sea oats (Uniola paniculata).

Shoreline or Shore – The interface of land and water and, as used in the coastal management element requirements, is limited to oceanic and estuarine interfaces. (Broward County Land Use Plan, 2017).

Storm Surge – The rise of water above normal water level on the open coast due to a number of factors, including the action of wind stress on the water surface and the rise in water level due to atmospheric pressure reduction (62B-41.002 (43) FAC).

Water-dependent Use – Activities which can be carried out only on, in or adjacent to water areas because the use requires access to the water body for: waterborne transportation including ports

or marinas; recreation; electrical generating facilities; or water supply (Broward County Land Use Plan, 2017).

Water-related Uses – Activities which are not directly dependent upon access to a water body, but which provide goods and services that are directly associated with water dependent or waterway uses (Broward County Land Use Plan, 2017).

Wetlands – those areas which are inundated by water, with sufficient frequency to support, and normally do support an assemblage of organisms that is adapted to saturated or seasonally saturated soil conditions for growth and reproduction including, but not necessarily limited to, swamps, marshes, bogs, sloughs, potholes, wet meadows, river flood plains, mud flats and wet prairies (Broward County Land Use Plan, 2017).

Wildlife Habitat – Areas where wild animals and vegetation naturally reside.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| ACOE | U.S. Army Corps of Engineers |
| BCLUP | Broward County Land Use Plan |
| BOCC | Broward County Board of County Commissioners |
| CCCL | Coastal Construction Control Line |
| CME | Coastal Management Element |
| DEP | Florida Department of Environmental Protection |
| EPCRD | Environmental Planning & Community Resilience Division |
| EPGMD | Broward County Environmental Protection and Growth Management Department |
| EMD | Emergency Management Agency, Broward County |
| FAC | Florida Administrative Code |
| FDOT | Florida Department of Transportation |
| FEMA | Federal Emergency Management Agency |
| GIS | Geographic Information System |
| ICW | Atlantic Intracoastal Waterway |

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Coastal Management

## INTRODUCTION

### A. General

The purpose of the Coastal Management Element (CME) is to plan for, and where appropriate, limit development activities where such activities would damage or destroy coastal resources, protect human life, and limit public expenditures in areas that are subject to destruction by natural disaster. The Florida Administrative Code (FAC) requires the CME to address coastal management, natural disaster and deepwater port issues. This element primarily addresses the coastal management issues. Its goal is to manage development activities in Broward County's coastal area to maximize aesthetic, environmental, recreational, and economic values. Natural disaster and Deepwater Port issues are respectively addressed in the Natural Disaster and Deepwater Port Components. The CME Support Document provides data and analysis used as the basis for the goal, objectives, and policies included in the CME.

The CME Support Document is divided into five parts. Part I identifies the service area and planning horizons. Part II addresses the data requirements and includes inventories of land uses, natural resources, beaches and dunes, estuarine conditions, infrastructure, and natural disaster planning. Part III analyzes current coastal resources and management practices. Part IV addresses CME implementation and Part V is an appendix.

### B. Service Area

The planning service area, as it relates to erosion and accretion trends, beach nourishment projects, beach conditions, vegetative coverings, marine resources, sea turtle protection, fisheries' management, and artificial reef, is Countywide.

### C. Planning Horizon

The short-term planning horizons is five years or 2023. The long–term planning is 10 years or 2028.

## DATA REQUIREMENTS

The CME is based upon the following data: inventories of existing land uses; natural resources; historic resources and sites; estuarine pollution; natural disaster concerns; beach and dune systems; public access facilities; existing infrastructures; and the Deepwater Port issues. CME part II addresses the above described rule requirements.

### A. Inventory of Existing Land Use Coverages

This section addresses existing land use coverage, shore line uses, and water-dependent and water-related uses.

1. Inventory of Shoreline Uses. Shoreline uses are those uses along the shore of either the Atlantic Ocean or the Intracoastal Waterway.

2. Inventory of Water-Dependent and Water-Related Uses. Activities which can be carried out only on, in or adjacent to water areas because the use requires access to the water body for: waterborne transportation, recreation, electrical generating facilities, or water supply, are water dependent-uses.

   Activities which are not directly dependent upon access to a water body, but which provide goods and services that are directly associated with water-dependent or waterway uses are water-related uses.

### B. Inventories of Natural Resources

This section addresses vegetative cover, wetlands, areas subject to coastal flooding, wildlife habitats, and living marine resources.

1. Vegetative Cover. Vegetative communities, such as coastal strands, oak hammocks, and cypress swamps. Which are classified by the presence of certain soils, vegetation and animals.

Vegetation on, and in proximity to, the beach consists primarily of grasses, sea oats, non-woody perennials, and exotic species used and landscape materials.

2. Wetlands. Wetlands are those areas that are inundated or saturated 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. Florida wetlands generally include swamps, marshes, Bayhead, riverine swamps and marshes, tidal marshes, mangrove swamps and other similar areas.

3. Areas Subject to Coastal Flooding. The term "areas subject to coastal flooding" refers to areas delineated in the local hurricane evacuation plan that require evacuation. In Broward County, it is defined as the area requiring evacuation in the event of a 100-year storm or a Category 3 storm event. Flood Zone Maps can be viewed here.

   Map ND-1 from the BrowardNEXT Map Series illustrates the evacuation zones for a Category 1-2 Hurricane and for a Category 3 or higher Hurricane.

4. Wildlife Habitats. Wildlife habitats are areas where wild animals and vegetation naturally reside.

5. Living Marine Resources. Living marine resources are oceanic or estuarine plants or animals, such as mangroves, seagrasses, algae, coral reefs, fish, shellfish, Crustacea, fisheries, sea turtles, and marine mammals. Living marine resources adjacent to the Broward County coast include at least fifteen families of cartilaginous fishes such as sharks and rays, and 555 families of bony fishes such as tarpon, herring, snook, snapper, and other species typically inhabiting the coral reefs of Southeast Florida.

   See Appendix CM-1 for a more complete marine resource listing.

## C. Inventory of Historic Resources

Historic resources are areas, districts, or sites containing properties listed on the Florida Master Site File, the National Register of Historic Places, or designated by the County as historically, architecturally, or archeologically significant. The Hillsboro Inlet Lighthouse was first placed into service on March 7, 1907. In 1997, the Hillsboro Lighthouse Preservation Society was founded for the purpose of preserving the historic Hillsboro Light in its original form for the safety, enjoyment, and education of the public. The primary objectives of the society were to repair the Hillsboro Light's original lens, to open the Lighthouse and its grounds for education and enjoyment of the public, and to support the community by

maintaining the Lighthouse for future generations. Additional information on historic resources can be found in the Historic Reservation Component.

## D. Inventory of Estuaries and Estuarine Conditions

An estuary is a semi-enclosed, naturally existing coastal body of water in which saltwater is naturally diluted by freshwater and which has an open connection with oceanic waters. There is only one estuarine system in Broward County, which can be found on the Natural Resource Map Series - Eastern Broward County: Beaches and Shores, Including Estuarine Systems, Rivers, Bays, Lakes, Harbors, and Dredge Spoil Disposal Sites, Broward County Land Use Plan. Westlake Regional Park and the Anne Kolb Nature Center are both county facilities located within the estuarine system.

## E. Natural Disaster Planning Issues

This section addresses natural disaster planning issues specifically, hurricane evacuation and post-disaster redevelopment planning. The Natural Disaster Component of the CME addresses natural disaster planning issues on a Countywide basis.

1. Hurricane Evacuation Planning. This subsection addresses the hurricane vulnerability zone, the number of persons requiring evacuation and public shelters, the number of shelter spaces available, evacuation routes, transportation and hazard constraints on the evacuation routes, and evacuation times.

    a. *Hurricane Vulnerability Zone*. The hurricane vulnerability zone includes the hurricane evacuation areas and mobile home parks in Broward County. Appendix ND-A of the Natural Disaster Component lists all mobile home parks in Broward. Map WM-7 of the BrowardNEXT map series illustrates floodplains, flood prone areas, and evacuation zones. Map ND-1 displays shelter locations and evacuation routes, in addition to evacuation zones.

    b. *Persons Requiring Evacuation*. Mandatory evacuation zones for Category 1 and 2 hurricanes are all areas located east of the Intracoastal Waterway. All areas east of Federal Highway/U.S. 1 must be evacuated for a Category 3 storm or higher. In addition, all mobile homes must be evacuated.

    c. *Persons Requiring Public Hurricane Shelter*. Only a portion of the people requiring evacuation will use a public hurricane shelter. The quantity is unknown. Many will evacuate to the homes of friends or relatives inland.

d. *Available Public Hurricane Shelter Spaces*. The School Board of Broward County makes several of its facilities available for public hurricane shelter spaces. A complete inventory of the spaces is included within the Natural Disaster Component.

e. *Evacuation Routes*. S.R. A1A is a two-lane undivided highway. Hillsboro Boulevard is a four-lane divided highway with a moveable bridge. NE 14th street is a four-lane divided highway with a moveable bridge. These roadways provide access to important north and south roadways, such as Interstate 95 and Florida's Turnpike, and are critical to local and regional evacuation.

f. *Transportation and Hazard Constraints on Evacuation Routes*. The normal travel speeds on evacuation routes will be reduced significantly due to the high number of evacuees using private automobiles. Hazard constraints include the unpredicted early arrival of gale force winds blowing debris and sand onto evacuation routes, flooding, and falling objects, such as utility poles causing road blockages and thereby restricting vehicular movement out of evacuation areas.

g. *Evacuation Time*. Evacuation time is the time in hours that evacuees reach their destinations. The estimated travel time includes 30 minutes loading time and 10 minutes unloading with a travel speed of 15 miles per hour.

2. Post Disaster Redevelopment. This subsection addresses existing and proposed land uses in the coast high hazard area, structures with a history of repeated damages in coastal storms, coastal or shore protection structures, and beach and dune conditions.

a. *Existing and Proposed Uses in the Coastal High-Hazard Areas*. Broward County has identified its Coastal High Hazard Area as the land and water from the Intracoastal Waterway eastward to the Atlantic Ocean including any coastal protection structures.

b. *Structures with a History of Repeated Damage*. No historical evidence has been found which identifies structures that have been affected by repeated storm damage.

c. *Coastal or Shore Protection Structures*. Shore-hardening structures, such as seawalls, bulkheads, revetments, or rubble mound structures, which are

intended to protect other structure from wave and hydrodynamic forces, or erosion control structures, which are intended to prevent erosion, such as groins, breakwaters, or aggregates of materials other than natural beach sand used for shoreline protection.

## F. Inventory of Beach and Dune System

The beach and dune system are important coastal features providing critical habitat for native flora and fauna while supporting robust economic activities associated with tourism and real estate investments throughout Florida. A healthy beach and dune system also provides vital nature-based coastal defenses against the impacts of storms and sea level rise. While beach nourishment has been a prominent shoreline protection strategy for many coastal communities, coastal dunes have often been deemphasized or even excluded from shoreline protection projects in favor of strategies that maximize vistas and the expanse of the beach. However, the restoration and preservation of coastal dunes has become an area of growing emphasis locally and nationwide as dunes have been increasingly recognized to significantly reduce the impacts of severe storms and coastal erosion, minimizing impacts to infrastructure and property. Coastal resilience will become increasingly important in the face of sea level rise and the increasing frequency of severe storms associated with climate change.

The Broward County coastline includes 24 miles of beaches, which are actively managed and nourished as part of ongoing local and regional beach nourishment projects. However, a 2014 assessment revealed that less than 65% of our beaches have an integrated dune system, that many existing dunes are degraded and that, in fact, some dunes have been actively removed. This is a tremendous impediment to the longer-term benefits of our beach nourishment projects given the importance of coastal dunes and vegetation in maintaining sand on the beach. Vegetated dunes help to trap and anchor windblown sand and, when well established, dunes enhance coastal defenses by absorbing additional wave energy and maintaining a sand reservoir that helps minimize erosion. Given the pressures on our shoreline, the magnitude of current investments in shoreline protection and the importance of building resilience to the impacts of climate change, it is necessary that we prioritize integration of coastal dune restoration and preservation as prominent component in our shoreline protection projects and work with local communities to build a shared appreciation for the importance of coastal dunes in improving community resilience to climate impacts. The County offers a grant program to civic associations, coastal property owners, municipalities, and non-profit groups to conduct dune restoration and

enhancement projects. The purpose of the Coastal Dune Restoration Grant Program is to promote the restoration of dunes where they are absent and to enhance and preserve the quality of existing dunes along Broward County's shoreline. In addition, the program helps build community awareness about the importance of nature-based methods, such as dune restoration and enhancement, as essential and cost-effective management practices that will contribute to shoreline resilience. The program also enhances the quality of sea turtle nesting habitat by using dunes to reduce shorefront lighting impacts on nesting sea turtles and their hatchlings.

1. Past Trends in Erosion and Accretion. Erosion trends on Broward County's beaches were first documented in a U.S. Army Corps of Engineers study in 1961. At that time, it was determined that beaches had been experiencing erosion problems for decades and that 8.9 miles of these beaches required nourishment and coastal protection structures. Table CM-1 shows shoreline change trends in Broward County.

Table CM-1
Shoreline Change Trends, Broward County

| SEGMENT | COMMENTS |
|---|---|
| Deerfield Beach (1980-1999) | Accretion 1.7 ft./yr. |
| Hillsboro Beach (1980-1999) | Accretion 1.2 ft./yr. (includes a beach nourishment project in 1998) |
| Pompano Beach/Lauderdale-by-the-Sea (1983-1998) | Accretion in north Pompano Beach at about 1.0 ft./yr. due to increased sand by passing at Hillsboro Inlet. Recession at south Pompano Beach and Lauderdale-by-the-Sea at about 4 ft./yr. following the 1983 beach nourishment project. |
| Fort Lauderdale (1983-1998) | Accretion north Port Everglades Inlet; stable to moderate recession along middle of Segment II |
| John U. Lloyd State Park (1989-1998) | Recession, north 9.0 ft./yr. |
| Dania (1989-1998) | Recession, 0.5 ft./yr. |
| Hollywood/Hallandale (1989-1998) | Recession, 4.0 ft./yr. |

Source: Broward County EPCRD

2. Identification of Existing and Potential Beach Renourishment Areas. Beach renourishment is a Countywide effort. The most recent renourishment project, Segment II, focused on reconstructing eroded areas of Lauderdale-By-the-Sea,

Pompano, and Fort Lauderdale beaches. The project replaced approximately 750,000 cubic yards of sand through three access points along 4.9 miles of shoreline between Hillsboro Inlet and Broward County's Port Everglades. The County received permits for the project from both State and Federal resource agencies. Segment III, completed in February 2006, covered areas from John U. Lloyd State Park to the Miami-Dade County Line. Table CM-2 shows the construction history of beach renourishment projects in Broward County.

Table CM-2
Beach Renourishment Project Construction History, Broward County

| YEAR | PROJECT | QUANTITY (cy) | LENGTH (mi) | TOTAL COST ($M) |
|---|---|---|---|---|
| 1970 | Pompano (Segment II) | 1,080,000 | 2.8 | 1.76 |
| 1971 | Hallandale (Segment III) | 360,000 | 0.75 | 0.78 |
| 1976 | John U. Lloyd (Segment III) | 1,090,000 | 1.5 | 2.96 |
| 1979 | Hollywood/ Hallandale (Segment III) | 2,000,000 | 5.2 | 7.83 |
| 1983 | Pompano/ Lauderdale-by-the-Sea (Segment II) | 1,800,000 | 5.3 | 9.99 |
| 1989 | John U. Lloyd (Segment III) | 604,000 | 1.6 | 5.68 |
| 1991 | Hollywood/ Hallandale (Segment III) | 1,100,000 | 5.2 | 9.47 |
| 2005-2006 | John U. Lloyd/ Hollywood/Hallandale/ Dania (Segment III) | 1,900,000 | 6.8 | 44.5 |
| 2013 | Fort Lauderdale A1A Emergency Project | 19,000 | 0.38 | 1.24 |
| 2013 | John U. Lloyd (PE Maintenance Dredging) | 111,400 | 0.57 | Unknown |
| 2015-2016 | Lauderdale-by-the-Sea/ Pompano/Fort Lauderdale | 750,000 | 4.9 | 44.0 |
| 2018* | PE Sand Bypass | - | - | 25 |
| 2020 | Segment III | 980,000 | 6.8 | 42.2 |
| | | | | |
| TOTAL | | 11,794,400 | 41.8 | 195.4 |

*Estimated

Source: Broward County EPCRD

## G. Inventory of Infrastructure

Infrastructure means those human structures which serve the common needs of the population, such as: roadways, bridges, causeways, sewage disposal systems, potable water systems, solid waste disposal sites, storm water systems, utilities, piers, docks, breakwaters, bulkheads, revetments, marinas, seawalls, and navigation channels.

1. Roadways. The main coastal road is State Road A1A. Local roads extend from State Road A1A to service the residential neighborhoods.

2. Bridges or Causeways. There are no causeways or bridges to the mainland. For hurricane evacuation purposes, the bridges or causeways that would be affected include Hillsboro Boulevard to the north and NE 14th Street to the south.

3. Sanitary Sewer Facilities. Wastewater treatment is accomplished by septic tanks or sanitary sewer service.

4. Man-made Drainage Facilities. Storm water runoff east of S.R. A1A Highway flows to the Atlantic Ocean.

5. Public Shore Protection Structures. There are no public shore protection structures.

## H. Post-Disaster Redevelopment

The CEMP Recovery Plan specifically addresses the recovery phase of a disaster and includes specific recovery actions from the response stage through the long-term recovery stage of a disaster, enabling a rapid and efficient delivery of recovery operations following a natural disaster. In 2019, Broward County will initiate a Vulnerability Analysis that will help inform the requirements of the 2015 Peril of Flood legislation, described below.

### 1. Peril of Flood Legislation

In 2015, the State Legislature adopted "Peril of Flood" legislation that was added to Section 163.3178 Coastal management, F.S. Subsection (2)(f) adds the requirement for, "A redevelopment component that outlines the principles that must be used to eliminate inappropriate and unsafe development in the coastal areas when opportunities arise." The component must:

1. Include development and redevelopment principles, strategies, and engineering solutions that reduce the flood risk in coastal areas which results from high-tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea-level rise.

2. Encourage the use of best practices development and redevelopment principles, strategies, and engineering solutions that will result in the removal of coastal real property from flood zone designations established by the Federal Emergency Management Agency.

3. Identify site development techniques and best practices that may reduce losses due to flooding and claims made under flood insurance policies issued in this state.

4. Be consistent with, or more stringent than, the flood-resistant construction requirements in the Florida Building Code and applicable flood plain management regulations set forth in 44 C.F.R. part 60.

5. Require that any construction activities seaward of the coastal construction control lines established pursuant to s. 161.053 be consistent with chapter 161.

6. Encourage local governments to participate in the National Flood Insurance Program Community Rating System administered by the Federal Emergency Management Agency to achieve flood insurance premium discounts for their residents."

These requirements are being met through multiple policies that appear in the Climate Change, Coastal Management, Intergovernmental Coordination, Natural Disaster, and Water Management Elements, in addition to the Broward Municipal Services District Land Use and Community Planning Element. A new objective has been added to the Coastal Management Element that focuses on flood mitigation and post disaster redevelopment issues related to flooding.

Broward County will continue to further explore other planning and post disaster strategies and policies, which address:

1. Expediting demolition of abandoned significantly damaged structures;
2. Requiring utility and infrastructure improvements that reduce vulnerability to storms and disasters;

3. Promoting energy efficient, heat reduction, and storm resilient features in the redevelopment of neighborhoods, including solar farms and replanting trees;
4. Improving drainage and raising structures, driveways and streets to avoid flooding damages;
5. Restricting redevelopment of properties in areas prone to repeat flood, wind or fire damage;
6. Addressing resiliency of mobile homes and other types of manufactured homes;
7. Transferring of title of abandoned properties within a reasonable time frame to promote expedited redevelopment.

# ANALYSIS REQUIREMENTS

The CME is based upon the following analyses: existing land use coverage analysis; natural resource analysis; analysis of estuarine pollution; analysis of natural disaster planning issues; beach and dune system analysis; and Deepwater Port analysis. This analysis is provided below, except for the Deepwater Port analysis, which is addressed in the Deepwater Port Component.

## A. Existing Land Use Coverage Analysis

1. Conflicts among Shoreline Uses. Land use conflicts center on the proximity of structures to the CCCL. Additional information can be found in the Broward County Land Use Plan.

## B. Natural Resource Analysis

The following analyzes the natural resources in the areas of vegetation, wetland, wildlife habitat, and living marine resources.

1. Vegetative and Wetland Analysis. Vegetation on and in proximity to the beach consists primarily of sea oats. Sea grapes. Grasses. Non-woody perennials, and exotic species used as landscape materials. This vegetation helps to protect upland property during storm conditions.

2. Wildlife Habitat and Living Marine Resources. The EPGMD has been involved in a variety of research projects that are aimed at improving the coastal environment. The Manatee Protection Plan implements additional manatee protection measures throughout the County's waterways that are accessible to manatees. Since the

inception of the plan, the county has been successfully implementing these protection measures which include: increased law enforcement, manatee monitoring, as well as educational and awareness. Additional information on the Manatee Protection Plan can be found in the Conservation Element.

Sea turtle research projects include fish predation on the hatchery released sea turtle hatchlings and hatchling disorientation from urban beach-front lighting. The Broward County EPGMD will maintain the guidelines for local government with implementation of sea turtle conservation programs developed in conjunction with the Florida Wildlife Research Institute. The Mooring Buoy program enables Broward County to further protect its reefs with a mooring buoy system, which was installed so that boaters can moor on the reefs without using an anchor, and avoid violating the law prohibiting dropping anchors on living coral reefs. Artificial reef studies include mechanisms of recruitment of reef fish to artificial reefs, effects of artificial reef construction and the effect of water depth on fish abundance at artificial reefs.

Broward County's coastal marine habitats include shallow and deep hard bottom communities and pelagic fish populations. These habitats are important from and ecological and economic perspective. According to EPGMD, new threats had created the need for response plans to minimize and assess damage from such events. To aid in creating response plans, it is necessary to develop offshore resource maps to serve as baseline data. Although fisheries' management is carried out by the State, Broward County's Artificial Reef Program creates an opportunity for involvement in lock stock restoration.

The initiation of reef fish recruitment studies by the EPGMD has demonstrated a need for such studies to the extent that artificial reefs may prove to be a valuable tool for increasing fish populations. While further scientific studies are very important, it is also important to understand the economic value of artificial reefs as well as natural habitats to justify funding of further projects and studies. A high level of boating activity in Broward County can result in an increased risk of anchor damage to reefs. The on-going installation and maintenance of permanent small boat moorings on the reefs allow divers and fishermen an opportunity to enjoy the resources without the risk of damaging hard bottom habitats.

## C. Impacts of Development/Redevelopment on Historic Resources and Sites

Information on development/redevelopment activities and impacts on historic resources and sites can be found in the Historic Preservation Component.

## D. Analysis of Estuarine Pollution

There is only one estuarine system in Broward County, which can be found on the Natural Resource Map Series - Eastern Broward County: Beaches and Shores, Including Estuarine Systems, Rivers, Bays, Lakes, Harbors, and Dredge Spoil Disposal Sites, Broward County Land Use Plan. Westlake Regional Park and the Anne Kolb Nature Center, both county facilities located in the City of Hollywood, lie within the estuarine system. The EPGMD and the Development Management Division assess the potential development impacts on estuaries through the development review process, including site plan and plat applications. Also, the EPD coordinates efforts and existing resource protection plans where possible, and of other agencies through participation in the development review process, to protect estuaries within the jurisdiction of more than one local government.

## E. Analysis of Natural Disaster Planning Issues

The Following natural disaster planning concerns are analyzed, but a more detailed analysis is founded in the Natural Disaster Component.

1. Hurricane Evacuation Planning. Hurricane evacuation planning is based on the hurricane evacuation plan contained in the local emergency management plan and the Coastal Hurricane Evacuation Plans. The hurricane vulnerability zone, the number of persons requiring evacuation, the number of hurricane shelter spaces available, evacuation routes, transportation and hazard constraints on the evacuation routes, and evacuation times are discussed below:

    a. *Hurricane Vulnerability Zones*. There are two evacuation zones in Broward County. Due to the limited number bridges over the Intracoastal Waterway, there are not many alternatives to change the zones or evacuation routes

    b. *Persons Requiring Evacuation*. More than 190,000 persons are estimated to live in coastal areas and mobile homes vulnerable to storm surges and winds in Category 3 through 5 hurricanes. With such a large amount of people evacuating within a short period of time, there is a need for better land use control to direct population concentrations away from the coastal high-hazard areas.

c. *Available Hurricane Shelter Spaces*. Broward County has a total of more than 67,000 hurricane shelter spaces. There are 12 primary shelter sites containing approximately 37,000 spaces. All shelters have been selected for safety features and location to serve the most vulnerable sections of the community. There are currently enough spaces for those who wish to evacuate. If additional shelter spaces are needed, more schools could be opened.

d. *Evacuation Routes*. Evacuees will use S.R. A1A and either NE 14th Street or Hillsboro Boulevard causeways to evacuate to the mainland.

e. *Transportation and Hazard Constraints on Routes*. NE 14th Street and Hillsboro Boulevard causeways have four-lane draw bridges. In the event of a hurricane, both boat and vehicle traffic will be hectic; thus, creating transportation constraints. Another hazard constraint will be potential flooding of roadways. The maintenance of good traffic flow is critical, especially along S.R. A1A, which is the main North-South thoroughfare east of the Intracoastal Waterway.

f. *Evacuation Time*. To ensure that all evacuees could reach their destination prior to a landfall, the County's Mayor would issue an evacuation order. Measures to maintain or reduce evacuation times were incorporated into the Broward County Emergency Operations Plan, which identifies tasks and assigns responsibility to specific County divisions for their timely implementation. The measures devised to reduce evacuation times include: public information, traffic control, debris removal, and public transit.

2. Post-Disaster Redevelopment. The Emergency Management Division along with other county agencies and municipalities shall develop a county wide post-disaster redevelopment and mitigation plan which reduces exposure to life and property to natural hazards. The EPMGD assists state agencies in the enforcement and monitoring of compliance with the Florida Department of Environmental Protection CCCL regulations. The EPGMD also assists in monitoring development in the coastal areas to ensure proper compliance with state and local regulations. In addition, structures with a history of repeated damages in coastal storms may be required to relocate westward of the CCCL to reduce exposure.

   According to the Natural Disaster Component, if a structure was damaged by a natural disaster more than 75 percent of its replacement cost, any post-disaster redevelopment would need to meet the design criteria established pursuant to the

designation of the CCCL. Measures to reduce exposure to hazards during a hurricane consist of a beach renourishment program and revegetation of an area on the beach to create sand dunes. The presence of sand dunes prevents sand from being blown onto upland property and moderates wave overtopping. Since most dunes were destroyed by coastal development, the replenishment of the dune system could help mitigate the impact of storms.

3. Coastal High-Hazard Areas. The only potentially threatened infrastructures are streets and highways; therefore, no potential for relocation exists. Relocating infrastructures owned or operated by the County was analyzed and deemed unnecessary because the County is responsible for maintaining local roadway networks. State Road A1A is maintained by FDOT.

## F. Beach and Dune Analysis

1. Past Trends in Erosion and Accretion. The EPGMD is charged to monitor and restore eroded beaches. The EPGMD regularly conducts Countywide beach surveys to identify areas where nourishment projects would generate the greatest benefits. Data repeatedly confirm that the County should continue its beach renourishment program as one means of conserving the barrier island's resources. The beaches should be maintained to a width of approximately 75 to 125 feet.

   Segment III of the Shore Protection Project (John U. Lloyd State Park to the Miami Dade-County Line) was completed in February 2006. The most recent project, Segment II, was completed in 2017. Any development and redevelopment in the coastal area should not degrade or destroy existing natural beaches or berm areas. Also, Broward County will continue to encourage local governments and property owners to protect existing beach vegetation, to revegetate the beach, where appropriate, and to encourage landscaping with native trees, shrubs, and ground covers in areas of historic beaches or berm communities through the distribution of educational pamphlets.

   Inlet management plans were carried out for Hillsboro Inlet and Port Everglades in accordance with cost sharing agreements with FDEP. The plans provided analyses and recommendations on strategies to improve sand bypassing, and stabilization of down drift beach sand using jetty modifications.

2. Measures Which Could Protect or Restore Beaches. Certain structural measures have been used to stabilize beach sand from erosion. These include inlet sand by bypassing, groins and breakwaters. In conjunction with beach renourishment, methods such as these could help stabilize sand and reduce the frequency or magnitude of renourishment. Engineering and economic studies should be undertaken to determine the feasibility of such measures.

### G. Infrastructure Analysis

S.R. A1A is the main roadway on the barrier island and is under State jurisdiction. The following infrastructure issues are analyzed;

1. Demands upon Existing Infrastructures. The traffic demand on A1A has its seasonal change from higher in the winter to lower in the summer.

2. Area Served by Existing Infrastructure. There are no existing infrastructures under county jurisdiction.

3. Estimated Future Need for Infrastructure. There is no need for additional infrastructure under county jurisdiction.

4. Fiscal Impacts in Terms of Estimated Costs, Funding Sources, and Phasing of Infrastructure. See the Capital Improvements Element for information on beach renourishment programs and budget.

### H. Post-Disaster Redevelopment

[Need to add analysis supporting Peril of Flood policies recently added to the GOPS.]

## IMPLEMENTATION

### A. Authority

Managing coastal resources in Broward County is the responsibility of several State and County Agencies. Table CM-3 lists these agencies, their responsibilities concerning coastal area management, and existing regulatory programs to protect environment quality in the coastal area.

## B. Sources

The EPGMD is the primary source for the data and analysis included in this Element. Other sources include the Broward County EMD and EPCRD.

Table CM-3
Coastal Management Legislation and Responsible Agencies, Broward County

| AGENCY | ENABLING LEGISLATION | RESPONSIBILITY |
|---|---|---|
| U.S. Department of Interior | Federal Coastal Zone Management Act of 1972, Public Law 92-583 | Provide financial assistance to participating coastal states. Identifies general coastal zones and defines permissible land and water uses within. |
| | Water Pollution Control Act, Public Law 92-500 | Prohibits coastal pollution. |
| | Coastal Barrier Resources Act, Public Law 97-348 | Restricts federal subsidies in undeveloped designated coastal areas. |
| Florida Department of Environmental Protection | Florida Coastal Management Act of 1978, Chapter 380, Part II, Florida Statutes | Coordinates the Florida Coastal Management Act of 1978; Implements the Federal Coastal Management Act of 1972. |
| | Chapter 403, Florida Statutes | Develops and enforces pollution controls on waters of the State. Permits dredge and fill activities in wetlands. |
| | Chapter 161, Florida Statutes | Established coastal construction control lines. Regulates coastal constructions. Oversees Erosion Control Trust Fund. Enables establishment of Beach and Shore Preservation Districts. |

| AGENCY | ENABLING LEGISLATION | RESPONSIBILITY |
|---|---|---|
| Broward Soil and Water Conservation District | Chapter 582, Florida Statutes | Control or prevent soil erosion and further the conservation of soil and water resources. |
| South Florida Water Management District | | Manages estuarine pollution through water control and timing of fresh water delivery. |
| Broward County Environmental Protection & Growth Management Department | Section 8.17, Broward County Chapter | Monitor water quality and permits dredge and fill activities. Develops and implements Beach Management Program. Implements Sea Turtle Conservation Program; manages Artificial Reef Program. |

# APPENDIX

## Appendix CM – A

## Marine Resources

## Broward County 2017

### 1. Myctophiformes

Family:

- Clupeidae - Herrings
- Engraulidae – Anchovies
- Synadontidae – Lizard fishes
- Chlorophthalmidae – Greeneyes
- Alepisauridae – Lancet Fish

### 2. Perciformes

Family:

- Centropomidae – Snooks
- Serranidae – Sea basses
- Grammistidae – Soapfishes
- Priacanthidae – Bigeyes
- Apogonidae – Cardinal fishes
- Branchiostegidae – Tilefishes
- Pomatomidae – Bluefishes
- Rachcentridae – Cobias
- Echeneidae – remoras
- Carangidae – Jacks and pompanos

Corphaenidae – dolphins

Lutjanidae – Snappers

Lobotidae – Tripletails

Gerreidae – Mojarres

Pomadasyidae – grunts

Sparidae – porgies

Sciaenidae – drums

Mullidae – Goatfishes

Pempheridae – Sweepers

Kyphosidae – Sea Chubs

Ephippidae – Spadefishes

Chaetodontidae – Butterflyfishes

Pomacentridae – Damselfishes

Cirrhitidae – Hawkfishes

Labridae – Wrasses

Scaridae – Parrotfishes

Mugilidae – Mullets

Sphyraenidae – Barracudas

Polynemidae – Threadfins

Opistognathidae – awfishes

Percophididae – Flatheads

Dactyloscopidae – Sand Stargazers

Uranoscopidae – Stargazers

Clinidae – Clinids

Blenniidae – Combtooth blennies

Gobiidae – gobies

Acanthuridae – Surgeonfishes

Trichiuridae – Cutlassfishes

Scombridae – Mackerels and tunas

Xiphiidae – Swordfishes

Istiophoridae – billfishes

Stromateidae – butterfishes

Scorpaenidae – Scorpionfishes

Triglidae – Searobins

Source: Broward County Environmental Protection Department, 1996

# Appendix CM – B

## Segment III Beach Management Study

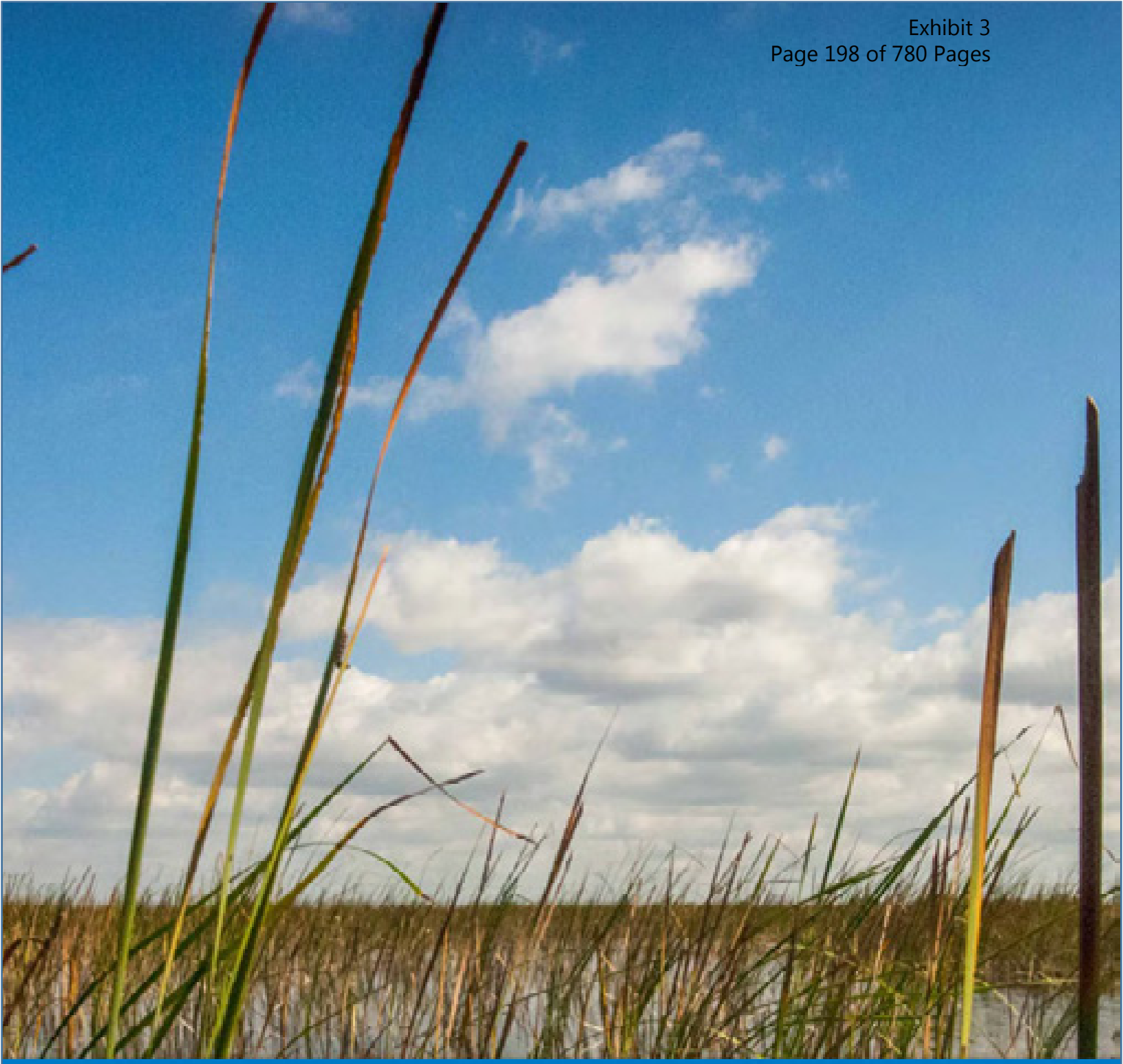
## Broward County

# Appendix CM – C

## Beach Renourishment Program Information

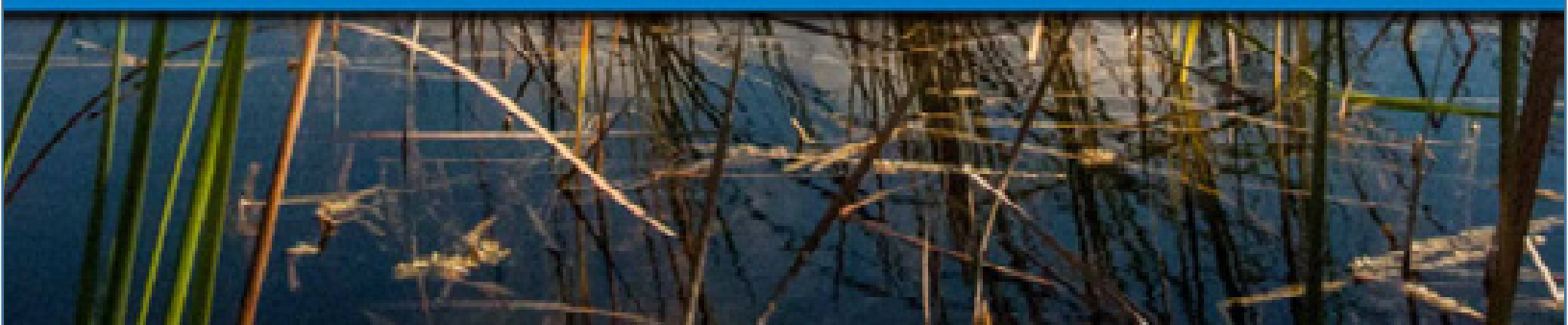
Beach Renourishment Video 2017

Segment II Beach Renourishment Project Community Presentation



BROWARD COUNTY
FLORIDA

# Conservation Element Support Document



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Airshed – An area of varying size that is dependent on a single air mass and that is uniformly affected by the same sources of air pollution.

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.

Channelization – To straighten and deepen streams so water will move faster.

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. The most recent list can be found in Chapter 68A-27.003, Florida Administrative Code.

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.

Evapotranspiration – The transfer of water to the atmosphere by the combined processes of evaporation and plant transpiration.

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 – 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.

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.

Sheet flow – 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.

Storm Surge – The increase in normal water levels, driven by high winds, near the area where the storm center makes landfall.

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.

Zone of Saturation – The zone in which interconnected interstices are saturated with water under pressure equal to or greater than atmospheric.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| ACOE | U.S. Army Corps of Engineers |
| ASC | Area of Special Concern |

| | |
|---|---|
| ASR | Aquifer Storage and Recovery |
| BCCO | Broward County Code of Ordinances |
| BOCC | Broward County Board of County Commissioners |
| BFSP | Boat Facility Siting Plan |
| BMP | Best Management Practice |
| BMSD | Broward Municipal Services District |
| CARL | Conservation and Recreational Lands |
| DEO | Department of Economic Opportunity |
| EMLEG | Enhanced Marine Law Enforcement Grant |
| EPGMD | Broward County Environmental Protection and Growth Management Department |
| ERL | Environmental Resource License |
| ERP | Environmental Resource Permit |
| EV | Electric Vehicle |
| FAC | Florida Administrative Code |
| FDEP | Florida Department of Environmental Protection |
| FDHSMV | Florida Department of Highway Safety and Motor Vehicles |
| FEMA | Federal Emergency Management Agency |
| FIND | Florida Inland Navigation District |
| FIRM | Flood Insurance Rate Map |
| FPL | Florida Power and Light Company |
| FWC | Florida Fish and Wildlife Conservation Commission |
| FWRI | Florida Fish and Wildlife Research Institute |
| FWS | U.S. Fish and Wildlife Service |
| GIS | Geographic Information System |

| | |
|---|---|
| ICW | Atlantic Intracoastal Waterway |
| LAPC | Local Area of Particular Concern |
| LEED | Leadership in Energy and Environmental Design |
| MAC | Broward County Marine Advisory Committee |
| MAG | Manatee Awareness Group |
| MIASF | Marine Industries Association of South Florida |
| MPP | Manatee Protection Plan |
| NAAQS | National Ambient Air Quality Standards |
| NFC | Natural Forest Communities |
| NFIP | National Flood Insurance Program |
| NIS | NatureScape Irrigation Services |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NRA | Natural Resource Area |
| NRCS | Natural Resource Conservation Service |
| OUI | Operating Under the Influence |
| PJA | Port Everglades Jurisdictional Area |
| SFWMD | South Florida Water Management District |
| USCG | U.S. Coast Guard |
| UWA | Urban Wilderness Area |
| WWS | Water and Wastewater Services |

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Conservation

## INTRODUCTION

### A. General

The purpose of the Conservation Element is to promote the conservation, wise use, and protection of Broward County's natural resources. The Conservation Element is a required element of the comprehensive plan as per Section 163.3177, Florida Statutes. Issues concerning conservation of natural resources are also addressed throughout this comprehensive plan. The Broward Municipal Services District (BMSD) Future Land Use Element provides implementation tools to preserve lands for conservation and promote appropriate land uses to minimize the impacts of development on the environment. The Transportation Element promotes strategies to improve air quality and protection of the Port's coastal environment. The Water Management and Solid Waste Elements ensure the provision of clean water, preservation of the sources of that water, and the safe efficient handling of wastewater and solid waste while protecting the county's air, water, and soil resources.

### B. Service Area

The planning area for air resources is the South Florida Airshed which is comprised of the developed areas of Palm Beach, Dade, and Broward Counties as defined by the U.S. EPA. The planning area for water resources is the Lower East Coast Area of the Central and Southern Florida Flood Control System (C&SF) as defined by the South Florida Water Management District (SFWMD). For biological resources the planning area is the County.

Broward County Charter, Section 8.04, 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. Therefore, the regulatory service area for this Element is

considered to be the entire County to the extent that it addresses air quality, water quality, water quantity, and the protection 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 achieve consistency with the plans of those outside agencies.

### C. Planning Horizon

The short-term planning horizons is five years or 2022. The long–term planning is 10 years or 2027.

## DATA REQUIREMENTS

### A. Water Resources and Water Quality

#### 1. Wetlands

The Water Conservation Areas (WCA), 797 square miles in size, are part of the surviving remnants of the historical Everglades, which originally spread from Lake Okeechobee south to Florida Bay. The WCAs are located west of Route 27 and the Sawgrass Expressway outside the developable area of the county. The WCAs 2 and 3 were created as a result of the construction of levees as part of the Central and Southern Florida Flood Control Project (C&SF) and are a major wetland of great importance. The WCAs serve a variety of purposes, including providing fish and wildlife habitat; supporting fish & wildlife propagation, including nesting grounds for waterfowl; storing regulatory releases of water from WCA 1 in Palm Beach County; conveying controlled water supply releases from Lake Okeechobee to eastern Broward County, Miami-Dade County, and Everglades National Park; detaining and storing water during the wet season for water supply purposes during the dry season; preventing water from flooding eastern Broward County; recharging ground water; and filtrating and purifying water as it percolates into the aquifer or flows towards Florida Bay.

In 1996, there were approximately 5,300 acres of wetlands existing in the area of Broward County east of the WCAs. Approximately 4,300 acres comprise the 3A/3B Seepage Management Area located between WCA 3 and U.S. Highway 27. Most of the remaining 1,300 acres of wetlands have been severely degraded as a result of growth and development activities. A minimal amount of acreage exists which is considered to

be in pristine condition. Major types of wetlands found in the county are melaleuca, cypress, mangrove, and sawgrass. Appendix A categorizes wetland types by community. Additional planning efforts are under way to enhance the protection of the WCAs.

As part of the Comprehensive Everglades Restoration Plan, the SFWMD and the U.S. Army Corps of Engineers are in process of developing the Broward Water Preserve Area (WPA) which will consist of two surface water reservoirs (the C-9 and C-11 Impoundments) and the 3A/3B Seepage Management Area. The purpose of the Broward WPA is to increase the spatial extent of functional wildlife habitat in the project area, help re-establish the natural timing of water deliveries and hydro patterns to the Everglades while maintaining flood protection and increasing aquifer recharge for urban areas. Water stored in these wetlands and reservoirs should also reduce seepage through and under existing levees, thereby reducing loss of water from the WCAs.

Broward County reaps many economic benefits from the protection of wetlands, particularly through the Water Conservation Areas. The continual processes of water filtration and purification as water percolates into the groundwater, especially the Biscayne Aquifer, translate into cost savings in terms of treatment levels required for potable water. Groundwater recharge is also valuable in terms of stemming the tide of saline intrusion, which results from the withdrawal of groundwater more quickly than it can be replaced. Saline intrusion can lead to expensive desalinization of potable water through processes such as reverse osmosis. Map C-4 delineates areas of saline intrusion.

The natural ability of wetlands to absorb excess water during a flood provides an enormous financial value by protecting property and possessions, as well as unquantifiable benefits of protecting human life and societal well-being. The abundance and diversity of wildlife and aquatic life found in wetlands attracts tourists in pursuit of recreational opportunities for fishing, birding, and boating, among others. Tourism can significantly bolster the economy through the influx of new dollars from outside the community. The wetlands of Broward County also have a broader economic impact in terms of contributions to the region. Maintenance of the Water Conservation Areas provides flood protection in Miami-Dade County. The protection of the remaining Everglades assures a flow of water into Florida Bay, which, if the wetlands are performing the ecological functions they are supposed to will help ensure the biological productivity and diversity of the bay.

Alterations of existing wetlands may have an adverse environmental impact on the waters of Broward County and on the ecological functional values wetlands provide. The Environmental Protection and Growth Management Department (EPGMD) 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 EPGMD 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 10 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 10 factors are used to develop a numerical ranking of wetlands, which range from 0.25 to 1.0. Conservation Element Objectives C10, C11 and C12 summarizes the key components of Broward County's Wetland Protection Ordinance and the WBI. It provides that property should be developed so that it avoids or minimizes, to the greatest degree practicable, wetlands. It provides that for wetlands with a WBI ranking of 0.80 or higher, there is a rebuttable presumption against development. This presumption could be overcome, for example, if application of the ordinance resulted in a taking of private property. If a wetland has a WBI below 0.80, then development can occur, but the developer must mitigate or enhance, or both, wetlands to compensate for the loss of wetland functions.

Clean water is fundamental to the health of the County's environment and economy. Public and private water utilities across the County rely entirely upon groundwater sources, including the Biscayne and Florida Aquifers, for potable water supplies. Extreme well stimulation such as hydraulic and acid fracturing (also known as "fracking") pumps a complex mix of fluids and chemicals, including large volumes of water, under very

high pressure into or below the surface of the ground to create fractures in oil-or gas-bearing geologic formations for the purpose of producing or recovering oil or gas. Many of the chemical constituents injected during fracturing have documented adverse effects on human health and the environment. Use of these well stimulation fracturing mixes exposes adjacent land and surface waters to the risk of contamination through open pit storage, truck transport on roadways, and activities during well development. Much of Florida's water supply comes from aquifers in highly-permeable limestone formations which are vulnerable to contamination from hydraulic rock-fracturing activities designed to extract hydrocarbons. On June 23, 2015, the Board of County Commissioners adopted Resolution 2015-340 opposing the use of hydraulic fracturing, acid fracturing and any form of extreme well stimulation for purposed of resource extraction.

## 2. Rivers and Canals

There are approximately 1,800 miles of waterways in the County. All the surface waters of the County are designated by the Florida Department of Environmental Protection as Class III waters. Class III waters have recreation and fish and wildlife propagation as the designated use. Class I waters have public water supply as the designated use. The Figure III.F of the Natural Resource Map Series shows all water features of Broward County.

Primary canals, maintained by the South Florida Water Management District, were originally constructed to provide drainage and flood protection in the low-lying areas of the Lower East Coast. Today, the operation of the primary canals has been expanded to aid in providing water supply, wetland rehydration, 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 surface water discharges and groundwater seepage from Water Conservation Areas 3A and 3B. In drought conditions, local supplies can be supplemented by deliveries of water stored in Lake Okeechobee and transported via the canal system. However, during periods of water shortage, Lake Okeechobee may be unable to provide the necessary water deliveries as was experienced during the drought conditions of the late 1980's and again in 2007. Water management operations and policies will limit future use of regional water deliveries for the purpose of providing recharge of urban canal systems. Water levels in Lake Okeechobee have been lowered by one foot due to concerns about the integrity of the 140-mile long Herbert Hoover Dike which surrounds the lake. This loss

of storage capacity may reduce the amount of water that would otherwise be available for dry season deliveries, a condition likely to persist until rehabilitation of the Dike is completed in 2030. Furthermore, the Governing Board of the South Florida Water Management District adopted the Regional System Water Availability Rule in February 2007. This rule is designed to prevent increased urban reliance upon regional water resources, including the Everglades Water Conservation Areas, beyond levels measured prior to April 2006. Thus, alternative water sources will have to be developed to provide any recharge to urban areas in excess of this threshold. Primary canals are listed in Appendix C-F.

The natural rivers of Broward County, listed in Table C-1, formed the natural drainage system for the Eastern part of Broward County. These rivers originally handled any eastward flow from the Everglades and drainage from low ridges, flatwood areas, and the Coastal Ridge. With the exception of Whiskey Creek, the Tarpon River, and the Stranahan River, the natural rivers of the county have been incorporated in the primary canal system providing conveyance to tidewaters in the Intracoastal Waterway (ICW).

Table C-1
Natural Rivers

| Rivers | |
|---|---|
| Middle River | South Fork of the New River |
| North Fork of the Middle River | Tarpon River |
| South Fork of the Middle River | Stranahan River |
| New River | Whiskey Creek |
| North Fork of the New River | |

## 3. Bays and Lakes

There are no water bodies classified as bays in Broward County. Lakes, the largest of which are West Lake, North Lake, and South Lake, are all located along or immediately west of the Intracoastal Waterway in the incorporated area. Most of the county's existing

lakes are manmade, usually formed as a by-product of excavation or mining activity. There is, however, a natural fresh water lake called Bonnet Slough a portion of which lies within Hugh Taylor Birch State Recreation Area in Fort Lauderdale. There is also a small freshwater lake on the Bartlett Estate, a privately-owned property along Fort Lauderdale's beachfront.

### 4. Groundwater

Two major aquifer systems underlie the eastern part of the county: the deep Floridan Aquifer System and the shallow Surficial Aquifer System. These aquifers are separated by the low permeability sediments of the Intermediate Aquifer System. The principal water-bearing unit of the Surficial Aquifer System is the Biscayne Aquifer. The Biscayne Aquifer is a high-quality aquifer, producing large quantities of water in eastern Broward. The Intermediate Aquifer System serves to restrict the flow of water between the Surficial Aquifer and the Floridan Aquifer Systems. This system does not yield significant quantities of water. The Floridan Aquifer System is present throughout the state and is the deepest part of the active water flow system on mainland Florida. The Floridan contains brackish water in Broward County which requires desalination to be used for either irrigation or potable uses. The City of Hollywood is currently the only Broward County municipality with a permitted Floridan well, with withdrawals approximating one million gallons per day. The Regional System Water Availability Rule adopted by the South Florida Water Management District in February 2007 restricts future withdrawals from the Biscayne Aquifer, currently the primary source of drinking water for Broward County and the entire Lower East Coast of the South Florida Water Management District's service area. As a result, local governments and other water providers will be required to develop alternative water supplies to satisfy water demands that exceed groundwater withdrawals measured prior to April 2006.

## B. Air Resources Quality

The air quality in Broward County is generally in the "good" range 78% of the time, in the "moderate" range over 21% of the time and in the "unhealthy for sensitive groups" range less than 1% of the time. Pressures on the air quality from mobile source emissions have decreased since 2007 due to a reduction in vehicle miles traveled and on-going federal regulations for cleaner vehicles and fuels, and the promotion of alternative modes of transportation such as carpooling, transit, etc.

## C. Commercially Valuable Minerals

Mining is a relatively minor commercial activity in Broward County accounting for only about 0.1 percent of the county's economy. Non-metallic minerals, mostly crushed limestone and gravel used in construction, account for most of the mining activity. This activity is declining as urban uses encroach into the areas previously limited to mining operations.

## D. Soil Associations and Areas with Soil Erosion Problems

Ten different soil associations are shown on Figure III.G of the Natural Resource Map Series. The western portion of the developable area is represented by the Hallandale-Margate and Lauderhill-Dania soil associations. These two (2) soil associations are characterized by nearly level, generally sawgrass marsh and are considered to be unsuitable for septic tank and drain field use. The soils are organic and overlie limestone. In many places, the soils are shallow (between 40-60 inches). As areas are developed, organic soils are removed (demucking process) and fill, consisting of rock or sand, is deposited.

The central portion of the developable area consists of nearly level, grassy areas, interspersed with small ponds. The Immokalee, Immokalee-Pompano, and Duette- Pomello soil associations are wet and sandy, underlain by limestone. This area is undergoing rapid urban development which requires the use of fill to raise surface elevations.

The eastern portion of the developable area is made up of sandy soils, some of which are poorly drained while other parts are excessively or well drained. Sandy soils include the Paola-St. Lucie, Palm Beach-Beaches, and Dade soils associations. Since the installation of drainage structures, the area has been almost entirely developed for urban use.

The U.S. Department of Agriculture, Natural Resource Conservation Service, indicates that inland soil erosion is minimal except at construction sites. With 24 miles of ocean shoreline, coastal erosion whether caused by the natural flow of sand, storm/wave action or man-made construction will always be a major concern for Broward County. (See Coastal Management Element for details on coastal erosion.)

## E. Natural Resource Areas

### 1. Recreationally Important Fish or Shellfish

Recreational fishing is one of the most important activities off the County coast. It is also important in the freshwater areas of the county in-land, with fishing activities primarily occurring in the Water Conservation Areas. Charter boats, drift boats, pleasure craft,

tackle and bait businesses constitute a major part of the recreational fishing industry. A large variety of aquatic life is supported in the county's inland and offshore waters. Salt and freshwater catches include bass, sailfish, dolphin, mackerel, bluefish, amberjack, black-fin, tuna, and swordfish. The Florida ~~Freshwater Fish and Game~~ Fish and Wildlife Conservation Commission regulates freshwater fishing in unincorporated Broward.

## 2. Commercially Important Fish or Shellfish

Very little commercial fishing takes place in Broward County waters. Netting, fish traps, and bottom longlines are prohibited by the State. Commercial fishing and shell-fishing has declined to about half between 1994 and 2011 with total catch for Broward County of measuring 1.6 million pounds in 1994 and 894,093 pounds in 2011. Among the approximately fifty different species that were reported- Swordfish held the highest count with 301,769 pounds.

## 3. Wildlife

Broward County consists of a variety of diverse ecological communities. Nine ecological communities have been identified and described by the Interpretive Section of the Parks and Recreation Division. Numerous species of plants and wildlife inhabit those communities including 135 species of endangered, threatened, or rare plants, mammals, birds, and reptiles. Listings of dominant plants and wildlife can be found according to ecological community in Appendix C-A. Endangered, threatened, rare, and species of special concern can be seen in Appendix C-B.

## 4. Marine Habitats

Most of Broward marine habitat is shallow open ocean area along the coast. Since 1967 Broward County has conducted an artificial reef program to provide habitat for marine species and expand recreational diving and fishing opportunities. Artificial reef sites are listed in Appendix C-E. Estuarine and mangrove habitat areas provide nesting areas and nurseries for many marine species. An inventory and description of the mangrove community is provided in Appendix C-A. See the Coastal Management Element for more information on management of estuarine and mangrove habitats.

The aquatic environment also supports threatened and endangered species such as the West Indian Manatee which, as of February 2017, had a minimum population count of 6,620 in Florida. As a result, the U.S. Fish & Wildlife Service issued its final rule to

downgrade the status of the West Indian Manatee from endangered to threatened under the Federal Endangered Species Act.

Three endangered or threatened species of sea turtle nest in Broward County: Loggerheads (Caretta caretta), Atlantic Green Turtles (Chelonia mydas), and Atlantic Leatherbacks (Dermochelys coriacea). EPGMD's Sea Turtle Conservation Program involves delineating major nesting areas, identifying nests, and relocating endangered nests either to hatcheries or safer areas of the beach. The most recent list of Florida endangered species can be found in Chapter 68A-27.003, Florida Administrative Code.

### 5. Vegetative Communities

An inventory of vegetative communities is incorporated in Appendix C-A Ecological Communities and an inventory of endangered and threatened plants is included in Appendix C-B. Figure III.B of the Natural Resource Map Series shows the environmentally sensitive lands in Broward County.

## F. Current Water Needs and Sources

The total average daily raw water demand in Broward County in 2015 was 215 million gallons per day (mgd) or 120.8 gallons per capita per day. More than 2,600 miles of canals and levees, 1,300 water control structures and 66 pump stations make up the regional water management system. The Biscayne Aquifer is an unconfined aquifer that underlies all of Broward County, Miami-Dade County and the southeastern Palm Beach County and is the primary water source for public water supply in these areas. Aquifer recharge primarily occurs as a result of local rainfall and recharge from the County's expansive canal network which provides a direct connection between surface waters and groundwater in the Biscayne Aquifer. Recharge of the County's canal network is provided through rainfall and surface water deliveries from the Water Conservation Areas located to the west of urban Broward County. Water Conservation Areas also provide aquifer recharge through groundwater seepage. The relative importance of the Water Conservation Areas as a source for aquifer recharge increases during the dry winter months and periods of drought. (See Drainage/Natural Groundwater Aquifer Recharge Element). While the County receives an average of sixty inches of rainfall a year, because of evapo-transpiration and runoff discharged directly from canals to the Atlantic Ocean, only fifteen to twenty inches actually reach the Aquifer.

The South Florida Water Management District (SFWMD) regulates the withdrawal of potable water from the Biscayne Aquifer through the issuance of a consumptive use permit. The standard consumptive use permit is valid for up to five (5) years although permits can be issued

for a period of up to twenty (20) years if certain conditions are met. Significant changes in regional water policy occurred with the adoption of the Regional System Water Availability Rule by the South Florida Water Management District's governing board in February 2007. The rule is designed to ensure that water needed for Everglades restoration and natural system function is retained within the Everglades and will require that local water providers and managers develop strategies to meet future water supply needs without creating additional demands on the regional system through surface water management or wellfield operations. Potential alternative water supplies include the Floridan Aquifer, reclaimed water, desalination, and aquifer storage and recovery. Alternative water supplies may be used to provide direct offsets for potable water demands or wellfield operations through recharge of the canal system and aquifer.

Consistent with regional water policy and as part of water resource planning efforts and as part of the Countywide Integrated Water Resources Plan, Broward County is developing a Countywide water management master plan with the application of the County's integrated surface water and groundwater model. The project will include a Countywide assessment of water demands and the identification, sizing, and cost estimates for various alternative water supply projects and management strategies capable of fulfilling the County's water supply needs and water resource goals through 2025.

The water quality status of our surface water resources in Broward County is generally good. In the last year, phosphorus levels at the S-9 Pump Station increased along with a decrease in urban water quality in the C-13 Canal. Pressures on water quality, such as building permits and locations without surface management regulation, have a decreasing trend. Efforts to improve water quality, such as street sweeping, certification of NatureScape Sites and education on environmentally-friendly landscaping, continue to increase. Groundwater wells for public water supply continue to meet standards. A trend toward increasing groundwater levels reversed in 2011. However, a growing number of wells are showing saltwater intrusion. Pressures on groundwater quality, such as septic systems, solid waste, number of contaminated sites and reported hazardous material discharges, are decreasing. Many water conservation efforts, such as the NatureScape Irrigation Service, Conservation Pays toilet rebates, and NatureScape educational programs, coupled with the Countywide 2-day per week limit on landscape irrigation, have resulted in a decrease in potable water well withdrawals and per capita consumption.

# ANALYSIS REQUIREMENTS

## A. Water Resources and Water Quality

### 1. Wetlands

Wetlands acreage in Broward County continues to decline due to development pressure primarily in southwest Broward. To compensate for unavoidable wetland impacts, EPGMD 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. Conservation Element Objective C8 summarizes the County's policies toward wetlands. Figure III.E of the Natural Resource Map Series is a map of wetlands within Broward County developed by EPGMD and updated annually (See Water Management Element Element).

The WCAs do provide opportunities for recreational opportunities for fishing, air boating, and limited hunting. Access points for these activities are located along I-75 and U.S. 27.

The largest pollution threat to wetlands in the WCAs is agricultural runoff from the Everglades Agricultural Area around Lake Okeechobee and within Palm Beach County. Another potential source of pollution is from the back pumping of storm water runoff from the developed areas. This activity can deliver storm water runoff from parking lots, roadways, commercial and agricultural operations, and residential lawns into the conservation areas. Agricultural and storm water runoff contain pollutants such as heavy metals, nutrients (nitrogen and phosphorus), and toxic substances. The S-9 pump station located at the western-most point on the C-11 Canal, adjacent to the WCA 3B has been a major source of urban pollution from Broward County to the Everglades. As part of flood protection operations, urban storm water runoff is discharged to WCA 3B through the S-9 pump station following storm events. Additional pumping from the C-11 occurs to return seepage lost from the WCA. The South Florida Water Management District has installed the S-381 structure to separate urban runoff in the C-11 Canal from WCA seepage so that more frequent back pumping with the smaller S-9A pump station returns only clean water to the WCA. The South Florida Water Management District is also developing the Broward Preserve Areas (WPA) as part of the Comprehensive Everglades Restoration Plan. The WPAs will include two impoundments that will store

urban storm water to lessen the need for operation of the S-9 pump station during heavy rain events.

Another threat to wetlands in the developed area, though not necessarily pollution, is the loss of viability of wetlands that are used as on-site mitigation through lack of maintenance or the original quality of the wetland was poor and was not suitable for sustained on-site mitigation.

Water utilities across the County rely entirely upon groundwater sources, including the Biscayne and Florida Aquifers, for potable water supplies. Use of well stimulation fracturing techniques and mixes exposes adjacent land and surface waters to the risk of contamination through open pit storage, truck transport on roadways, and activities during well development. On June 23, 2015, the Board of County Commissioners adopted Resolution 2015-340 opposing the use of hydraulic fracturing, acid fracturing and any form of extreme well stimulation for purposed of resource extraction. Policy C3.4 prohibits oil, gas, and mineral extraction and exploration, through drilling, core testing, fracking, and any other methods, in areas designated for Conservation future land use on the Broward County Land Use Plan or the BMSD Future Land Use Map Series.

## 2. Rivers and Canals

During the summer months or rainy season, urban runoff (nonpoint 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, hygrophyla and cattail which deplete water of dissolved oxygen. Urban runoff also transports toxic materials such as pesticides, heavy metals, hydrocarbons and dissolved inorganic materials. Objective C3 addresses water quality.

As development activity increases, the total amount of polluted urban runoff concurrently increases. Therefore, urban development and storm water runoff have a serious negative impact on surface water quality (see Water Management Element). Map C-3 shows storm water outfalls regulated by a National Pollutant Discharge Elimination System permit.

There are approximately 29 miles of rivers and canals within the BMSD of Broward County. This represents two (2) percent of the nearly 1,800 miles located in the county. The potential for the protection and conservation of rivers and canals is limited because most of the land surrounding the rivers and canals in the BMSD is developed.

Water quality in rivers and canals is important to the county. The Broward River Trails Program establishes linear parks and greenways along rivers and canals which serve as buffers filtering pollutants and preserving water quality. Land is secured by utilizing techniques such as conservation easements, purchase of development rights and donations. Several pitfalls associated with the implementation of the River Trails Program include property owners concerns over issues such as liability, crime and litter.

The Middle and New River systems are mainly used by private boat owners for dockage and access to the ICW and the ocean. Major commercial yacht building, repair, and marina facilities are located along the New River as it flows through Fort Lauderdale and along the South Fork of the New River just west of I-95.

The largest pollution threat to surface waters in the county is storm water runoff from roadways, parking lots, golf courses and residential lawns. In canals where marinas and private boat dockage are located, a major pollution threat is point source pollution from live aboard boats/vessels and ship repair facilities. Live aboard vessels are known to illegally release raw sewage, degrading the water with pollutant inputs such as floatable debris and coliform bacteria. Marinas contribute debris from construction and repair of vessels. The combination of these factors makes the New River the most contaminated in the county.

The EPGMD 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 46 surface water stations located on major waterways of the county. Map C-1 depicts surface water monitoring sites. 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 results and data of this testing program are currently being used by state and federal agencies to assess the water quality condition of the County's surface waters per the United States Clean Water Act and state of Florida's Watershed Restoration Act.

The EPGMD 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 Planning & Community Resilience 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.

## 3. Lakes

Lake excavation in the County is regulated by Chapter 27 of the Broward County Code. Licenses are required by EPGMD for the creation of lakes, canals and other water bodies.

To obtain a license, the planned lake must meet the requirements presented in Ordinance 93-49 for minimum side slope and vegetation. Previously, many lakes and borrow pits were constructed with little or no side slope, which were dangerous for children and non-swimming adults. Earlier designs also rendered them biologically dysfunctional and provided direct access of polluted runoff to the Biscayne Aquifer. Poorly designed rock pits increased the opportunity for unfiltered or untreated urban runoff to enter the aquifer. Erosion from excavated material contributed to the siltation of the associated rock pit. Further, open rock pits and slag piles became hazards to the public if not properly safeguarded. Since the licensing program's inception in 1993 newly created lakes have been successfully designed to meet certain side slope and vegetative requirements. Some problems have been encountered with property owners who find vegetation in lakes objectionable and do not allow it to grow. Objective C5 addresses soils and soil erosion.

## 4. Groundwater

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 threatening groundwater supplies in eastern portions of the County. The saltwater intrusion line has been moving steadily westward for the past few decades. Saltwater intrusion is caused by historical drainage of freshwater wetlands and resultant loss of freshwater head and can be exacerbated by increased pumping of groundwater and diversion of surface water flows for drinking water, irrigation, and other purposes.

Saltwater intrusion currently threatens ten major wellfields operated by Broward County and the municipalities of Dania Beach, Deerfield Beach, Fort Lauderdale, Hallandale Beach, Hillsboro Beach, Hollywood, and Pompano Beach. Those wellfields include 155 wells with a combined pump capacity of 350 mgd, representing 48% of total wellfield pump capacity Countywide. The U.S. Geological Survey, SFWMD, WWS, and EPGMD

operate a groundwater monitoring system designed to track the extent of saltwater intrusion in the County.

Another serious water quality issue is the potential for contamination of the public drinking water supply by industrial/commercial pollution. The Broward County Board of County Commissioners adopted the original Wellfield Protection Ordinance in August 1984. The current version of the Wellfield Protection Ordinance, No. 93-7, was enacted on November 23, 1993. The purpose of the Ordinance is to safeguard public health by providing criteria for the regulation of storage, handling, use and production of hazardous and toxic substances within the protected areas of water supply wells.

Implementation of the Hazardous Material Regulations and Storage Tank Regulations 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. Approximately 5,830 facilities are currently licensed and are inspected at least biennially. EPGMD maintains a response program to investigate threats of contamination, participate in the cleanup and prepare enforcement cases as appropriate. The current version of the Hazardous Materials and Storage Tank Regulations include Ordinance Nos. 93-7 and 93-6, respectively.

More than 23,000 tests are performed each year to comply with national standards in WWS' NELAP certified drinking water laboratory. WWS also employs certified water treatment operators who conduct more than 317,000 process control tests annually. These tests ensure that the water treated and delivered to Broward County customers meets or exceeds all federal requirements for safe drinking water under the Safe Drinking Water Act. Table C-2 lists the parameters set by the Safe Drinking Water Act, the levels detected in potable water for Districts 1A, 2A, 3A and 3B/C and includes the results of monitoring for the period of January 1 to December 31, 2015. Data obtained before January 1, 2015, and presented in this report, are from the most recent testing done in accordance with drinking water laws, rules and regulations.

# Table C-2
# 2015 Water Quality Report

## WHAT IS IN MY WATER? - 2015 TEST RESULTS *(3A and 3BC water supplied by the City of Hollywood)*

**MICROBIOLOGICAL CONTAMINANTS**

| Contaminant | Dates of Sampling (mo/yr) | MCL Violation Y/N | 1A Highest Monthly % Positive | 2A Highest Monthly % Positive | 3A Highest Monthly % Positive | 3BC Highest Monthly % Positive | MCLG | MCL | Likely Source of Contamination |
|---|---|---|---|---|---|---|---|---|---|
| Total Coliform Bacteria (treated water in the distribution system) | 01/15 - 12/15 | N | 4.7% | 1.6% | 4.2% | 4.9% | 0.0% | > 5.0% | Naturally present in the environment |

**INORGANIC CONTAMINANTS**

| Contaminant | Dates of Sampling (mo/yr) | MCL Violation Y/N | 1A | 2A | 3A | 3BC | MCLG | MCL | Likely Source of Contamination |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic (ppb) | 05/14-08/15 | N | ND | ND | 0.81 | 0.81 | 0 | 10 | Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes |
| Barium (ppm) | 05/14-08/15 | N | 0.004 | 0.006 | 0.0033 | 0.0033 | 2 | 2 | Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes |
| Fluoride (ppm) | 05/14-08/15 | N | 0.87 | 0.849 | 0.48 | 0.48 | 4 | 4 | Erosion of natural deposits; discharge from fertilizer and aluminum factories. Water additive which promotes strong teeth when at the optimum level of 0.7 ppm |
| Nitrate (ppm) | 05/14-08/15 | N | 0.284 | 0.417 (ND-0.417) | 0.064 | 0.064 | 10 | 10 | Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits |
| Nitrite (ppm) | 05/14-11/15 | N | ND | 0.442 (ND-0.884) | ND | ND | 1 | 1 | Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits |
| Sodium (ppm) | 05/14-08/15 | N | 42.2 | 30.5 | 28.9 | 28.9 | NA | 160 | Salt water intrusion, leaching from soil |

**DISINFECTANTS and DISINFECTION BY-PRODUCTS**

| Contaminant | Dates of Sampling (mo/yr) | MCL Violation Y/N | 1A (range) | 2A (range) | 3A (range) | 3BC (range) | MCLG or MRDLG | MCL or MRDL | Likely Source of Contamination |
|---|---|---|---|---|---|---|---|---|---|
| Chlorine (ppm) | 01/15 - 12/15 | N | 3.1 (0.4-4.1) | 3.4 (0.5-4.1) | 3.6 (1.1-4.1) | 3.1 (0.9-4.0) | 4.0 | 4.0 | Water additive used to control microbes |
| HAA5-haloacetic acids (ppb) | | N | 43.63 (12.8-68.1) | 15.05 (ND-24.4) | 7.02 (5.64-7.02) | 12.3 (7.22-12.3) | NA | 60 | By-product of drinking water disinfection |
| TTHM-total trihalomethanes(ppb) | | N | 58.77 (34.2-71.5) | 14.08 (8.73-18.5) | 5.45 (4.57-5.45) | 13.8 (10.6-13.8) | NA | 80 | By-product of drinking water disinfection |

**LEAD and COPPER (Tap Water)**

| Contaminant (90th Percentile Value) | Dates of Sampling (mo/yr) | AL Violation Y/N | 1A | 2A | 3A | 3BC | MCLG | Action Level (AL) | Likely Source of Contamination |
|---|---|---|---|---|---|---|---|---|---|
| Copper (Tap Water) (ppm) | 08/13 | N | 0.06800 | 0.04500 | 0.09900 | 0.03700 | 1.3 | 1.3 | Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives |
| # of Sites exceeding the AL | | | 0 | 0 | 0 | 0 | | | |
| Lead (Tap Water) (ppb) | | N | 8.48 | 1.89 | 1.79 | 2.45 | 0 | 15 | Corrosion of household plumbing systems |
| # of Sites exceeding the AL | | | 0 | 0 | 0 | 0 | | | |

**UNREGULATED CONTAMINANTS**

| Contaminant | Dates of Sampling (mo/yr) | MCL Violation Y/N | 1A (range) | 2A (range) | 3A (range) | 3BC (range) | Draft Reference Concentration (RC) | Likely Source of Contamination |
|---|---|---|---|---|---|---|---|---|
| Chlorate (ppb) | 01/15-02/15 | NA | NA | 325 (320-330) | 230 (230-230) | NA | 210 | Agricultural defoliant; disinfection by-product |
| Chlorodifluoromethane (ppt) | 01/15-02/15 | NA | NA | 110 (110-110) | 170 (170-170) | NA | Not Available | Refrigerant; solvent; fluorocarbon resins |
| Chromium (ppb) | 01/15-02/15 | NA | NA | 0.43 (0.42-0.43) | 0.235 (0.23-0.24) | NA | 100 | Naturally occurring element |
| Hexavalent Chromium (ppb) | 01/15-02/15 | NA | NA | 0.18 (0.16-0.19) | 0.053 (0.0560-0.056) | NA | Not Available | Release of industrial chemicals |
| Molybdenum (ppb) | 01/15-02/15 | NA | NA | ND | ND | NA | 40 | Naturally occurring element |
| Strontium (ppb) | 01/15-02/15 | NA | NA | 410 (400-420) | 225 (220-230) | NA | 4000 | Naturally occurring element |
| Vanadium (ppb) | 01/15-02/15 | NA | NA | 0.87 (0.85-0.88) | 0.435 (0.43-0.44) | NA | 21 | Naturally occurring element |

Source: Broward County Water and Wastewater Services, 2015 Water Quality Report

## B. Air Resources

Ambient air monitors continue to report that the air quality in Broward County is about 78% in the good range (i.e. Air Quality Index in the 0 – 50 range). However, Broward County's air quality exceeded the U.S. Environmental Protection Agency (EPA) National Ambient Air Quality Standards (NAAQS) less than one percent (1%) in the past 5 years, indicating that continued growth rates could pose a challenge in the future to meet these standards, unless the County is environmentally vigilant when approving land use and transportation plans. Broward County is within eight to ten years of using all of its available land and the impact of future growth should be carefully planned to determine the detrimental effect, if any, on air quality. Exceeding the EPA NAAQS due to excessive emissions could result in facilities having to spend more money to install costly pollution control equipment and state and local agencies having to implement costly transportation control measures.

In accordance with EPA, Florida Department of Environmental Protection (DEP) and local air regulations, EPGMD issues air permits and performs air compliance inspections of facilities that cause, contribute or have the potential to emit significant air pollution. EPGMD will continue to enforce EPA, DEP and local asbestos regulations to protect the public from exposure to asbestos fibers that may result from the disturbance and/or removal of asbestos containing building products and systems during the renovation or demolition of public, commercial, industrial and certain types of residential structures and building systems. In addition, EPGMD has representation in the Metropolitan Planning Organization Technical Committee (MPOTC). As part of the active role in the MPOTC, EPGMD promotes alternative modes of transportation, transit-oriented development and walkable communities to alleviate traffic congestion and air pollution. The Department is also involved in the promotion and implementation of alternative fuel vehicles through participation in local, state and federal initiatives and public-private partnerships.

## C. Floodplains

In general, the County has been managing floodplains successfully since 1977 through the review and permitting process. Flooding problems have been greatly alleviated, by the creation of 19 drainage/water control districts which have developed a system of secondary canals and small manmade lakes (see Water Management Element). Even with the existence of flood control regulations and structures, flooding is still a major issue. As a result, Broward County is a recognized participant community in the Federal Flood Insurance Program. This program requires the adoption of a resolution of intent to participate and cooperate with FEMA and submit a floodplain management ordinance that meets or exceeds the minimum NFIP criteria

and of which also adopts any Flood Insurance Rate Map or Flood Hazard Boundary Map for the community.

## D. Commercially Valuable Minerals

Mining activities by their nature of operation have a negative impact upon surface water quality. All such activities in the County are surface extractions resulting in open rock pits and slag piles. Rock pits increase the opportunity for unfiltered or untreated urban runoff to enter the Aquifer. Erosion from excavated material contributes to the siltation of the associated rock pit. Further, open rock pits and slag piles become hazards to the public if not properly safeguarded. Newly adopted state reclamation requirements as specified within the Resource Extraction Reclamation Act of 1986 (Chapter 378, FS) address some of these concerns. Requirements for reclamation, trash and unusable equipment disposal, erosion control and revegetation provide these safeguards. In addition, the U.S. Army Corps of Engineers and the SFWMD have adopted standards for the creation of littoral slopes which may introduce biological function to reclaimed rock pits. Objective C4 manages mineral resources.

## E. Soil Associations and Areas with Soil Erosion Problems

Of Broward County's ten (10) soils associations, only the Hallandale-Margate and Lauderhill-Dania soil associations are generally unsuitable for septic tank usage. In these two (2) soil associations, septic tank usage could potentially cause adverse impacts to groundwater or surface waters if residential densities or non-residential intensities are too high, as shown in the Broward County Land Use Plan's Natural Resource Map Series.

Objective C5 provides for the County to maintain its land development codes allowing septic tanks where a centralized wastewater system is not available, provided all legal requirements are met. The term—available as used herein is intended to be interpreted consistent with the Section 64E-6.002(9), FAC. The land development codes governing septic tank usage are codified in Chapter 34, Article II½, Broward County Code of Ordinances (Code).

The land development codes mandating that all premises which abut a sanitary sewer main be connected to the sanitary sewer main, unless exempted, are codified in Chapter 34, Article II, Code. The Code provides for two (2) exceptions. The first exception is for connection charges that are not just or unreasonable. The second exception, adopted into Chapter 34 on July 14, 1998, is for areas designated with a rural residential designation (1 dwelling unit per acre or less). These two (2) articles, which are considered environmental regulations and thus apply Countywide, supplement the standards for onsite sewage treatment and disposal system provisions codified in Chapter 64E-6, Florida Administrative Code (FAC).

The U. S. Department of Agriculture, Natural Resource Conservation Service (NRCS) has indicated that inland erosion is minimal except for siltation at construction sites. Coastal erosion continues to be the main concern. The Broward County Erosion Prevention District was established in 1963 by special act of the Florida Legislature and given the authority to implement a beach preservation program for the twenty-four miles of ocean shoreline in Broward County. In 1992, DPEP took over the functions of the Erosion Prevention District. (See the Coastal Management Element). Soil erosion is addressed through Objective C5.

## F. Natural Resource Areas

### 1. Recreationally Important Fish and Shellfish

Opportunities to enhance or improve recreational saltwater fishing are extremely limited because there is only approximately 1.2 miles of coast line in unincorporated Broward. However, because recreational saltwater fishing is considered to be so important to the County, the EPGMD created the Artificial Reef Program, which is described in the marine habitat category of the natural resource section. Marine habitat and fisheries are addressed by Objective C7.

### 2. Commercially Important Fish and Shellfish

Opportunities to enhance or improve commercial saltwater fishing are extremely limited because there is only approximately 1.2 miles of coast line in the BMSD. However, because commercial saltwater fishing is considered to be so important to the County's economy, the EPGMD created the Artificial Reef Program, which is described in the marine habitat category of the natural resource section. Marine habitat and fisheries are addressed by Objective C7.

### 3. Wildlife

Conservation of wildlife species is dependent upon the conservation of the vegetative resources that provide them with food, shelter and nesting areas. In 2009, the Broward County Commission designated 46 Native Vegetation Category Local Areas of Particular Concern (LAPC) and 79 Natural Resource Areas (NRA), many of which are also LAPCs. Appendix C-C lists NAPCs, LAPCs and NRAs. These areas 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. Development is preceded by an environmental impact report and, potentially, mitigation measures if

they are required. During the development review of the LAPC sites, all or a portion of the designated resource can be set aside as a private or public preservation area.

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. Appendix C-D lists the Urban Wilderness Areas.

Development will continue in Broward County for the foreseeable future, therefore, pressures to develop environmentally sensitive areas shall continue. It is assumed that state grants, such as the Conservation and Recreational Lands (CARL) program, and locally generated funds, such as regional park impact fees, will be utilized for acquiring sites on the Urban Wilderness Inventory. Appendix C-D contains the Urban Wilderness Inventory. Additionally, through the 1989 Environmentally Sensitive Land Bond Issue that was approved by the voters of the County, nearly 1000 acres of the most endangered sites have been purchased for conservation and passive park usage. Wildlife is addressed by Objective C7.

## 4. Marine Habitats

To create additional habitat for marine life, the EPGMD manages an active artificial reef program. Through this program, objects such as derelict ships, oil platforms and engineered structures are introduced into the marine environment. These underwater structures provide shelter and foraging areas for fish, substrate for benthic organisms and nursery areas. The effectiveness of the Artificial Reef Program is inconclusive. Certainly, more habitat is being provided. It is not known whether providing an increased quantity of habitat actually leads to an increased abundance of aquatic life or biodiversity, although that is the presumption of many leaders in the field of marine biology and oceanography. According to NOAA, research suggests that in some instances, artificial reefs may divert some pressure away from natural reefs while still allowing visitors to enjoy diverse marine life. Because many of these divers, snorkelers and anglers charter through local businesses, artificial reefs can have a positive impact on local economy as well. In some instances, however, the negative ecological impacts of artificial reefs may outweigh potential economic gains. For example, development of artificial reefs may cause an increase in overall visitation to an area, meaning more visitors to both artificial and natural reefs. Or, if artificial reefs are not carefully planned or constructed, they can potentially damage natural habitats. In addition, monitoring observations indicate that many artificial structures are quickly becoming habitat and

possibly a spawning source for invasive species such as the orange-cup coral. Marine habitat is addressed by Objective C7.

Manatees, which inhabit rivers, shallow estuaries, and saltwater bays, are found year-round in Broward County. In 1993 the State of Florida approved County-recommended speed restrictions along most major waterways for manatee protection. Manatee numbers increase during the winter months when migration from the central part of the State occurs.

A portion of Port Everglades remains designated as a "Manatee Sanctuary" by the Florida Legislature. Additionally, the cooling lakes connected to the inland FPL power plant have been designated "essential manatee habitat" by Broward County and as a "no entry zone" by the State.

Manatees have no known predators however principal threats to the manatees' existence in Broward County are boat or barge collisions and crushing or drowning in canal locks. Although manatees are protected under the Endangered Species Act and the Marine Mammal Protection Act, a slow decrease in their population is projected by experts in the field.

In 2007, the Environmental and Growth Management Department developed the Manatee Protection Plan to ensure the long-range protection of the manatee species and its habitat by implementing additional manatee protection measures and including increased law enforcement, manatee monitoring, education and awareness throughout the County's waterways that are accessible to manatees.

As part of the Plan, the Board adopted Ordinance No. 2007-34, which, beginning October 1, 2008:

1. Established a $400 (with a 4% annual increase) per new slip fee for new marine facilities or existing marine facilities undergoing expansion.

2. Sets an annual manatee conservation fee of $20 (with a 4% annual increase) per slip for all facilities with five or more slips (multi-family residential, commercial, municipal and private marinas, and/or boat ramps).

3. To help document and track the number of slips in the County, requires facilities with five or more slips to apply for an annual Marine Facility Operating License.

All three species of sea turtles known to nest in Broward County are designated as either endangered or threatened. There are numerous reasons for the decline in the turtles' populations. Coastal development activities have the greatest negative impact. The Sea Turtle Conservation Program, administered by EPGMD, serves to mitigate the negative effects of development activities by marking and recording nesting sites, and when necessary, relocating turtle eggs to non-hazardous areas. This program is funded and administered by the Board through the Environmental Planning and Community Resilience Division (EPCRD) and carried out by Nova Southeastern University to conduct sea turtle nesting surveys daily from March 1, 2015 – October 31, 2015 for all Broward County beaches except John U Lloyd State Park (Index Beach, monitored by Park staff). All loggerhead, green and leatherback turtle crawls (nests and false crawls) were identified to species and recorded by Geographic Positioning System (GPS). All nests were marked using wooden stakes and Red-Glo flagging tape and monitored throughout the season until they hatched or were determined to be non-viable. Reproductive success was investigated for a total of 2,172 nests after hatch-out (2,087 in situ, 41 Relocated, 44 Restraining Cage nests). The 2015 sea turtle nesting season had the second highest nest numbers since the inception of the project/surveys in 1981, although earlier years may have slightly varied in survey area and season length. Nesting Success (Nests/(Nests + False Crawls)) averaged 41.2% for all species combined, 39.6% for loggerheads, 51.0% for greens, and 97.2% for leatherbacks. The combined species nesting success was 10% lower than the 2014 season and nearly 7% lower than the 5-year average of 48.0%.

## 5. Vegetative Communities

The Tree Preservation Ordinance has provisions for the protection of Natural Forest Communities (NFC). Sites designated as an NFC must preserve portions of their property through a conservation easement to receive a Tree Removal License. Municipalities which have their own Tree Ordinances are required to have similar provisions. However, in some cases enforcement of Municipal Tree Ordinances is less stringent and may not provide adequate protection.

Preservation of the native understory vegetation within native communities is accomplished, in part, by the Natural Resource Area provisions of the code which limits the clearing activities that may occur on the site until a certain level of development approval is received. There are 79 sites that have been designated by the Board as NRAs.

To re-establish the benefits provided by native plants within the developed environment, a certain percentage of native plants is required within landscape plans reviewed by the County. Broward County also administers the NatureScape Broward program with the goal of protecting water quality and quantity, and creating wildlife habitat through appropriate landscaping practices, the prudent use of our water resources, and the planting of native, non-invasive and other drought tolerant plants in Broward County. Policy C6.8 references the implementation of the NatureScape Broward program and program principles as part of the County's efforts to achieve water conservation as landscape irrigation accounts for up to 50% of water consumption in Broward County. Additionally, plant species known to invade natural vegetative communities are precluded from use by the landscape ordinance. Objective C8 conserves and protects native vegetative communities.

Table C-3
Broward County Projected Water Demand

| | 2016 | 2025 | 2035 | 2045 |
|---|---|---|---|---|
| Population | 1,909,632 | 2,000,000 | 2,100,000 | 2,200,000 |
| Projected Required Allocation (mgd) | 318 | 246.7 | 261.9 | 272.9 |
| Projected Required Additional Pumpage (mgd) | 239.4 | 7.3 | 22.5 | 33.5 |

*Projected Broward County water demands based on current BEBR and PCUR measured in 2016 provided by the Environmental Planning and Community Resilience Division.

## 6. Projected Water Needs and Sources

Broward County's population is projected to increase by 13.2% between 2012 and 2027, from 1.76 to 2 million people. The Biscayne Aquifer is currently the primary drinking water source for all of Broward County and even under current demands has been

subject to restrictions during periods of water shortage. In the absence of alternative water supply development, raw water demands on the Biscayne Aquifer would be expected to increase at a rate commensurate with population growth, assuming that the treatment technology and the per capita rate of consumption were to remain the same. However, Broward County's overall raw water demands are likely to increase at a rate that surpasses that of population growth since many water utilities are expected to upgrade their treatment technologies from lime softening to membrane filtration, the latter of which has lower recovery of finished water but produces a higher water quality. Membrane filtration systems will also allow utilities to utilize the brackish Floridan Aquifer as a source water for potable treatment systems through upgrading of filtration skids, thereby providing diversification in water sources, increasing overall treatment capacity to meet growing demands, and achieving consistency with the Regional System Water Availability Rule.

Recognizing the potential value of water conservation programs, the Board instituted a variety of measures in 1991 to reduce per capita water use. The key components of these plans are discussed below. As shown, the water conservation programs developed on a Countywide basis are focused on ordinances that require specific irrigation hardware, restriction of outdoor uses of water, low-flow fixtures for indoors and public education.

1. The Board adopted an ordinance that requires the installation of rain sensor devices on all irrigation systems installed after May 1, 1991 (Chapter 39, Broward County Code of Ordinances, Article VII). These sensors prevent irrigation systems from turning on when it is raining. The ordinance does not affect systems installed prior to 1991.

2. The Board adopted a Countywide ordinance (Ordinance 91-8, Chapter 36, Broward County Code of Ordinances, Article II) limiting hours of irrigation from 5:00 PM to 9:00 AM. The primary focus of the ordinance is to allow irrigation only during night time hours and to encourage the use of low flow watering by providing exemptions for low volume irrigation systems.

3. The Board adopted a Countywide ordinance (Chapter 39, Broward County Code of Ordinances, Article VIII) adopting the principles of ~~Xeriscape~~Florida Friendly Landscaping. This ordinance is intended to conserve water by promoting the use of native plant communities that require less frequent watering.

4. The Board adopted a Countywide ordinance (Chapters 5 and 39, Broward County Code of Ordinances, Article III) applying the South Florida Building Code, which requires water conservation fixtures and low flow volume irrigation. The ordinance applies to all construction occurring after the date of ordinance passage but does not address retrofitting of buildings prior to the data of the ordinance.

5. The Board approved Resolution 85-867 to adopt FAC Chapter 40E-21 by reference at such time the South Florida Water Management District declares a water shortage condition exists. Graduated, detailed and specific water reductions are mandated in such an emergency and are fully enforceable by law enforcement agencies.

In addition to the Countywide ordinances adopted by the Board, the EPGMD has implemented a Countywide water conservation and educational outreach program called Water Matters, designed to inform homeowners, professional property managers, and children about the need for water conservation and the connection between urban water practices and the quality of our natural resources. Several Water Matters program initiatives are implemented in partnership with municipal governments, drainage districts, businesses and other governmental agencies.

1. EPGMD annually coordinates and administers the celebration of Water Matters Day, a Countywide water conservation event to educate residents about the need for water conservation, water management in Broward County and ways they can help conserve and protect local water resources.

2. EPGMD implements the nationally recognized Naturescape Broward program which promotes the use of native and other drought tolerant and low-maintenance plants in landscaping to protect the quality and quantity of water resources.

3. EPGMD operates a NatureScape Irrigation Service (NIS) designed to achieve significant reductions in landscape irrigation through landscape site evaluations that assist property managers in providing more efficient maintenance and operation of large volume irrigation systems.

4. EPGMD provides Know-the-Flow training to landscape professionals, property managers, public works staff and others on a monthly basis. Know-the-Flow is a 4-hour course in surface water management and best management practices to protect the quality and quantity of local water resources.

5. EPGMD staffs the Broward Everglades Working Group with representation from municipalities, drainage districts, agricultural and other interest groups, which was convened to develop a pollution reduction action plan for the C-11 West Basin as part of local efforts to increase source controls on pollution in support of Everglades restoration.

EPGMDs programs are intended to make the public, policy makers and governmental agencies more aware of the value of conserving both the quality and quantity of water resources and increasing their active participation in water conservation efforts as part of daily activities.

Broward County's water utility, Water and Wastewater Services (WWS), is also focused on achieving significant water savings through more efficient operations, water conservation and educational programs. WWS originally prepared a Water Conservation Plan to comply with the requirements of the South Florida Water Management District in April 1988. The plan has been updated on a regular basis since that time to reflect the latest conservation measures and policies in the water supply industry. Current elements of the plan include the following programs:

1. Since 1991, WWS has maintained a three-tiered rate structure for water pricing. In 2003, the rate structure was amended to further enhance conservation.

2. WWS has implemented a plan for mitigating unaccounted for water losses, which includes a leak detection program utilizing surveillance techniques, certification and calibration of water meters.

3. WWS has developed a public education program that includes the development and distribution provision of brochures and educational materials for elementary and high school students, and presentations to homeowner and condominium associations regarding water supply, treatment and conservation issues.

4. WWS continues to pursue opportunities to increase the amount of reclaimed water used from the North Regional Waste Water Treatment Facility to offset irrigation demands.

5. WWS is partnering with EPGMD to fund the operation of a NatureScape Irrigation Service within its service area to help customers implement improved irrigation practices on their property.

6. WWS is currently developing a water use profile for each of its four service areas. The profile is designed to identify specific demographic, operational, engineering and fiscal characteristics of each service area that allows WWS to determine area specific customer patterns within each service area. The proposed data will be used to develop a targeted conservation program for each district. Elements of the program may include revised educational programs, demand management by testing the impact of gradual pressure reductions, rebate programs, or increased use of reclaimed water. Upon completion of the profile, the existing conservation program will be updated.

# IMPLEMENTATION

## A. Authority

Programs, policies, and standards related to environmental protection and conservation in Broward County are developed and implemented by federal, state, regional and county public agencies. A list of responsible agencies is provided in Appendix C-H, which identifies the enabling legislation and authority granted to each public agency. The primary agencies charged with the enforcement of environmental regulations in Broward County are the Florida Department of Environmental Protection (DEP), the South Florida Water Management District (SFWMD), the Broward County Environmental Protection and Growth Management Department (EPGMD), Florida Fish and Wildlife Conservation Commission (FWC), and the Broward County Water and Wastewater Services (WWS).

## B. Regulatory Efforts to Promote Conservation and Protection of Natural Resources

The Tree Preservation Ordinance, Section 27-340, Broward County Code of Ordinances, has provisions for protecting Broward's remaining upland habitat. The Ordinance requires a License for tree removal. The Ordinance is enforced by the EPGMD.

Under the provisions of the ordinance, EPGMD reviews site plans or construction plans for impacts to trees through a license application. The applicant is required to preserve trees if possible and to relocate or replace trees if not possible. There are additional requirements for the preservation of Natural Forest Communities and Specimen Trees, as well as standards for the protection of trees during construction. The Ordinance is countywide; however, it is not enforced in a municipality if that municipality has certified that it has an ordinance as stringent as the county's ordinance and is capable of enforcement.

The County also has an ordinance that regulates the pruning of trees. Section 27-421-425 of the Broward County Code prohibits improper pruning of trees, such as topping. This ordinance is enforced Countywide and has similar municipal exemption language.

Broward County's Countywide protective land clearing ordinance is designed to regulate removal of native vegetation in designated areas. An owner may only clear property of existing understory in accordance with Ordinance 89-6. Indiscriminate land clearing can, and often does, destroy valuable trees by disturbing root systems as well as diminishing the integrity of the resource. Such activity contributes to the loss of natural areas and habitats in the County

and, thereby, negatively impacts the quality of life. This Ordinance protects the understory vegetation until appropriate development permits have been issued.

The County has review authority over an environmentally sensitive area if the area has been designated as a Local Area of Particular Concern (LAPC) or has been included in the Urban Wilderness Inventory. Sites so designated or included cannot be developed until an environmental impact report has been completed in accordance with the Broward County Land Development Code. If, upon review of the environmental impact report, the Broward County Commission determines that acquisition of all or part of the land is necessary to prevent adverse environmental impact, the Board may defer action on the development permit application for a period of up to one year. At that time, approval will be granted subject to specific conditions unless the land has already been acquired by the County.

LAPC's may be designated in six categories according to the types of resources present. LAPC's must have one or more of the characteristics for the respective category. The categories are as follows:

- Marine Resource Category

  Coastal areas of unique, scarce, fragile or vulnerable natural habitat, physical features and scenic importance, or; Coastal areas of high natural productivity or essential habitat for fish, wildlife and the various trophic levels in the food web critical to their well-being, or; coastal areas of substantial recreational value and/or potential, or; areas needed to protect, maintain, or replenish coastal flood plains, coral and other reefs, beaches, offshore sand deposits and mangrove stands.

- Natural Landforms and Features Category

  A geological, hydrological, or physiographical feature confined to a small area of Broward County and considered quite rare locally or regionally, or; a representative natural ecosystem and/or its units existing in a few isolated locations but extirpated from most of the County.

- Native Vegetation Category

  Areas containing native plant communities of unique character and/or rare, threatened, or endangered species or species of special concern, or; native vegetative communities exceptionally outstanding in growth, structure, and/or variety, or; isolated or well developed native vegetative communities in urban or rapidly urbanizing areas.

- Wildlife Category

Existing wildlife refuges, reserves, and sanctuaries, or; known habitats of rare, threatened or endangered species or species of special concern, or; major wildlife intensive use areas such as well-developed hammock communities, highly productive coastal tidelands and mangroves, or; areas used for scientific study and research on wildlife.

- Economic Resource Category

Existing ports, marinas, piers, energy resources and artificial reefs or; areas noted for scientific study and research concerning economic development.

- Cultural Resource Category

Sites designated on the National Register of Historic Places or on the Florida Master Site File, or; sites related to the general development of the local area, region or State, or; buildings which are significant examples of the architectural design of their period, or; sites associated with the life/lives of important person(s) or social, political, cultural, or economic movements or with historical events, or; archaeological sites which have yielded useful information on the area's past.

Unique Natural Areas were first identified in the Broward County Land Use Plan in 1977. These areas were considered to be the last remains of Broward County's natural landscape, having unique and/or ecological significance. Since that time, Unique Natural Areas have been designated LAPC's and are subject to environmental review prior to development.

The Urban Wilderness Inventory is a list of natural areas proposed by the Urban Wilderness Advisory Board for preservation as Urban Wilderness Areas. The Urban Wilderness Advisory Board was established by Chapter 25 ½, Broward County Code of Ordinances. The Advisory Board is composed of nine members each having expertise in either biology, botany, zoology or physical or environmental science. The purpose of the Advisory Board is to maintain an inventory of existing natural areas and to make recommendations to the Board on acquisition and regulation of those areas. Currently, there are 38 Urban Wilderness Area sites on the Inventory. Exact locations and descriptions of the sites are provided in Appendix C-D.

Water utilities across the County rely entirely upon groundwater sources, including the Biscayne and Florida Aquifers, for potable water supplies. Use of well stimulation fracturing techniques and mixes exposes adjacent land and surface waters to the risk of contamination through open pit storage, truck transport on roadways, and activities during well development. The Board of County Commissioners adopted in 2015 a

resolution (Resolution 2015-340) opposing the use of hydraulic fracturing, acid fracturing and any form of extreme well stimulation for purposed of resource extraction. Policy C3.4 prohibits oil, gas, and mineral extraction and exploration, through drilling, core testing, fracking, and any other methods, in areas designated for Conservation future land use on the Broward County Land Use Plan or the BMSD Future Land Use Map Series.

# APPENDICES

## Appendix C-A

## Ecological Communities

## Broward County 2017

### 1. Beach and Dune Community

General Description: Composed of unconsolidated sand facing the open ocean and shaped by the wind, waves, currents, and tides. Behind the beach, sand may be piled up by the wind forming dunes. The key to pronounced dune growth is adequate sand supplies and the existence of pioneer vegetation.

Geology and Soils: Ancient coral reef substrate; surface deposits of shell fragments, calcium carbonate and silica sands; soils infertile and unstable; elevation 0-5 feet MSL.

Natural Influences: Wave action; longshore and offshore currents; tides; storm surges; sea-level changes; wind; salt spray; sunlight; hurricanes; vegetative colonization.

Human Influences: Coastal development; jetties; seawalls; beach nourishment; recreational activities; pedestrian and vehicular traffic; beach cleaning equipment; oil spills; ocean dumping.

Dominant Plant Species: Sea Oats (*Uniola paniculata*); Sea Grape (*Coccoloba uvifera*); Beach Sunflower (*Helianthus debilis*); Beach Star (*Remirea maritima*) (E); Beach Creeper (*Ernodea littoralis*) (T); Spanish Bayonet (*Yucca aloifolia*); Cocoplum (*Chrysobalanus icaco*); Railroad Vine (*Ipomoea pes-caprae*); Beach Peanut (*Okenia hypogaea*)(E); Beach Croton (*Croton punctatus*); Beach Bean (*Canavalia humifusa*); Saw Palmetto (*Serenoa repens*); Prickly-pear Cactus (*Opuntia humifusa*); Nickerbean (*Caesalpinia bonduc*).

Dominant Animal Species: Atlantic Green Turtle (*Chelonia mydas mydas*) (E); Atlantic Hawksbill (*Eretmochelys imbricata imbricata*) (E); Atlantic Loggerhead (*Caretta caretta caretta*) (T); Atlantic Leatherback (*Dermochelys coriaceo*) (E); Ghost Crab (*Ocypade quadrata*); variety of shorebirds; variety of fishes.

Current Status: Few native beaches and dunes remain along Broward County's 24-mile coastline. The 1.1-mile North Beach Park in the City of Hollywood is the largest. Additional parcels of vegetated beach and dunes exist in John U. Lloyd State Recreation Area and in the Town of Hillsboro Beach.

## 2. Coastal Strand Forest Community

General Description: Behind the beach and dunes, forest trees are able to grow protected from salt spray and in soils with some accumulation of organic material. Most of the species are of Caribbean origin brought to our shores as seeds by tropical currents, storms, and migrating seed-eating birds. The tropical hardwood hammock which develops is more specifically called the coastal strand forest.

Geology and Soils: Ancient coral reef substrate; sandy soils from former dunes; thin layer of organic material; decreased salinity of soil; elevation 10-12 MSL.

Natural Influences: Occasional storm surges; humidity; warming influence of the ocean; proximity to tropical seed sources; hurricanes, protection from wind and salt spray; protection from fire.

Human Influences: Land development; introduction of exotic plant species; recreational overuse and abuse; illegal collection of native plants.

Dominant Plant Species: Sea Grape (*Coccoloba uvifera*); Poisonwood (*Metopium toxiferum*); Mastic (*Mastichodendron foetidissimum*); Black Ironwood (*Krugiodendron ferreum*); Paradise Tree (*Simarouba glauca*); Torchwood (*Amyris elemifera*); Spanish Stopper (*Eugenia foetida*); Silver Palm (*Coccothrinax argentata*); Inkwood (*Exothea paniculata*); Gumbo-limbo (*Bursera simaruba*); Sabal Palm (*Sabal palmetto*); Live Oak (*Quercus virginiana*); Strangler Fig (*Ficus aurea*); Red Mangrove (*Rhizophora mangle*); White Mangrove (*Languncularia racemosa*); Marlberry (*Ardisia escallonioides*); White Stopper (*Eugenia axillaris*); Wild Coffee (*Psychotria spp*.); Snowberry (*Chiococca alba*).

Dominant Animal Species: Raccoon (*Procyon lotor*); Gray Fox (*Urocyon cinereoargenteus*); migrating Passerines; various squirrels.

Current Status: The last remnants of Broward County's coastal strand forests are contained within Hugh Taylor Birch State Recreation Area and the Bartlett Estate in the City of Fort Lauderdale.

## 3. Mangrove Community

General Description: Mangrove swamps occur in estuaries, on sheltered coasts, and in protected bays and waterways of tropical and subtropical shallow waters. Mangroves are comprised of salt tolerant trees and shrubs which grow as far inland as the tide ranges. The

term "mangrove" encompasses not only a community of plants of several unrelated families/genera, but also the entire habitat including animals and highly organic soils.

Geology and Soils: Oolitic limestone substrate; highly organic mud which may cover marl deposits; elevation approximately MSL.

Natural Influences: Highly saline to fresh water; tidal inundation increases salinity, rain and freshwater runoff decreases salinity; high humidity; protection from wave action; hurricanes; nearly frost-free climate; wood-boring crustaceans.

Human Influences: Degradation of water quality; dredge and fill operations; construction of marinas and seawalls; coastal development; litter; boat wakes.

Dominant Plant Species: Red Mangrove (*Rhizophora mangle*); White Mangrove (*Languncularia racemosa*); Black Mangrove (*Avicennia nitida*); Buttonwood (*Conocarpus erectus*); Sea-oxeye Daisy (*Borrichia frutescens*).

Dominant Animal Species: Mangrove and fiddler crabs, herons, egrets, spoonbill, osprey, mangrove gribble; mollusks, crustaceans, and other mud animals; juveniles of several game and commercial fish; West Indian Manatee (*Trichechus manatus latirostris*).

Current Status: Although the pressures for coastal development are great, the economic importance of mangrove communities to fish and shrimp industries has led to some protection. Broward County has preserved 1500 acres of mangrove-lined estuary within West Lake Tract Park.

4. Scrub Community

General Description: Scrub is a plant community found on deep, well-drained sand deposits, almost exclusively in Florida. Because of the excessive drainage and intense sunlight, Florida scrub is a harsh, desert-like environment inhabited by specially adapted plants and animals.

Geology and Soils: Ancient sand dunes atop oolitic limestone ridge; deep, fine, well- drained sand deposits; acid soil; very low organic content; elevation 10-20 MSL.

Natural Influences: Desert-like conditions; little soil moisture; rainwater percolates quickly through sand; water table deep beneath the surface, unavailable to plants; intense sunlight; intense reflection; high temperatures; little shade; occasional fire.

Human Influences: Industrial and residential development; dumping; off-road vehicles; human-caused fires; well fields for drinking water.

Dominant Plant Species: Sand Pine (Pinus clausa); Rosemary (*Ceratiola ericoides*); Paw-paw (*Asimina reticulata*)(E); Gopher Apple (*Licania michauxii*); Scrub Mint (*Conradina grandiflora*)(T); Spike Moss (*Selaginella arenicola*)(T); Sand Live Oak (*Quercus geminata*); Myrtle Oak (*Quercus myrtifolia*); Chapman Oak (*Quercus chapmanii*); Rusty Lyonia (*Lyonia fruticosa*); Tarflower (*Befaria racemosa*); Saw Palmetto (*Serenoa repens*); Shiny Lyonia (*Lyonia lucida*); Tallowwood *(Ximenia americana*); Curtiss' Milkweed (*Asclepias curtissi*)(T); Nodding Pinweed (*Lechea cernua*); terrestrial lichens (*Cladonia spp.*); associated wildflowers; vines.

Dominant Animal Species: Gopher Tortoise (*Gopherus polyphemus*)(T); Florida Scrub Lizard (*Sceloporus woodi*); Florida Scrub Jay (*Aphelocoma coerulescens coerulescens*)(T).

Current Status: Scrub occurred in Broward County west of the Intracoastal Waterway to the Everglades from Palm Beach County to Dade County and was transversed by swamps and marshes. Only a few remnants remain of this once extensive natural system; examples of this community are the Jungle, Crystal Lake and Military Trail sites preserved through the Broward County 1989 Environmentally Sensitive Land Bond Issue.

5. Pine Flatwoods Community

General Description: Pine flatwoods occur where soils are poorly to well-drained and are fairly uniform in elevation. Slash pine and saw palmetto predominate in this fire-adapted community. Fire eliminates dense vegetation and allows sunlight to penetrate to the understory, which in turn encourages the growth of pine seedlings, grasses, herbs and shrubs.

Geology and Soils: Oolitic limestone substrate; limestone may be exposed or covered with a thin layer of marl or sand; organic material may accumulate in limestone pockets; elevation 10-15 MSL.

Natural Influences: Low humidity; frequent low-intensity fires; lightning; open sunny environment.

Human Influences: Industrial and residential development; logging; introduction of exotic plants; disruption of the frequency and increase in the intensity of fires; drainage; off-the-road vehicles.

Dominant Plant Species: Slash pine (*Pinus elliotii*); Saw Palmetto (*Serenoa repens*); Gallberry (*Ilex glabra*); Rusty Lyonia (*Lyonia fruticosa*); St. John's Wort (*Hypericum spp.*); Tickseed (*Coreopsis leavenworthii*); Pennyroyal (*Piloblephis rigidus*); Cabbage Palm (*Sabal palmetto*); Shiny Lyonia (*Lyonia lucida*); Wax Myrtle (*Myrica cerifera*); associated herbs, shrubs, and grasses.

Dominant Animal Species: Great Horned Owl (Bubo virginianus); Southern Toad (Bufo terrestris terrestris); Box Turtle (Terrapene carolina bauri); Tree Frog (Hyla spp.); various woodpeckers; various snakes and lizards.

Current Status: No pristine pine flatwoods remain in Broward County. Pinelands have been preserved within Tradewinds Park, Fern Forest Nature Center, Hampton Pines Park, Hillsboro Pineland ESL and Miramar ESL.

6. High Hammock Community

General Description: High hammock forests are among the most diverse systems in south Florida, containing more than 100 species of trees and shrubs. They are widely distributed and develop only where conditions of favorable land elevation and fire protection occur. Hammocks develop slowly as organic material accumulates building up the land. This association represents the climax community in south Florida. Temperate and tropical plant species are present, accounting for the diversity of high hammocks.

Geology and Soils: Oolitic limestone substrate; exposed or covered by consolidated marl limestone or thin layer of highly organic material; organic soils accumulate within pockets in the highly eroded limestone; elevation 10-15 MSL.

Natural Influences: High humidity; moisture retention of soil; capillary action of limestone from groundwater to surface; protection from fire; protection from frost and wind; shaded understory; tornadoes.

Human Influences: Residential and commercial development; introduction of exotics; drainage; fire; agriculture; drying effects of roadways; illegal collection of plants; human overuse and abuse.

Dominant Plant Species: Live Oak (Quercus virginiana); Pigeon Plum (*Coccoloba diversifolia*); Paradise Tree (*Simarouba glauca*); Gumbo-Limbo (*Bursera simaruba*); Willow Bustic (*Bumelia salicifolia*); Lancewood (*Nectandra coriacea*); Mastic (*Mastichodendron foetidissimum*); Strangler Fig (*Ficus aurea*); Satinleaf (*Chrysophyllum olivaeforme*)(E); Mulberry (*Morus rubra*); Simpson Stopper (*Myrcianthes fragrans*); Marlberry (*Ardisia escallonioides*); Wild Coffee (*Psychotria spp*.); various ferns.

Dominant Animal Species: Bobcat (*Lynx rufus*); Opossum (*Didelphis marsupialis*); Raccoon (*Procyon lotor*); Armadillo (*Dasypus novemcinctus*); various owls, squirrels, foxes; migrating passerines, raptors.

Current Status: Historically higher elevations were the prime areas for development. In Broward County, Fern Forest, Snyder Park, and the Pine Island Ridge system remain as examples of the high hammock community.

7. Low Hammock Community

General Description: Low hammocks are areas of dense forest vegetation dominated by tree species, such as laurel oak, strangler fig, and cabbage palm. Low hammocks develop on land that is of sufficient elevation to be seldom flooded, but near water environments, and is protected from fire. They frequently occur in transitional areas between drier upland communities and lowland vegetation types, such as marsh, wet prairie, cypress swamp, or mangrove.

Geology and Soils: Oolitic limestone substrate exposed or covered by fine sands; highly organic, moisture-retaining surface soils; elevation 8-10 MSL.

Natural Influences: High humidity; moisture retention of soil; proximity to groundwater and surface water environments; protection from fire; protection from frost and wind; shaded understory.

Human Influences: Residential and commercial development; introduction of exotics; drainage; salt water intrusion; fire; illegal collection of plants; filling.

Dominant Plant Species: Laurel Oak (*Quercus laurifolia*); Strangler Fig (*Ficus aurea*); Cabbage Palm (*Sabal palmetto*); Red Maple (*Acer rubrum*); Cocoplum (*Chrysobalanus icaco*); Wild Coffee (*Psychotria spp.*); Marlberry (*Ardisia escallonioides*); Slash Pine (*Pinus elliotii*); various ferns.

Dominant Animal Species: Raccoon (*Procyon lotor*); Gray Fox (*Urocyon cinereoargenteus*); Turkey Vulture (*Cathartes aura*); migratory passerines, raptors; various squirrels.

Current Status: In Broward County low hammocks were associated with the Hillsboro River, Cypress Creek, Middle River, and New River systems. Extensive areas of hammock forests have been destroyed by urban development. Remnants are preserved within Secret Woods and Fern Forest Nature Centers.

8. Cypress Wetland Community

General Description: Cypress wetlands occupy the freshwater lowlands of the Atlantic Coastal Plain from the Carolinas to Florida, and along the Gulf of Mexico west to Texas. Temperate deciduous trees dominate areas which are seasonally flooded. Flooding is necessary for the

germination of cypress seeds; however, once established young trees can grow in the absence of seasonal inundation.

Geology and Soils: Oolitic or bryozoan limestone substrate covered by a thin layer of sand and/or marl; organic soils accumulate in depressions; elevation 4-12 MSL.

Natural Influences: Seasonal flooding; poorly-drained land; seasonal changes in light intensity; drought; fire.

Human Influences: Drainage; urbanization; agriculture; logging; salt water intrusion; introduction of exotics; illegal collection of plants.

Dominant Plant Species: Bald-cypress (*Taxodium distichum*); Red Maple (*Acer rubrum*); Cocoplum (*Chrysobalanus icaco*); Wax-Myrtle (*Myrica cerifera*); Dahoon Holly *(Ilex cassine*); Pond-apple (*Annona glabra*); Leather Fern (*Acrostichum danaeifolium*); Royal Fern (*Osmunda regalis*); various bromeliads.

Dominant Animal Species: Raccoon (*Procyon lotor*); Opossum (*Didelphis marsupialis*); Armadillo (*Dasypus novemcinctus*); Screech Owl (*Otus asio*); Water Moccasin (*Agkistrodon piscivorus)*; Box turtle (*Terrapene carolina bauri*); various woodpeckers; various tree frogs.

Current Status: Large strands of cypress swamp existed in central Broward County along the historic Hillsborough, Cypress Creek, and New River floodways. Although drainage has allowed for the development of much of our freshwater wetlands, examples of this plant community remain preserved within Tradewinds, Secret Woods, Easterlin, and Fern Forest county parks.

9. Everglades Community

General Description: The Everglades is a flat expanse of freshwater wetland dominated by sawgrass and dotted with tree islands. Lake Okeechobee lies at the head of this shallow, water-filled basin. Before drainage canals were constructed, the water from the lake overflowed into the northern Everglades and, augmented by rainfall, moved slowly southward. Although this sheetflow has been manipulated by man, freshwater remains the key to the survival of the Everglades.

Geology and Soils: Miami limestone or Ft. Thompson formation covered with a thin layer of marl limestone, surface soil a rich organic muck or peat; elevation in Broward County 7-8 MSL.

Natural Influences: Seasonal inundation for approximately six months; sheet flow; drought; fire; alligator holes.

Human Influences: Water management practices; agriculture; introduction of exotic plants; roadways which impede sheet flow; salt-water intrusion; elimination of deer predators; man-made fires; airboats; swamp buggies.

Dominant Plant Species: Sawgrass (*Cladium jamaicensis*); Coastal Plain Willow (*Salix caroliniana*); Wax-Myrtle (*Myrica cerifera*); Elderberry (*Sambucus canadensis*); Cattail (*Typha spp.*); Canna Lily (*Canna flaccida*); periphyton; various ferns.

Dominant Animal Species: Alligator (*Alligator mississippiensis*)(T); Snail Kite (*Rostrhamus sociabilis*); Apple Snail (*Pomocea paludosa*); Largemouth Bass (*Micropterus salmoides*); bream (*Lepomis spp.*); gar (*Lepisosteus spp.*); crayfish; various water snakes and frogs.

Current Status: The Everglades is a unique ecosystem occurring only in south Florida. Historically the Everglades covered an area of 3,900 square miles from Lake Okeechobee to the Gulf of Mexico and Florida Bay. But its great size alone cannot protect this ecosystem from the disruptive effects of water management practices and commercial agriculture. Approximately 500,000 acres of sawgrass have been destroyed; the remaining sawgrass communities have been impacted in varying degrees. The Conservation Areas and the Everglades Buffer Strip in western Broward County are representative of the Everglades Community.

Source: Interpretive Section of the Broward County Parks and Recreation Division, 1987.

# Appendix C-B
# Endangered and Threatened Plants and Animals
# Broward County 2005

| PLANTS | | | | |
|---|---|---|---|---|
| Scientific Name | Common Name | Designated Status | | |
| | | FGFWFC | FDA | USFWS |
| *Acrosichum aureum* | Gold leather fern | | E | |
| *Acrostichum danaeifolium* | Giant leather fern | | T | |
| *Anemia adiantifolia* | Pine fern | | T | |
| *Asclepias curtissii* | Curtiss' milkweed | | T | |
| *Asplenium abscissum* | Spleenwort (unnamed) | | T | |
| *Asplenium serratum* | Bird's nest spleenwort; wild birdnest fern | | E | |
| *Asplenium trichomanes-dentatum* | Spleenwort (unnamed) | | T | |
| *Bletia purpurea* | Pinepink | | T | |
| *Campyloneurum phyllitidus* | Strap fern (unnamed) | T | | |
| *Catopsis floribunda* | Air plant (unnamed) | | E | |
| *Chrysophyllum olivaeforme* | Satinleaf | | E | |
| *Coccothrinax argentata* | Silver palm | | C | |
| *Cocos nucifera* | Coconut palm | T | | |
| *Ctenitis sloanei* | Comb fern (unnamed) | T | | |
| *Ctenitis submarginalis* | Comb fern (unnamed) | T | | |
| *Encyclia cochleata* | Shell orchid; clamshell orchid | | T | |
| *Encyclia tampensis* | Butterfly orchid | | T | |
| *Epidendrum difforme* | Unbelled epidendrum | | T | |
| *Epidendrum nocturnum* | Night-scent orchid; night-smelling | | T | |
| *Epidendrum rigidum* | Rigid epidendrum | | T | |
| *Ernodia littoralis* | Beach creeper | T | | |

| | | | | |
|---|---|---|---|---|
| *Eulophia alta* | Wild coco; ground coco | | T | |
| *Habenaria odontopetala* | Rein orchid (unnamed) | | T | |
| *Monotropa brittonii* | Scrub Indian pipes; Britton's pinesap | | | UR2 |
| *Myrcianthes fragrans var. simpsonii* | Simpson's stopper; twinberry | | | UR2 |
| *Nephrolepis biserrata* | Boston fern (unnamed) | | T | |
| *Okenia hyopgaea* | Burrowing four-o'clock | | E | |
| *Ophioglossum palmatum* | Hand adder's tongue fern | | E | UR5 |
| *Osmunda regalis* | Royal fern | | C | |
| *Peperomia floridana* | Everglades peperomia | E | | UR2 |
| *Phlebodium aureum* | Golden polypody | | T | |
| *Pleopeltis revoluta* | Star-scale fern | T | | |
| *Polypodium ptilodon* | Polypody fern (unnamed) | | T | |
| *Psilotum nudum* | Whisk fern; fork fern | T | | |
| *Pteris longifolia* | Ladder brake fern | | T | |
| *Pteris tripartite* | Giant brake fern | | T | |
| *Pteris vittata* | Brake fern (unnamed) | T | | |
| *Remirea maritima* | Beach star | | E | |
| *Sabal etonia* | Scrub palmetto | | T | |
| *Scaevola plumieri* | Inkberry | | T | |
| *Selaginella arenicola* | Sand spikemoss | | T | |
| *Suriana maritima* | Bay cedar | | E | |
| *Tectaria heracleifolia* | Halberd fern (unnamed) | | T | |
| *Tectaria incisa* | Halberd fern (unnamed) | | T | |
| *Thelypteris dentate* | Downy shield fern | | T | |
| *Thelypteris interrupta* | Aspidium fern (unnamed) | | T | |

| | | | | |
|---|---|---|---|---|
| *Thelypteria kunthii* | Aspidium fern (unnamed) | | T | |
| *Thelypteria ovata* | Aspidium fern (unnamed) | | T | |
| *Thelypteris palustris* | Marsh fern | | T | |
| *Thelypteris reptans* | Creeping fern | T | | |
| *Tillandsia balbisiana* | Wild pine; air plant (unnamed) | | T | |
| *Tillandsia fasciculata* | Common wild pine | | C | |
| *Tillandsia flexuosa* | Twisted air plant | | T | |
| *Tillandsia paucifolia* | Wild pine; air plant (unnamed) | | T | |
| *Tillandsia polystachia* | Wild pine; air plant (unnamed) | | T | |
| *Tillandsia setacea* | Wild pine; air plant (unnamed) | | T | |
| *Tillandsia utriculata* | Giant wild pine; giant air plant | | C | |
| *Tillandsia valenzuelana* | Wild pine; air plant (unnamed) | | T | |
| *Trismeria trifoliata* | Bracken fern (unnamed) | | T | |
| *Vittaria lineata* | Shoestring fern | | T | |
| *Zamia integrifolia* | Florida arrowroot | | C | UR5 |

| ANIMALS | | | | |
|---|---|---|---|---|
| Scientific Name | Common Name | Designated Status | | |
| | | FWC | FDACS | USFWS |
| *Chenille mydas* | Atlantic green turtle | E | E | |
| *Eretmochelys imbricate* | Atlantic hawksbill turtle | E | E | |
| *Caretta* | Atlantic loggerhead turtle | T | T | |
| *Dermochelys coriacea* | Leatherback turtle | E | E | |
| *Gopherus polyphemus* | Gopher tortoise | SSC | UR2 | |
| *Alligator mississippiensis* | American alligator | SSC | T(S/A) | |
| *Trichechus manatus latirostris* | West Indian manatee | E | T | T |
| *Rana areolate* | Florida gopher frog | SSC | UR2 | |
| *Crocodylus acutus* | American crocodile | E | E | |
| *Drymarchon corais couperi* | Eastern indigo snake | T | T | |
| *Tantilla oolitica* | Miami black-headed snake | T | UR2 | |
| *Falco peregrinus* | Peregrine falcon | E | E | |
| *Pelecania occidentalis carolinensis* | Eastern brown pelican | T | E | |
| *Pandion halieotus* | Osprey | SSC | | |
| *Falco sparverius Paulus* | Southern American kestrel | T | UR2 | |
| *Haenatopus palliates* | American oyster catcher | SSC | | |
| *Sterna antillarum* | Least tern | T | | |
| *Aphelocoma coerulescens* | Florida scrub jay | T | UR2 | |
| *Egretta caerulea* | Little Blue Heron | T | | |
| *Athene cunicularia* | Burrowing Owl | T | | |
| *Eudocimus albus* | White ibis | SSC | | |

Animal list was updated by the Broward County Cooperative Extension.

FWC - Florida Fish and Wildlife Conservation Commission

FDACS - Florida Department of Agriculture and Consumer Services

USFWS - U.S. Fish and Wildlife Service

C - Commercially exploited

E - Endangered

T - Threatened

T(S/A) - Threatened Due to Similarity of Appearance

SSC - Species of Special Concern

UR1 - Under review for federal listing, with substantial evidence in existence indicating at least some degree of biological vulnerability and/or threat.

UR2 - Under review for listing, but substantial evidence of biological vulnerability and/or threat is lacking.

Sources: Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida, Florida Game and Fresh Water Fish Commission, 1987. Florida Cooperative Extension Service.

# Appendix C-C

## Local Areas of Particular Concern (LAPC) and Natural Resource Areas (NRA)

## Broward County 2009

| Site Name | Municipality | Section/Township/Range | Designation |
|---|---|---|---|
| Highlands Scrub Natural Area | Pompano Beach | 134842 | LAPC, NRA |
| Military Trail | Deerfield Beach | 144842 | LAPC, NRA |
| Tall Cypress Natural Area | Coral Springs | 134841 | LAPC, NRA |
| Crystal Lake Sand Pine Scrub | Pompano Beach | 234842 | LAPC, NRA |
| Woodmont Natural Area | Tamarac | 044941 | LAPC, NRA |
| Warbler Wetland | Fort Lauderdale | 174942 | LAPC |
| Hillsboro Pineland Natural Area | Coconut Creek | 314742, 064842 | LAPC, NRA |
| Pine Island Ridge | Davie | 175041, 205041 | LAPC, NRA |
| Pond Apple Slough | Davie | 195042, 305042, 255041 | NRA |
| Secret Woods Nature Center | Dania Beach | 205042 | LAPC, NRA |
| Long Key Nature Center | Davie | 235040, 265040 | LAPC, NRA |
| Anne Kolb Nature Center | Hollywood, Dania Beach | 265042, 255042, 355042, 365042, 025142, 015142, 115142, 125142 | LAPC, NRA |
| Tradewinds Park | Coconut Creek | 174842, 204842 | LAPC, NRA |
| Lyons Creek Cypress Preserve | Coconut Creek | 054842 | NRA |
| Cypress Creek Sand Pine Preserve | Fort Lauderdale | 094942 | LAPC, NRA |
| Mills Pond Park Addition | Fort Lauderdale | 284942 | LAPC, NRA |
| Lakeside Sand Pine Preserve | Oakland Park | 294942 | LAPC, NRA |

| Site Name | Municipality | Section/Township/Range | Designation |
|---|---|---|---|
| Coconut Creek Green Space | Coconut Creek | 324742 | NRA |
| Site 31 | Deerfield Beach | 124842 | NRA |
| Site 29 | Deerfield Beach | 114842 | NRA |
| Site 47 | Hillsboro Beach | 084843 | LAPC, NRA |
| Site 72 | Wilton Manors | 264942 | NRA |
| Site 67 | Fort Lauderdale | 114942 | NRA |
| Site 82A | Fort Lauderdale | 015042 | NRA |
| Site 92 | Fort Lauderdale | 215042 | NRA |
| Site 36 | Margate | 194842 | NRA |
| Site 78 | Unincorporated | 135041 | LAPC, NRA |
| Site 94 | Dania Beach | 235042 | NRA |
| Site 93 | Dania Beach | 235042 | LAPC, NRA |
| Site 66 | Fort Lauderdale | 104942 | LAPC, NRA |
| Site 62 | Fort Lauderdale | 094942 | NRA |
| Site 63 | Fort Lauderdale | 094942 | NRA |
| Site 60 | Fort Lauderdale | 084942 | NRA |
| Site 61 | Fort Lauderdale | 084942 | LAPC, NRA |
| Site 70 | Fort Lauderdale | 174942 | NRA |
| Site 41 | Pompano Beach | 244842 | NRA |
| Site 37 | Pompano Beach | 214842 | NRA |
| Site 42B | Pompano Beach | 254842 | LAPC |
| Site 42D | Pompano Beach | 254842 | LAPC |
| Site 42C | Pompano Beach | 254842 | LAPC |
| Site 57 | Pompano Beach | 044942 | NRA |
| Site 42A | Pompano Beach | 254842, 264842 | LAPC |
| Site 81 | Davie | 295041 | NRA |
| Site 77B | Davie | 255040 | LAPC, NRA |
| Site 77A | Davie | 255040 | LAPC, NRA |
| Site 112 | Dania Beach | 335042 | NRA |
| Site 110 | Dania Beach | 325042 | NRA |
| Site 114 | Dania Beach | 345042 | NRA |
| Site 95 | Hollywood | 255042 | LAPC, NRA |
| Site 5 | Parkland | 024841 | NRA |
| Site 2 | Parkland | 364741 | NRA |
| Site 124B | Coral Springs | 114841 | LAPC, NRA |
| Site 124A | Coral Springs | 114841 | LAPC, NRA |

| Site Name | Municipality | Section/Township/Range | Designation |
|---|---|---|---|
| Site 10A | Coral Springs | 124841 | NRA |
| Site 10B | Coral Springs | 124841 | NRA |
| Site 10C | Coral Springs | 124841 | NRA |
| Site 11 | Coral Springs | 124841 | NRA |
| Site 12 | Coral Springs | 124841 | NRA |
| Site 14 | Coral Springs | 154841 | LAPC, NRA |
| Site 13D | Coral Springs | 134841 | NRA |
| Site 15 | Coral Springs | 224841 | NRA |
| Site 13C | Coral Springs | 134841 | NRA |
| Site 20B | Coconut Creek | 324742 | NRA |
| Site 21A | Coconut Creek | 054842 | NRA |
| Site 21C | Coconut Creek | 054842 | NRA |
| Site 24 | Coconut Creek | 064842 | NRA |
| Site 26 | Coconut Creek | 074842 | LAPC, NRA |
| Site 28B | Coconut Creek | 174842 | LAPC, NRA |
| Site 35 | Coconut Creek | 184842 | LAPC, NRA |
| Site 43A | Coconut Creek | 304842 | LAPC, NRA |
| Site 43B | Coconut Creek | 304842 | LAPC, NRA |
| Site 44B | Coconut Creek | 314842 | LAPC, NRA |
| Site 45 | Coconut Creek | 314842 | LAPC, NRA |
| Site 27 | Coconut Creek | 084842, 054842 | LAPC, NRA |
| Site 20A | Coconut Creek | 324742 | NRA |
| Site 20C | Coconut Creek | 324742 | NRA |
| Site 44A | Coconut Creek | 314842 | LAPC, NRA |
| Site 97 | Dania Beach | 265042 | LAPC, NRA |
| Site 117 | Hollywood | 015141 | LAPC, NRA |
| Site 122 | Miramar, Weston, Southwest Ranches, Pembroke Pines | 334939, 344939, 035039, 045039, 095039, 105039 | LAPC |
| Site 98 | Hollywood, Dania Beach | 265042, 355042 | LAPC, NRA |

Source: Broward County Natural Resources Planning and Management Division, Land Preservation Program, 2009

# Appendix C-D

## Urban Wilderness Areas

## Broward County 2009

| Site Name | Municipality | Section/Township/Range |
|---|---|---|
| Doris Davis Forman Preserve | Parkland | 354741 |
| Coconut Creek Maple Swamp | Coconut Creek | 054842 |
| Site 39 | Coconut Creek | 054842 |
| West Creek Pineland | Coconut Creek | 064842 |
| Helene Klein Pineland Preserve | Coconut Creek | 064842 |
| Saw Palmetto Natural Area | Coconut Creek | 064842 |
| Holmberg Road Site | Parkland | 034842 |
| Highlands Scrub Natural Area | Pompano Beach | 134842 |
| Helwig Natural Area | Deerfield Beach | 134842 |
| Military Trail | Deerfield Beach | 144842 |
| Tall Cypress Natural Area | Coral Springs | 134841 |
| Crystal Lake Sand Pine Scrub | Pompano Beach | 234842 |
| Woodmont Natural Area | Tamarac | 044941 |
| Shooster Preserve | Margate | 014941 |
| Warbler Wetland | Fort Lauderdale | 174942 |
| Hillsboro Pineland Natural Area | Coconut Creek | 314742, 064842 |
| Pine Island Ridge | Davie | 175041, 205041 |
| Pond Apple Slough | Davie | 195042, 305042, 255041 |
| Secret Woods Nature Center | Dania Beach | 205042 |
| Long Key Nature Center | Davie | 235040, 265040 |
| Anne Kolb Nature Center | Hollywood, Dania Beach | 265042, 255042, 355042, 365042, 025142, 015142, 115142, 125142 |
| Fern Forest Nature Center | Coconut Creek | 064942, 054942 |
| Easterlin Park | Oakland Park | 214942 |
| Miramar Pineland Preserve | Miramar | 285141 |
| Hollywood North Beach Park | Hollywood | 015142, 125142 |
| Tradewinds Park | Coconut Creek | 174842, 204842 |
| Deerfield Island Park | Deerfield Beach | 054843 |

| Site Name | Municipality | Section/Township/Range |
|---|---|---|
| Site 67 | Fort Lauderdale | 114942 |
| Site 78 | Unincorporated | 135041 |
| Site 66 | Fort Lauderdale | 104942 |
| Site 61 | Fort Lauderdale | 084942 |
| Site 42A | Pompano Beach | 254842, 264842 |
| Site 117 | Hollywood | 015141 |
| Fern Glen Park | Coral Springs | 124841 |
| Woodside Estates Park | Coral Springs | 144841 |
| Red Lichen Preserve | Coral Springs | 334841 |
| Tivoli Sand Pine Preserve | Deerfield Beach | 014842 |
| Hacienda Flores/NNRB | Davie | 195042 |

Source: Broward County Natural Resources Planning and Management Division, Land Preservation Program, 2009

# Appendix C-E

## Artificial Reef Program List of Sites

## Broward County 2017

| Reef Name | Latitiude | Longitude | Depth | Year |
|---|---|---|---|---|
| Mt. Deerfield II | 26° 19.065′ N | 80° 03.720′ W | 67′ | 2016 |
| Lady Luck | 26° 13.807′ N | 80° 03.807′ W | 130′ | 2016 |
| Mt. Deerfield | 26° 19.043′ N | 80° 03.752′ W | 65′ | 2015 |
| Rapa Nui | 26° 19.007′N | 80° 03.720′ W | 70′ | 2015 |
| BioRock Reef Project | 26° 11.196′ N | 80° 05.561′ W | 12′ | 2011 |
| NOVA Reef Roc Artificial Reef | 26° 09.100′ N | 80° 05.195′ W | 43′ | 2009 |
| C2-Eternal Reef | 26° 08.553′ N | 80° 04.916′ W | 65′ | 2005 |
| Miss Dania Beach | 26° 00.605′ N | 80° 05.502′ W | 71′ | 2004 |
| Eternal Reef | 26° 08.553′ N | 80° 04.894′ W | 65′ | 2004 |
| Eternal Reefs | 26° 08.551′ N | 80° 04.894′ W | 65′ | 2002 |
| Bulk Trader | 26° 08.551′ N | 80° 03.835′ W | 313′ | 2002 |
| Eben-Ezer-2 | 26° 00.398′ N | 80° 05.589′ W | 70′ | 2002 |
| Dantor | 26° 00.590′ N | 80° 04.990′ W | 128′ | 2002 |
| Grady Hopper Barge | 26° 00.615′ N | 80° 05.644′ W | 70′ | 2001 |
| Summerfield | 26° 00.601′ N | 80° 05.599′ W | 70′ | 2000 |
| Qualman Barge | 26° 17.977′ N | 80° 03.709′ W | 69′ | 2000 |
| Grady Barges | 26° 06.764′ N | 80° 04.228′ W | 191′ | 2000 |
| Dog Pile Reef | 26° 08.559′ N | 80° 04.852′ W | 66′ | 1999 |
| Ft. Lauderdale, C-1 Reef | 26° 08.206′ N | 80° 04.967′ W | 25′ | 1999 |
| Ken Vitale, Formerly The "Tracy" | 26° 09.559′ N | 80° 04.763′ W | 70′ | 1999 |
| Lauderdale Site, C-2 | 26° 09.635′ N | 80° 04.747′ W | 72′ | 1998 |
| Donald G Mcallister | 26° 00.548′ N | 80° 05.565′ W | 70′ | 1998 |
| Peter B. Mcallister | 26° 10.149′ N | 80° 04.718′ W | 69′ | 1998 |
| Guy Harvey | 26° 12.647′ N | 80° 03.944′ W | 135′ | 1997 |
| Site C – Corky Micco Reef | 26° 10.085′ N | 80° 04.709′ W | 65′ | 1997 |
| NOVA Deep Reefballs | 26° 07.620′ N | 80° 04.890′ W | 69′ | 1997 |
| Coffin Memorial Reefballs | 26° 07.460′ N | 80° 05.880′ W | 23′ | 1996 |

| Reef Name | Latitiude | Longitude | Depth | Year |
|---|---|---|---|---|
| NOVA/Swiss Cheese-Deep | 26° 11.190′ N | 80° 04.950′ W | 70′ | 1996 |
| NOVA/Swiss Cheese-Shalllow | 26° 08.130′ N | 80° 05.790′ W | 24′ | 1996 |
| Rodeo Site – Johnny Morris | 26° 14.383′ N | 80° 03.411′ W | 200′ | 1996 |
| Site C – Bruce Mueller Reef | 26° 10.116′ N | 80° 04.706′ W | 65′ | 1996 |
| Site D – Joe's Nightmare Barge | 26° 04.225′ N | 80° 04.225′ W | 217′ | 1996 |
| Site E – Emmi Boggs | 26° 00.606' N | 80° 05.617' W | 75′ | 1995 |
| Site C - Eagle Scout Reefballs | 26° 07.496' N | 80° 05.889' W | 23′ | 1995 |
| Curry Reef | 26° 00.648' N | 80° 05.606' W | 75′ | 1995 |
| Site C - Deep Reef Balls | 26° 07.807' N | 80° 04.390' W | 144′ | 1995 |
| Rodeo Site – Boating Magazine | 26° 14.056' N | 80° 03.666' W | 156′ | 1995 |
| Rinker Deep Site | 26° 07.461' N | 80° 04.894' W | 65′ | 1995 |
| Site E - Hollywood Reef Site | 26° 00.459' N | 80° 05.620' W | 70′ | 1995 |
| Site E - Hollywood | 26° 00.459' N | 80° 05.623' W | 65′ | 1995 |
| Four Reef Balls | 26° 07.462' N | 80° 05.885' W | 24′ | 1994 |
| Rinker Experimental Deep | 26° 07.350' N | 80° 05.490' W | 70′ | 1994 |
| Rinker Experimental Shallow | 26° 07.462' N | 80° 05.380' W | 23′ | 1994 |
| Jim Torgerson | 26° 13.642' N | 80° 03.896' W | 120′ | 1994 |
| Site E - Curry Reef | 26° 00.486' N | 80° 05.606' W | 75′ | 1994 |
| NOVA Reefballs-Midwater | 26° 07.494' N | 80° 04.912' W | 45′ | 1994 |
| Pennel's Reef | 26° 19.180' N | 80° 04.080' W | 30′ | 1993 |
| Captain Dede's | 26° 00.575' N | 80° 05.591' W | 74′ | 1993 |
| Seacon - NSWC Array's | 26° 00.601' N | 80° 05.624' W | 74′ | 1993 |
| Mariner 2 | 26° 13.353' N | 80° 03.189' W | 125′ | 1993 |
| Mariner 2 | 26° 14.110' N | 80° 03.807' W | 125′ | 1993 |
| NOVA Tire Chip | 26° 07.490' N | 80° 05.890' W | 23′ | 1993 |
| Old Deerfield Pier Reef | 26° 18.932' N | 80° 03.756' W | 67′ | 1992 |

| Reef Name | Latitiude | Longitude | Depth | Year |
|---|---|---|---|---|
| Mariner 1 | 26° 14.074' N | 80° 03.869' W | 108′ | 1992 |
| Wendy Rossheim | 26° 09.183' N | 80° 04.820' W | 65′ | 1991 |
| Site D - NSWC Cable Spools | 26° 07.950' N | 80° 04.630' W | 150′ | 1991 |
| Noula Express | 26° 19.278' N | 80° 03.448' W | 71′ | 1991 |
| Paul Sherman Reef | 26° 09.197' N | 80° 04.831' W | 70′ | 1991 |
| Imor Reef | 26° 13.048' N | 80° 03.760' W | 165′ | 1991 |
| Ancient Mariner | 26° 18.121' N | 80° 03.729' W | 70′ | 1991 |
| Rodeo 25 | 26° 13.878' N | 80° 03.813' W | 122′ | 1990 |
| Captain Dan Garnsey | 26° 13.857' N | 80° 03.960' W | 110′ | 1990 |
| Kornahrens Reef | 26° 12.480' N | 80° 03.190' W | 140′ | 1990 |
| Robert Edmister | 26° 09.193' N | 80° 04.837' W | 76′ | 1989 |
| Bud Krohn Reef | 26° 10.260' N | 80° 02.420' W | 400′ | 1989 |
| Chuck-A-Luck | 26° 18.088' N | 80° 03.684' W | 70′ | 1989 |
| Papa's Reef | 26° 14.102' N | 80° 03.383' W | 265′ | 1989 |
| Moonshot, River Bend | 26° 06.641' N | 80° 03.830' W | 70′ | 1989 |
| Port Everglades Reef | 26° 06.760' N | 80° 04.040' W | 145′ | 1989 |
| Ronald B. Johnson | 26° 13.880' N | 80° 03.445' W | 240′ | 1988 |
| Rodeo Site - Jay Dorman | 26° 13.859' N | 80° 04.027' W | 78′ | 1988 |
| Alpha, Rodeo Divers Reef | 26° 13.857' N | 80° 04.027' W | 78′ | 1988 |
| Pipe And Pontoon | 26° 08.105' N | 80° 04.786' W | 70′ | 1988 |
| Rodeo Site -Buddy Merrit | 26° 14.150' N | 80° 03.360' W | 414′ | 1987 |
| Hydro Atlantic | 26° 19.500' N | 80° 03.043' W | 166′ | 1987 |
| Atria (Jim) Atria Reef | 26° 09.870' N | 80° 04.225' W | 112′ | 1987 |
| Berry Patch | 26° 18.083' N | 80° 03.703' W | 65′ | 1987 |
| Rodeo Site - Miller Lite | 26° 12.394' N | 80° 02.749' W | 155′ | 1987 |
| Hog Heaven | 26° 08.102' N | 80° 04.786' W | 69′ | 1986 |
| Jay Scutti | 26° 09.520' N | 80° 04.760' W | 67′ | 1986 |
| Site C - Bill Boyd Reef | 26° 09.088' N | 80° 03.842' W | 265′ | 1986 |
| Site C -Fla. League Of Anglers | 26° 10.150' N | 80° 03.360' W | 388′ | 1986 |
| Rodeo Site - Corey & Chris | 26° 13.863' N | 80° 03.432' W | 244′ | 1986 |
| Powell Barge | 26° 07.888' N | 80° 03.445' W | 314′ | 1986 |

| Reef Name | Latitiude | Longitude | Depth | Year |
|---|---|---|---|---|
| Reuben Reef | 26° 07.250' N | 80° 04.600' W | 70′ | 1986 |
| Mako | 26° 10.905' N | 80° 02.740' W | 240′ | 1986 |
| Tote Machines | 26° 11.810' N | 80° 03.310' W | 200′ | 1986 |
| Site D - Marriott Reef | 26° 05.479' N | 80° 03.946' W | 71′ | 1985 |
| Caicos Express | 26° 12.502' N | 80° 03.663' W | 240′ | 1985 |
| Site C - Rebel | 26° 10.253' N | 80° 04.332' W | 110′ | 1985 |
| Rodeo Site - Renegade | 26° 13.360' N | 80° 03.620' W | 190′ | 1985 |
| Mercedes | 26° 09.370' N | 80° 04.513' W | 97 | 1985 |
| Rodeo-Lowrance | 26° 13.202' N | 80° 03.640' W | 200′ | 1984 |
| Great Lakes | 26° 07.690' N | 80° 03.910' W | 170′ | 1983 |
| Site D - Te Amo | 26° 05.187' N | 80° 03.211' W | 215′ | 1983 |
| NOVA A.R. (No County) | 26° 07.198' N | 80° 03.865' W | | 1983 |
| NOVA A.R. (No County) | 26° 07.025' N | 80° 04.120' W | 70′ | 1983 |
| Qualmann Barge | 26° 07.058' N | 80° 03.337' W | 145′ | 1983 |
| US Concrete Pipe | 26° 07.280' N | 80° 04.500' W | 70′ | 1983 |
| Osborne | 26° 06.449' N | 80° 03.896' W | 65′ | 1983 |
| Chevron / Rodeo | 26° 10.545' N | 80° 02.818' W | 170′ | 1983 |
| Grouper Grotto | 26° 08.382' N | 80° 04.328' W | 150′ | 1983 |
| Chevron 1 | 26° 07.400' N | 80° 04.550' W | 73′ | 1983 |
| Trio Bravo | 26° 08.727' N | 80° 04.293' W | 145′ | 1982 |
| Site D - Tracor/Navy Drydock | 26° 06.765' N | 80° 04.233' W | 210′ | 1982 |
| DNR Barges | 26° 08.557' N | 80° 04.637' W | 70′ | 1982 |
| Chris Craft Molds | 26° 04.850' N | 80° 03.237' W | 210′ | 1978 |
| Osborne Tire Reef | 26° 08.322' N | 80° 04.897' W | 64′ | 1977 |
| Houseboat | 26° 06.677' N | 80° 03.716' W | 95′ | 1974 |
| Spaghetti Barge | 26° 07.760' N | 80° 04.220' W | 105 | 1972 |
| Unnamed Barge | 26° 08.520' N | 80° 04.886' W | 70′ | 1970 |
| Monomy | 26° 07.520' N | 80° 04.350' W | 60′ | 1970 |
| Erojacks Dania | 26° 03.738' N | 80° 06.435' W | 12′ | 1967 |
| Erojacks Ft. Lauderdale | 26° 05.950' N | 80° 05.376' W | 25′ | 1967 |

Source: Florida Fish and Wildlife Conservation Commission, Artificial Reef Program, 2016

## Appendix C-F

## Primary Canals

| PRIMARY CANALS | PURPOSE |
|---|---|
| Hillsboro Canal | Provide drainage for 102 square miles in northern Broward County, water for wellfield recharge, convey excess water from WCA 1 to tidewater, control seepage from WCA 2A, and maintain ground water elevations west of Deerfield Lock adequate to prevent saltwater intrusion. |
| L-36, L-37, L33, L-35A, L-35B, L-67A, L-67C, L-68A, C-6 (Miami) Canals | Provide water level control and conveyance in the WCA's. |
| Pompano Canal | Provide flood protection to seven square miles in northeastern Broward County, water for wellfield recharge, and maintain ground water elevations west of G-57 (a sheet pile dam with a controlled weir) adequate to prevent saltwater intrusion. |
| Cypress Creek (C-14) Canal | Provide flood protection to 59 square miles in northeastern Broward County, water to recharge wellfields, convey excess water from WCA 2A to tidewater, controls seepage from WCA 2A, and maintain ground water elevations west of S-37A (a gated spillway) adequate to prevent saltwater intrusion. |

| PRIMARY CANALS | PURPOSE |
|---|---|
| Middle River Canal (C-13) | Provide flood protection to 39 square miles in eastern Broward County, water to recharge wellfields, control seepage from WCA 2B, and maintain ground water elevations west of S-36 (a gated spillway) adequate to prevent saltwater intrusion. |
| Plantation (C-12) Canal | Provide flood protection to 19 square miles in eastern Broward County, maintain ground water elevations west of S-33 (a gated spillway) adequate to prevent saltwater intrusion. |
| North New River (L-35) Canal | Provide flood protection to 30 square miles in eastern Broward County, water to recharge wellfields, convey excess water from WCAs 2A, 2B, and 3A to tidewater, and controls seepage from WCA 2B. |
| Dania Cut-off Canal | Convey water from the C-11 and C-10 canals to tidewater and provide drainage for the area south and east of the Fort Lauderdale-Hollywood International Airport. |
| South New River (C-11) Canal | Provide flood protection to 104 square miles in south central Broward County, water to recharge wellfields, control seepage from WCA 3a, and maintain ground water elevations west of S-13 (a spillway) adequate to prevent saltwater intrusion. |

| PRIMARY CANALS | PURPOSE |
|---|---|
| Hollywood (C-10) Canal | Provide flood protection to 15 square miles in southeastern Broward County. |
| Snake Creek (C-9) Canal | Provide flood protection to 59 square miles in southeastern Broward County and 39 square miles in northeastern Dade County, water to recharge wellfields, irrigation, control seepage from WCA 3B, and maintain ground water elevations west of S-29 (a gated spillway) adequate to prevent saltwater intrusion. |

Source: South Florida Water Management District, April 1995

# Appendix C-G

## Flood Zone Designations

| ZONE | DESCRIPTION |
|---|---|
| A | Special Flood Hazard Area Inundated by 100-Year Flood. No base flood elevations determined. |
| AE | Special Flood Hazard Area Inundated by 100-Year Flood. Base flood elevations determined. |
| AH | Special Flood Hazard Area Inundated by 100-Year Flood. Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined. |
| AO | Special Flood Hazard Area Inundated by 100-Year Flood. Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined. |
| A99 | Special Flood Hazard Area Inundated by 100-Year Flood. To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined. |
| V | Special Flood Hazard Area Inundated by 100-Year Flood. Coastal flood with velocity hazard (wave action); no base flood elevations determined. |
| VE | Special Flood Hazard Area Inundated by 100-Year Flood. Coastal flood with velocity hazard (wave action); base flood elevations determined. |
| X | There are two areas designated as Zone X on the FEMA Flood Insurance rate map. Shaded: Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile and areas protected by levees from 100-year flood. Unshaded: Areas determined to be outside 500-year flood plain. |

Source: Flood Insurance Rate Map, Broward County.

## Appendix C-H

## Environmental Legislation and Responsible Public Agencies

| WATER | | |
|---|---|---|
| Agency | Legislation | Functions |
| U.S. Army Corps of Engineers | Federal Water Pollution Control Act of 1972 | Dredge & fill permitting for navigable waters |
| U.S. Environmental Protection Agency | Federal Water Pollution Control | Establish water quality standards for navigable waters |
| Florida Department of Natural Resources | Control Act | Florida Air and Water Pollution | Establish water quality standards |
| Florida Department of Environmental Protection | Florida Air and Water Pollution | Regulate water pollution discharges, including groundwater, surface water, and coastal waters |
| Florida Department of Environmental Protection | Federal Water Pollution Control Act Amendment of 1977 (Clean Water Act) | Regulate public water systems |
| Florida Department of Environmental Protection | Florida Safe Drinking Water Act | Establish and enforce drinking water standards |
| Broward County Water Management Division | Broward County Administrative Code Section 40.11 | Implement county water resource management program |
| Broward County Water and Wastewater Services | Broward County Administrative Code Section 40.10 | Maintain potable water distribution and wastewater collection systems |
| Broward County Environmental Protection & Growth Management | Broward County Charter, Section 8.17 | Surface water quality monitoring; dredge and fill permitting |

| WATER | | |
|---|---|---|
| Agency | Legislation | Functions |
| South Florida Water Management District | Water Quality Assurance Act of 1983 | Assume permitting authority for water projects from DEP |

| AIR | | |
|---|---|---|
| Agency | Legislation | Functions |
| U.S. Environmental Protection Agency | Clean Air Act of 1970 | Establish list of hazardous air pollutants; establish pollutant standards; establish vehicle emission standards; regulate fuels, fuel additives |
| Florida Department of Environmental Protection | Florida Air and Water Pollution Control Act | Regulate air pollution |
| Florida Department of Environmental Protection | Florida Electrical Power Plant Siting Act | Regulate siting of power plants |
| Florida Division of Forestry | Chapter 5I-2, FAC | Prohibits open burning on rural lands |
| Broward County Environmental Protection and Growth Management | Broward County Charter, Section 8.17 | Monitor air quality |

| LAND USE | | |
|---|---|---|
| Agency | Legislation | Functions |
| Florida Department of Environmental Protection | Florida Outdoor Recreation and Conservation Act of 1963 | Acquire lands, including public beaches |

| LAND USE | | |
|---|---|---|
| Agency | Legislation | Functions |
| Florida Department of Environmental Protection | Chapter 377, FS | Regulate oil and gas exploration |
| Florida Department of Environmental Protection | Chapter 378, FS | Regulate mineral extraction activities |
| Florida Department of Environmental Protection | Chapter 258, FS | Establish and protect state-owned park lands |
| Florida Department of Environmental Protection | Chapter 253, FS | Permitting of use of submerged and state-owned lands |
| Florida Division of Forestry | Chapter 589, FS | Acquire and manage land for state purposes |
| Florida Fish and Wildlife Conservation Commission | Chapter 372~~9~~, FS | Control and management of state game lands |
| Florida Department of Environmental Protection | Chapter 378, FS | Adopt a master land reclamation plan consistent with local comprehensive plans |
| Florida Department of Environmental Protection | Florida Resource Recovery and Management Act | Regulate solid waste disposal |
| Broward County Environmental Protection and Growth Management Department | Broward County Administrative Code Section 110.01 | Implementation of Comprehensive Plan and Land Development Code |
| Urban Wilderness Advisory Board | Chapter 25 ½ of Broward County Code of Ordinances | Advise Board of County Commissioners on acquisition and development of Urban Wilderness Area |
| Broward County Parks and Recreation Division | Broward County Administrative Code Section 30.09 | Acquire and maintain land for recreation, preservation, and conservation purposes |

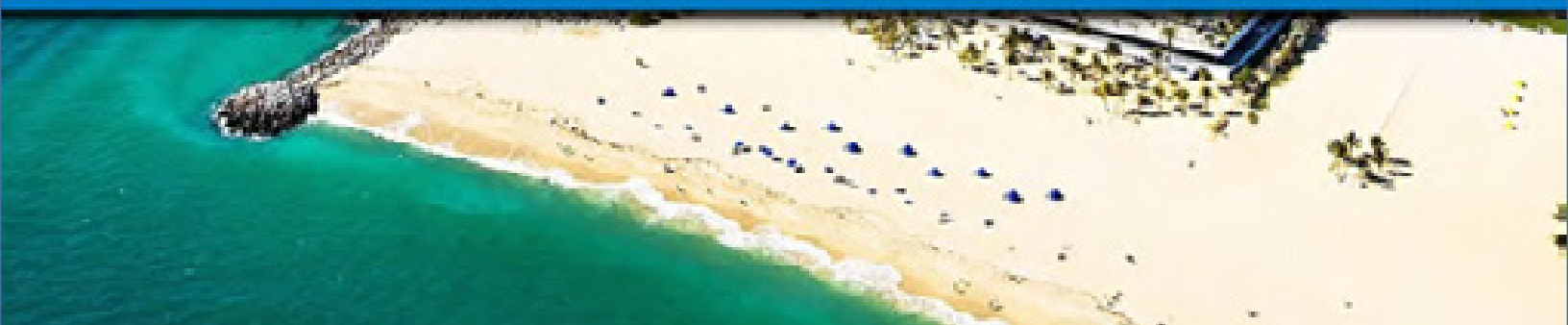
| WILDLIFE/PLANT PRESERVATION | | |
|---|---|---|
| Agency | Legislation | Functions |
| U.S. Fish and Wildlife Service | Endangered Species Act of 1972 | Identify and protect threatened and endangered species; regulate offshore marine fisheries |
| Florida Fish and Wildlife Conservation Commission | Marine Mammal Protection Act Chapter 37~~2~~9, FS (also see endangered species list in Chapter 68A-27.003, Florida Administrative Code) | Prohibit taking of marine mammals Regulate hunting and fishing activities; -protect endangered and threated species |
| Florida Department of Agriculture and Consumer Services | Chapter 581, FS (Also see Chapter 5B-40, Florida Administrative Code for state-listed plants) | Prohibit the willful destruction, sale, harvest, or transplant of plants listed on the state endangered or threatened plant list |
| ~~Florida Department of Environmental Protection~~ Florida Fish and Wildlife Conservation Commission | Chapter 37~~0~~9, FS | Protection of marine turtles, manatees, porpoises, manta rays Regulate saltwater fishing activities |
| Florida Fish and Wildlife Conservation Commission | Broward County Code of Ordinances, Chapter 13 | Prohibits use of nets in salt water |
| Broward County Environmental Protection and Growth Management Department | Broward County Charter, Section 8.17 | Implementation of Sea Turtle Conservation Program |
| Broward County Environmental Protection and Growth Management Department | Broward County Administrative Code, Section 20.04 | Implementation of the County Tree Ordinance |

| WILDLIFE/PLANT PRESERVATION | | |
|---|---|---|
| Agency | Legislation | Functions |
| Broward County Environmental Protection and Growth Management Department | Tree Preservation Ordinance (Sec. 27-340) | Regulates Tree Removal |
| Florida Department of Environmental Protection | Florida Resource Recovery and Management Act | Regulate solid waste disposal |
| Broward County Environmental Protection and Growth Management Department | Broward County Administrative Code Section 110.01 | Implementation of Comprehensive Plan and Land Development Code |
| Broward County Environmental Protection and Growth Management Department | Tree Abuse Ordinance (Sec. 27-421-425) | Regulates Tree Pruning |
| National Marine Fisheries Service within the National Oceanic and Atmospheric Administration | Magnuson-Stevens Fishery Conservation and Management Act | Protects Marine Species |

Section 8.04 of the Broward County Charter gives the County authority to protect the environment by prohibiting or regulating air or water pollution, or the destruction of the resources of the County.

BROWARD COUNTY
FLORIDA

# Deepwater Port Component Support Document



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Atlantic Intercoastal Waterway – Navigable waterway between Maine and Key West, the use of which is regulated by Section 4, Rivers and Harbors Act of August 8, 1917. The U.S. Department of the Army, Jacksonville District, Corps of Engineers, and the U.S. Coast Guard, Seventh District are responsible for the enforcement of federal regulations in the Intracoastal Waterway from Fernandina to Key West, Florida.

Break Bulk Cargo – Ocean cargo that is not containerized, but is shipped in bagged, baled, or palletized units within the ship's hold. Port Everglades' current break-bulk cargo includes primarily steel/coils/rebar which may also be referred to as neo-bulk.

Bulk Cargo – Cargo stowed loose in the hold of a ship and not enclosed in any container such as boxes, bales, bags, or casks. This may include free-flowing cargo such as oil, grain, coal, or ore that can be pumped, run through a chute, or handled by dumping. Port Everglades' bulk cargo includes liquid bulk commodities, such as petroleum, and dry bulk commodities, such as cement and crushed rock.

Bunker – A compartment for storing fuel or potable water below the decks of a vessel.

Bunkering – Loading fuel or potable water into a ship's bunker for the ship's own use, as distinguished from loading it as cargo.

Coastal High-Hazard Area – The Coastal High-Hazard Area is defined as the Category 1 and 2 Hurricane Evacuation Zones, as shown on the "Flood Plains, Flood-Prone Areas and Coastal High-Hazard Areas" map in the Broward County Land Use Plan Map Series.

Container – A box for transporting cargo constructed to withstand transportation stresses, which allows for the intermodal movement among ships, railroads, and highway trucks.

Container (Gantry) Crane – A dockside crane, also called gantry crane, mounted on rails and designed to transfer containers to and from ships. Standard container cranes have a moveable boom that is stored in an up position when idle and is lowered into a horizontal position when in use. Low-profile container cranes usually have a horizontal boom that shuttles in and out over the ship, allowing for a structure of minimum height

Containerized Cargo – Cargo that is carried in containers.

Container-on-flat-car (COFC) – A container mounted directly to a specially designed railroad flat car.

Daily Cruise – A cruise that embarks and disembarks from the same port within a twenty-four hour period. Port Everglades' daily cruises are associated with one-day and one-night trips, with

destinations that include Freeport, Bahamas as well as cruises-to-nowhere. Daily cruise ships may include multiple embarkations within a single day.

Deepwater Port – Port listed in Sections 403.021(9) and 311.09(1), FS.

Development of Regional Impact – Any development that, because of its character, magnitude, or location, would have a substantial effect on the health, safety, or welfare of citizens of more than one county. Developments in Broward County, which exceed threshold standards in Chapter 380, FS must prepare an Application for Development Approval to be coordinated by the South Florida Regional Planning Council and adopted by the affected local government.

Florida Seaport Transportation and Economic Development – A funding program created by state statute to finance port facility projects that improve the movement and intermodal transportation of cargo and cruise passengers.

Foreign Trade Zone – A site in or near a U.S. Customs port-of-entry where all merchandise is considered to be in international commerce, outside U.S. Customs territory, and duties on merchandise can be deferred, reduced, or in some cases eliminated. Port Everglades is designated as Foreign-Trade Zone #25.

Hurricane Vulnerability Zone – The areas (hurricane evacuation areas and mobile home parks) delineated by the regional or local evacuation plan as requiring evacuation.

Home Port – A port that is utilized by a passenger or cargo vessel as its operational base.

In-Water Facility – In-water facilities serving waterborne commerce include ship berths, bulkheads, wharfs, piers, harbors, turning basins, and navigable channels.

Intermodal Container Transfer (ICTF) – A rail yard that facilitates the transfer of cargo containers between ships, highway trucks, and railroad cars.

Lay-In – To berth in a harbor or port for the purpose of storage or repairs, but not to transfer cargo; also, the name of the berth.

Lift-on/Lift-off (Lo/Lo) – Containers and cargo lifted on and off ships by cranes.

Low-profile Container Crane – A container crane specially designed to meet specific height restrictions. Low-profile container cranes usually have a horizontal boom that shuttles in and out over the ship, allowing for a structure of minimum height

Mobile Harbor Crane – A crane mounted on a rubber-tired chassis that can handle all types of cargo and move easily between locations to provide operational flexibility

Multi-day Cruise – A cruise that embarks and disembarks from the same port for more than one day at sea and that may include several ports-of-call. Cruise lines that serve Port Everglades offer 3- or 4- night to 144-night cruises, including Caribbean, trans-Panama Canal, trans-Atlantic, trans-Pacific, and world cruises

Neo-bulk Cargo – Akin to break-bulk cargo, neo-bulk encompasses units of a single commodity, such as vehicles, lumber, or scrap metal.

Panamax Ship – A ship with a maximum width (beam) of 106 feet, a length of 965 feet, and a depth of -39.5 feet which is designed to pass through the existing Panama Canal locks.

Port Jurisdictional Area (PJA) – The Port Everglades PJA is defined by Chapter 59-1157, Laws of Florida, as amended.

Port-of-call – A port at which a vessel stops as part of an itinerary

Port Tariff – A document, such as that adopted by the Broward County Board of County Commissioners and filed with the Federal Maritime Commission, which describes port facilities, establishes rules and regulations governing the use of port facilities, and sets fees for dockage, wharfage, terminal storage, gantry cranes, container yards, and port services.

Post-Panamax Ship – A ship with a beam greater than 106 feet which is too wide to pass through the current Panama Canal locks.

Project Depth – The maintained depth of navigable waters, as determined by the U.S. Army Corps of Engineers.

Roll-on/Roll-off (Ro/Ro) – Containers and cargo rolled or driven on and off a ship.

Stevedore – Untreated potential drinking water. (U.S. EPA)

Strategic Intermodal System (SIS) – Large volumes of shallow water moving very slowly. (South Florida Regional Planning Council)

Super-Post Panamax – The generation of cargo ships designed to pass through the new Panama Canal locks to be completed in 2014. These ships, which can carry 12,000 TEUs, can have a beam of 160.7 feet, a length of 1,200 feet, and a depth of -49.8 feet.

Stick Crane – A mobile landside crane, normally mounted on a truck chassis, used to load and unload cargo ships

Twenty-foot Equivalent Unit (TEU) – A twenty-foot long shipping container, a standard shipping container size, often used to measure port capacity and performance.

Throughput – 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. (Rare and Endangered Biota of Florida)

Trailer-on-flat-car (TOFC) – A railroad flat car used to transport highway cargo trailers.)

Wharf – A structure built on the shore of a harbor to berth ships; when extending along the shoreline, it is known as a marginal wharf; when extending into deep water, it is also known as a pier.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| ACOE | U.S. Army Corps of Engineers |
| APM | Automated People Mover |
| BCAD | Broward County Aviation Department |
| CBP | U.S. Customs and Border Protection |
| COFC | Container-on-flat-car |
| EPGMD | Broward County Environmental Protection and Growth Management Division |
| FAC | Florida Administrative Code |
| FDEP | Florida Department of Environmental Protection |
| FDOT | Florida Department of Transportation |
| FEC | Florida East Coast Railway |
| FEMA | Federal Emergency Management Agency |
| FLL | Fort Lauderdale-Hollywood International Airport Inland Navigation District |
| FPL | Florida Power & Light Company |
| FIHS | Florida Intrastate Highway System |
| FS | Florida Statutes |
| FSTED | Florida Seaport Transportation and Economic Development Program |
| FTZ | Foreign-Trade Zone |

| | |
|---|---|
| GPD | Gallons per Day |
| ICTF | Intermodal Container Transfer Facility |
| LAPC | Local Area of Particular Concern |
| LF | Linear Feet |
| LO/LO | Lift-on/Lift-off |
| LOS | Level of Service |
| MGD | Million Gallons per Day |
| MPO | Metropolitan Planning Organization |
| NEPA | National Environmental Policy Act |
| NPDES | National Pollution Discharge Elimination System |
| ODMDS | Ocean Dredged Material Disposal Site |
| PED | Port Everglades Department |
| PEDD | Port Everglades Development District |
| PEECO | Port Everglades Environmental Corporation |
| PJA | Port Jurisdictional Area |
| POV | Privately Owned Vehicle |
| RO/RO | Roll-on/Roll-off |
| SIS | Strategic Intermodal System |
| TEU | Twenty-foot Equivalent Unit |
| TIP | Transportation Improvement Program |
| TRIP | Transportation Regional Incentive Program |
| TOFC | Trailer-on-Flat-Car |
| VPD | Vehicles per Day |

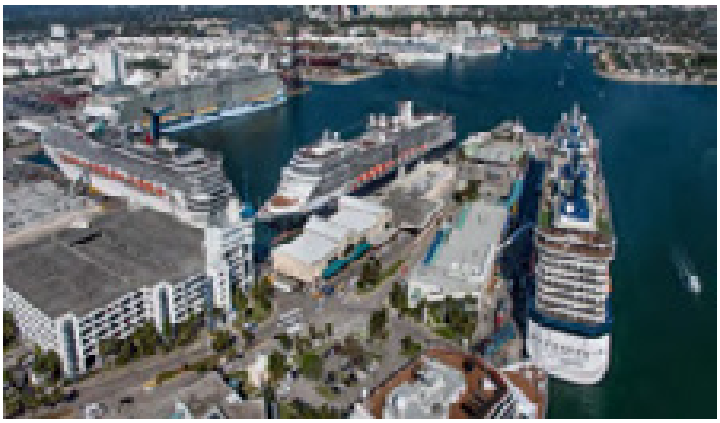
BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Deepwater Port

The Deepwater Port Support Document provides data and analysis which led to the development of the goals, objectives and policies. The component is focused on integrating various elements of the Comprehensive Plan while setting a core vision for Port Everglades in accordance with the Port Evergaldes Master/ Vision Plan.

Port Evergaldes is currenly updating its Master/Vision Plan and intends to perform a comprehensive review of the Deepwater Port Component and Support Document as a part of that initiative. As such, data, tables, and timelines contained in this support document will be updated in accordance with the Master/Vision Plan schedule in 2018/2019.



# INTRODUCTION

The Deepwater Port Component is one of two sub-elements in the Coastal Management Element, the other is the Natural Disaster Component. The component summarizes information in the Port Everglades Master/Vision Plan, adopted by the Broward County Board of County Commissioners on March 1, 2011, and provides the data and analysis relevant to the Port Everglades service area to fulfill the deepwater port requirements cited in Chapter 163.3178(2)(k), Florida Statutes (FS).

Part I of the Deepwater Port Component describes Port Everglades' jurisdictional area (PJA), defines the planning horizons in the Port's Master/Vision Plan, and provides a list of definitions and acronyms. Part II addresses the data requirements of Chapter 163.3178(2)(k)), FS, including inventories of land use, natural resources, areas subject to coastal flooding, historic resources and sites, estuarine pollution sources, beach and dune systems, and Port infrastructure. It also addresses natural disaster planning issues and deepwater port factors. Part III presents the Port's 5-and 10-year maintenance and expansion plans. It includes forecasts for the Port's key business lines -- containerized cargo, non-containerized cargo (dry bulk), liquid bulk (petroleum), and cruise -- and the specific projects planned to provide the capacity needed to meet those forecasts. Part IV then analyzes the data presented in Part II in the context of the Port's planned development over the identified planning horizons. Part V concludes with Deepwater Por Component implementation.

## A. General Description

Port Everglades is located on Florida's east coast, 23 miles north of Miami and 312 miles south of Jacksonville. Figure P-1 shows the Port's South Florida location. Port Everglades is one of the deepest ports in Florida and has one of the shortest, straightest entrance channels among the U.S. Atlantic Coast seaports. The Port's outer channel project depth is 45 feet mean low water and the outer channel width is 500 feet. The inner channel and main turning basin project depths range from 31 to 42 feet mean low water. The inner channel is 450 feet wide from a point 1,000 feet within the jetty entrance. From this point, it flares to a width of 1,500 feet at the turning basin. Berth water depths vary up to 42 feet. 1.2 nautical miles. The main turning basin, which measures 1,200 feet east-to-west and 2,450 feet north-to-south, is 9,000 feet from the ocean sea buoy. The proximity of the main turning basin to the ocean buoy enables ships to dock within a half hour from reaching the ocean buoy, less time than is required at any other Atlantic port. The main turning basin's north extension is 630 to 900 feet wide by 1,150 feet long. The south extension is 1,300 feet by 1,100 feet. The distance from the ocean entrance of the channel to the main turning basin is approximately 1.2 nautical miles. The main turning basin, which measures 1,200 feet east-to-west and 2,450 feet north-to-south, is 9,000 feet from the ocean sea buoy. ~~The proximity of the main turning basin to the ocean buoy enables ships to dock within a half hour from reaching the ocean buoy, less time than is required at any other Atlantic port. The main turning basin's north extension is 630 to 900 feet~~

~~wide by 1,150 feet long. The south extension is 1,300 feet by 1,100 feet. The distance from the ocean entrance of the channel to the main turning basin is approximately 1.2 nautical miles. The main turning basin, which measures 1,200 feet east-to-west and 2,450 feet north-to-south, is 9,000 feet from the ocean sea buoy. The proximity of the main turning basin to the ocean buoy enables ships to dock within a half hour from reaching the ocean buoy, less time than is required at any other Atlantic port. The main turning basin's north extension is 630 to 900 feet wide by 1,150 feet long. The south extension is 1,300 feet by 1,100 feet.~~

## B. Service Area

Port Everglades' PJA encompasses a total of 2,190 acres, which includes 1,742 acres of upland and 448 acres of submerged land. Upland acreage falls in the following municipalities:

- 1,242 acres or 71.3 percent of the Port is located in the City of Hollywood.
- 232 acres or 13.3 percent of the Port is located in the City of Fort Lauderdale
- 234 acres or 13.4 percent of the Port is located in the City of Dania Beach.
- 34 acres or 2 percent of the Port is located in unincorporated Broward County.

Figure P-1: Port Everglades Location

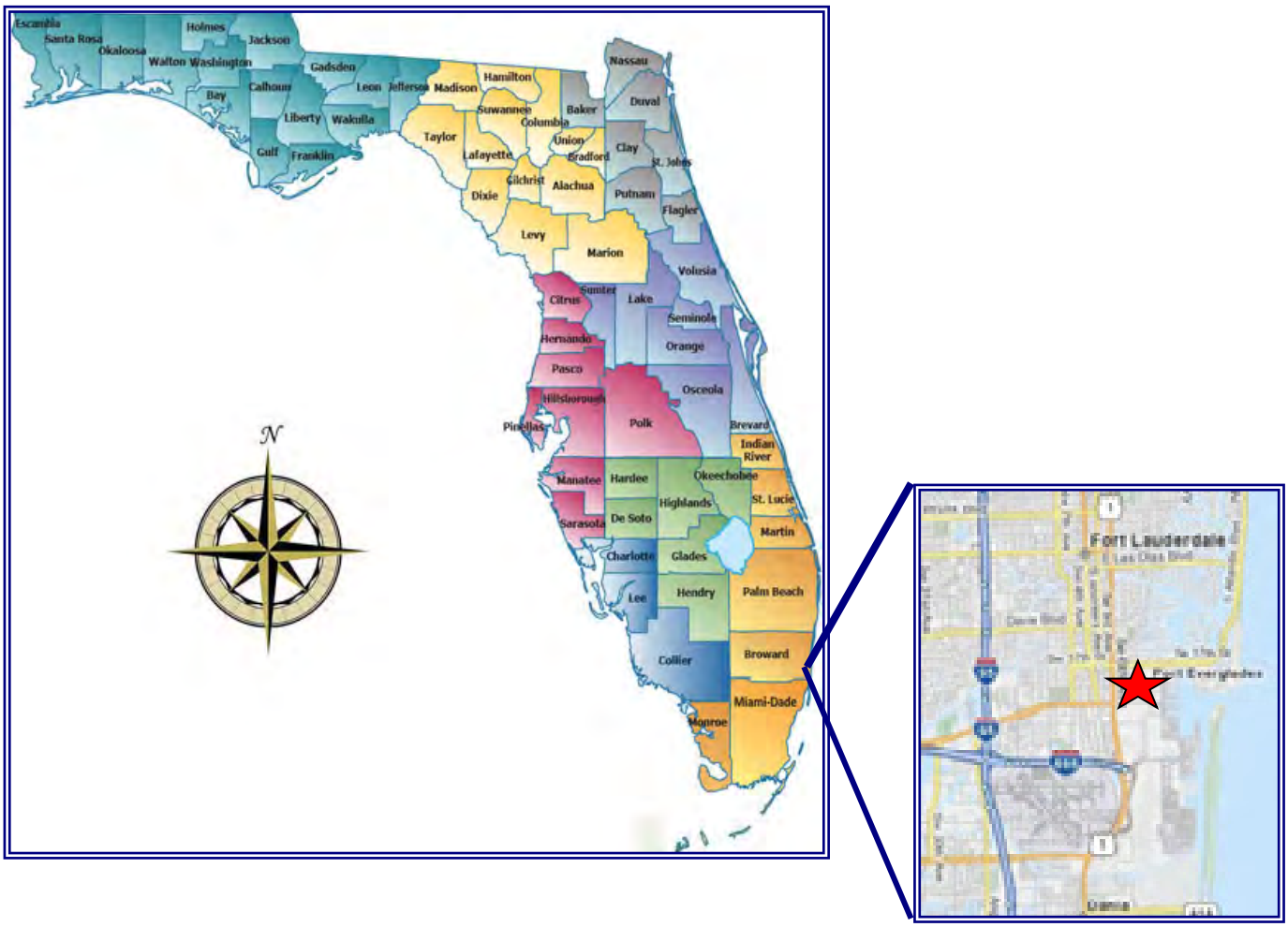


Figure P-2: Port Everglades Jurisdictional Area


## C. Planning Horizons

The short-term (5-year) planning horizon of the Deepwater Port Component is 2015, while the longer-term (10-year) planning horizon is 2019. The Deepwater Port Component projections, capital improvements program, and adopted Goals, Objectives, and Policies reflect these two planning horizons, incorporating the recommendations of the Port Everglades Master/Vision Plan, which also looks at the 20-year planning horizon of 2029.

# DATA REQUIREMENTS

The data requirements include inventories of existing land uses, natural resources, areas subject to coastal flooding, historic resources and sites, estuarine pollution sources, beach and dune systems, and infrastructure. This section also addresses natural disaster planning issues and deepwater port factors.

## A. Inventories of Existing Land Use

This section includes inventories of existing land uses, shoreline uses, water-dependent and water-related uses, and areas in need of redevelopment.

1. General Description. Port Everglades contains three distinct areas, referred to as Northport, Midport, and Southport, which are illustrated on Figure P-3. The current uses in each of these areas are as follows:
    a. *Northport*, located approximately between 17th Street and SE 26 Street, accommodates cruise ships and petroleum tankers as well as break-bulk/neo-bulk, and dry bulk ships. The Broward County Convention Center, which is part of an approved Development of Regional Impact (DRI) that includes a proposed hotel complex and ancillary facilities, is located at Northport. In addition, Northport contains a Port-owned parking garage.
    b. *Midport*, located approximately between Spangler Boulevard and the Southport Turning Notch, is the Port's main cruise ship berthing area, but also accommodates liquid bulk (petroleum), dry bulk (cement), and break-bulk terminals. Nine multi-day cruise terminals are located in Midport, together with another Port-owned parking garage, the Port Administration building, Florida Power & Light (FPL), the Foreign-Trade Zone building, and Public Safety and other buildings.
    c. *Southport*, located approximately between the Turning Notch and the Dania Cut-Off Canal to the east and from Eller Drive to the Dania Cut-Off anal to the west, is Port Everglades' primary container facility, accommodating both roll/on and roll/off (Ro/Ro) and lift/on and lift/off (Lo/Lo) cargo operations. Southport is the area that has experienced most of the Port's containerized cargo growth and will be the site of a proposed near-dock intermodal container transfer facility (ICTF) to move containerized cargo directly from ship to rail car.

2. Inventory of existing land use coverage. Figure P-4 identifies the various Port-related uses in the PJA while Table P-1 provides an inventory of the existing land uses. The

predominant existing land uses are preservation/recreation/water (635 acres or 29.0 percent), petroleum storage (339 acres or 15.5 percent), container areas (348 acres or 15.9 percent), and office/commercial (108 acres or 4.9 percent). Other significant uses in the PJA include FPL's Fort Lauderdale power plant, located on 44 acres in Midport and an easement on the western edge of Southport. Several DRIs, adopted pursuant to Chapter 380, FS, are located in the PJA, as illustrated on Figure P-5. These include the Port Everglades Petroleum Terminal DRI, and the Mobil Oil DRI. The Northport DRI, which relates to the construction of a proposed hotel and ancillary facilities adjacent to the Convention Center, received a three-year extension in March 2009. The previously pending Amoco Oil DRI has been withdrawn and the Hollywood Harbor DRI has been abandoned. Adjacent to the Port is the Fort Lauderdale-Hollywood International Airport (FLL) DRI.

Figure P-3: Port Everglades Facilities

Figure P-4: Existing Land Uses- Port Jurisdictional Area

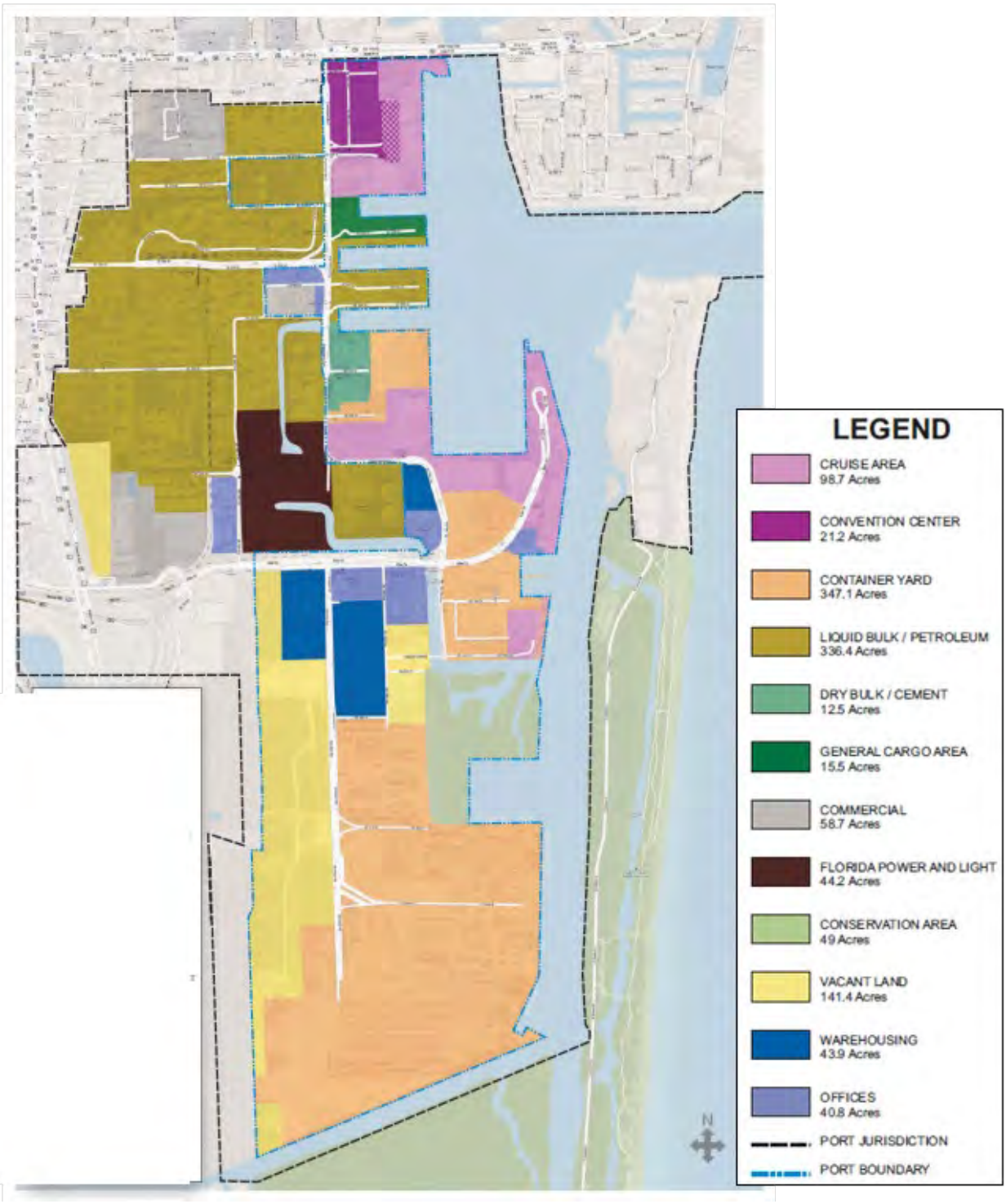


Table P-1: Existing Land Uses-Port Jurisdictional Area

| Land Use | Acres | Percent |
|---|---|---|
| Cruise Area | 92 | 4.2 |
| Convention Center | 31 | 1.4 |
| Container Yard | 348 | 15.9 |
| Liquid Bulk/Petroleum | 339 | 15.5 |
| Dry Bulk/Cement | 12 | 0.6 |
| General Cargo Area (Break-bulk) | 16 | 0.7 |
| Commercial | 67 | 3.1 |
| Florida Power and Light | 44 | 2.0 |
| Office | 41 | 1.9 |
| Conservation Area | 57 | 2.6 |
| Preservation/recreation/water | 635 | 29.0 |
| Warehousing | 44 | 2.0 |
| Vacant Land | 112 | 5.1 |
| Transportation | 200 | 9.1 |
| Other | 152 | 6.9 |
| Total | 2,190 | 100.0 |

12-5 Source: Master/Vision Plan analyses

Figure P-5: Developments of Regional Impact

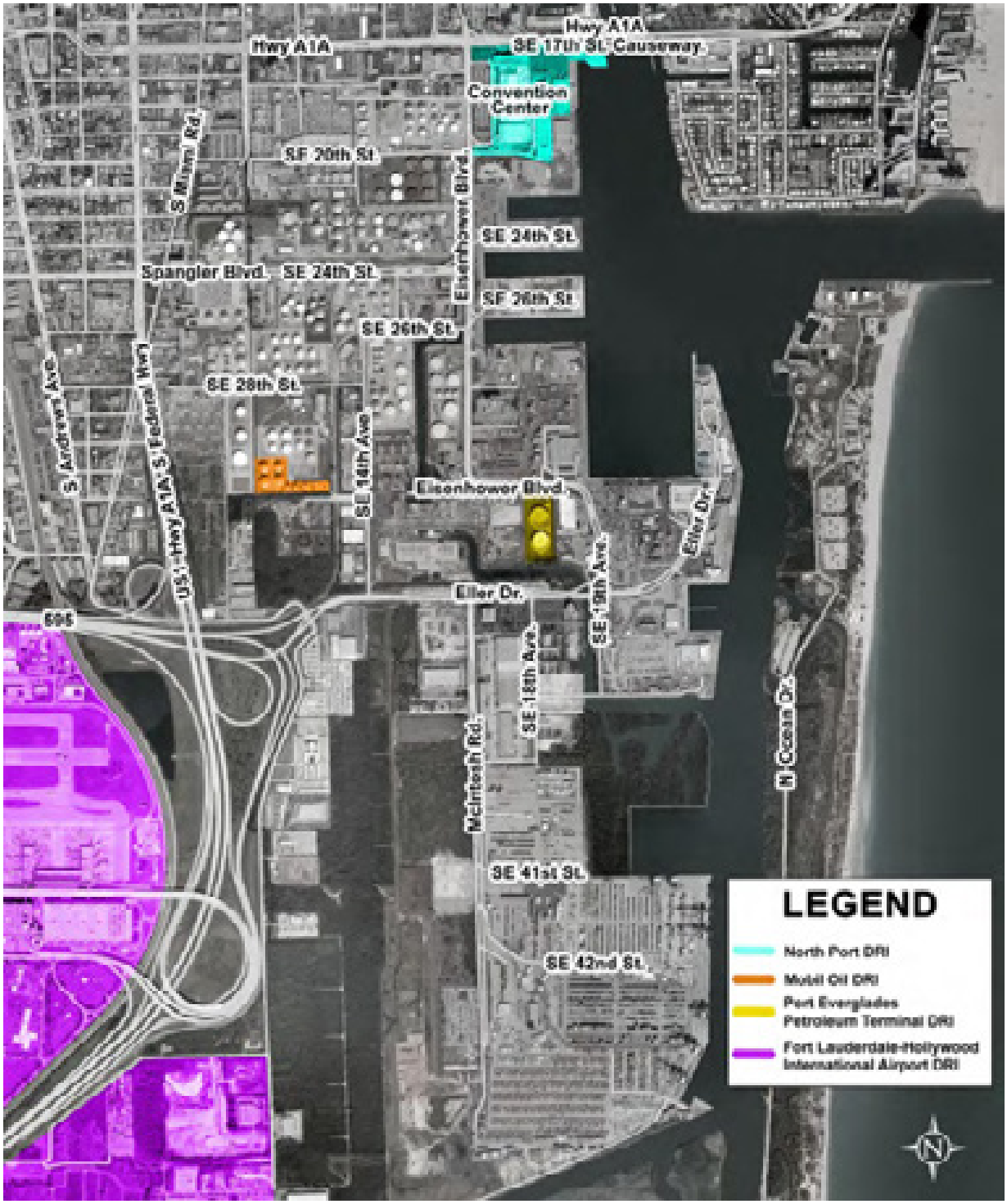


Figure P-6 shows the existing grid and lease land uses for Port-owned land. The PED has 519 acres available for leasing as well as 400,000 square feet of warehouse space and 100,000 square feet of office space. The Port-owned twelve cruise terminals have 557,582 square feet of passenger-processing and baggage-handling areas.

3. Inventory of shoreline uses Shoreline uses in the PJA include the following:

    a. Transportation uses (the Port's primary 35 berths used for cargo and cruise operations plus other smaller berths for lay-in and other uses).

    b. Institutional uses (the U.S. Naval Surface Weapons Center, the U.S. Coast Guard Station, the Environmental Education Facility, and the Nova Southeastern University Oceanographic Center).

    c. Recreational uses (a portion of the Dr. Von D. Mizell-Eula Johnson State Park, 251 acres of barrier island between the Atlantic Ocean and the Intracoastal Waterway, from Port Everglades on the north to Dania Beach on the south).

    Figure P-7 shows the locations of the Port's primary 35 berths and Table P-2 identifies the length, depth, and use of each berth. The other shoreline uses are shown previously on Figure P-3.

4. Inventory of water-dependent and water related uses Water-dependent uses are activities that can be carried out only on, or adjacent to, water areas because the use requires access to the water body. The water-dependent uses in the PJA include the Port's cargo and cruise berths, the Florida Marine Patrol facility located adjacent to the FPL Discharge Canal, and the above-mentioned U.S. Coast Guard, U.S. Navy, and Nova Southeastern University facilities on the Dr. Von D. Mizell-Eula Johnson State Park. These uses are also identified on Figure P-3.
Water-related uses are activities that are not directly dependent on access to a water body, but that provide goods and services directly associated with water-dependent or waterway uses. These include the Port's Foreign-Trade Zone, petroleum storage tanks, offices and warehouses, institutional facilities, and parking garages.

5. Areas in need of redevelopment Table P-3 identifies all the Port-owned buildings by building number, indicating the year built, address, port use, floor area in square feet, and existing use for each building. These buildings are generally in good condition; however, as noted on Table P-8 in Part III, improvements to Cruise Terminals 2, 4, 19, 21, and 26 are identified in the Port Master Plan along with parking garage improvements. (Figure P-3 includes the numbers of the main buildings referenced on Table P-3.)

Figure P-6: Existing Land Uses- Port-Owned Property (Port Leases and Grid Map)

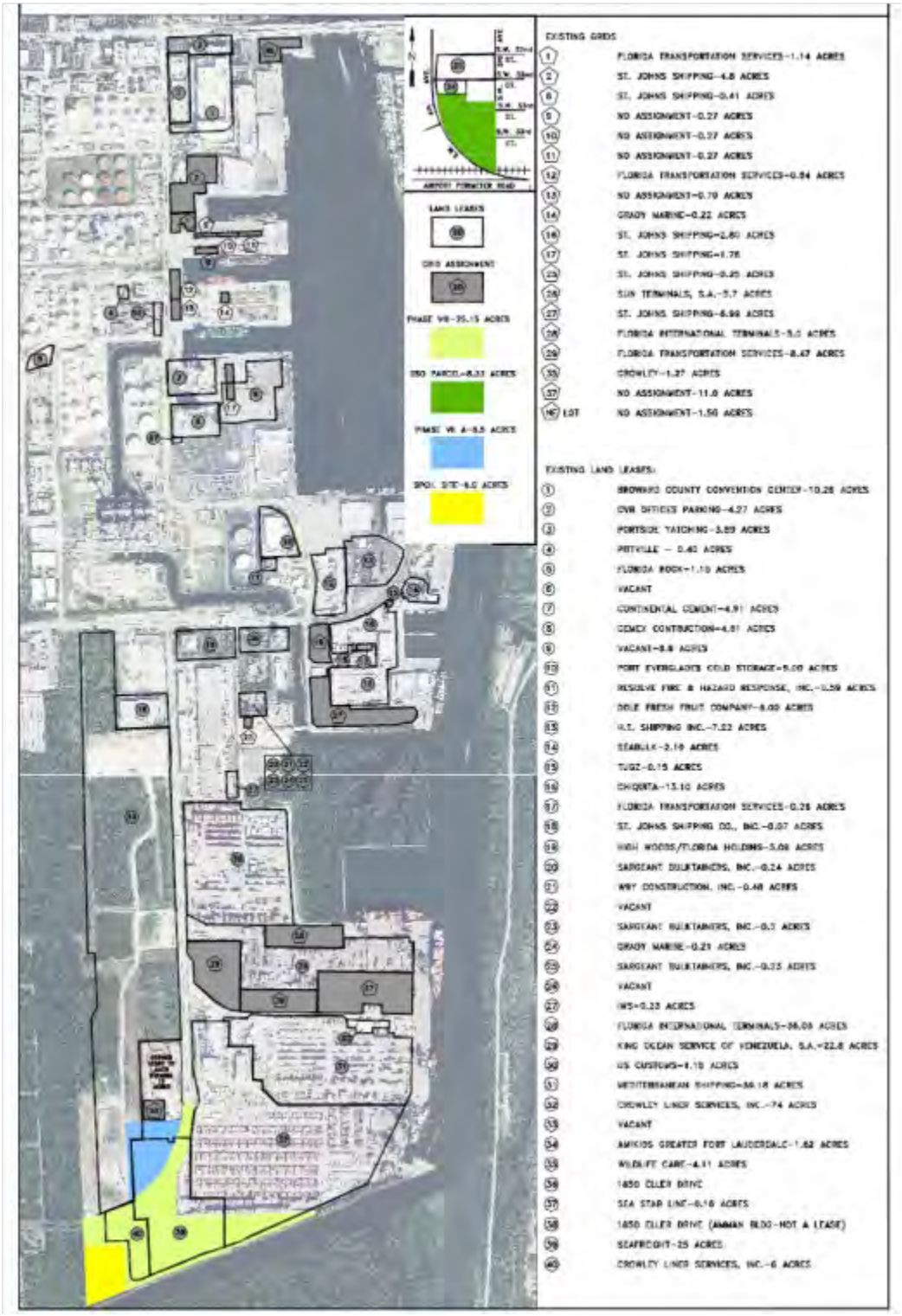


Figure P-7: Port Berth Locations

# Table P-2: Existing Berth Inventory

| Berth Number | Length (In feet) | Depth (In feet mean low water) | Berth Usage |
|---|---|---|---|
| NORTHPORT | | | |
| 1A | 180 | 12 | Lay-in |
| 1B | 220 | 23 | Lay-in |
| 1, 2, 3 | 1,601 | 31 | Cruise/Occasional cargo/Navy |
| 4 | 900 | 43 | Cruise/Occasional cargo |
| 4A, 4B | 290 | 43 | Ro/Ro |
| 5 | 900 | 43 | General cargo/Petroleum tanker |
| 6 | 380 | 38 | Lay-in |
| 7, 8 | 1,200 | 38 | Petroleum tanker |
| 8A, 9A | 300 | 38 | Miscellaneous |
| 9, 10 | 1200 | 38 | Petroleum tanker |
| 11 | 500 | 38 | Barge |
| 12A, 13A | 300 | 38 | Miscellaneous |
| 12, 13 | 1,226 | 38 | Petroleum tanker |
| MIDPORT | | | |
| 14, 15 | 1,226 | 38 | Cement/Other cargo |
| 16, 17, 18 | 1,648 | 38 | Cruise (Oasis -class)/Cargo (weekdays) |
| 19, 20 | 1,300 | 38 | Cruise/ Cargo/Navy |
| 21, 22 | 1,475 | 38 | Cruise/Cargo/Navy |
| 23 | 240 | 38 | Miscellaneous |
| 24, 25 | 1,369 | 40 | Cruise |
| 26, 27 | 1,337 | 40 | Cruise |
| 28A | 480 | 27 | Tug |
| 28B | 275 | 27 | Lay-in |
| 28C | 350 | 27 | Lay-in |
| 28D | 350 | 27 | Lay-in |
| 28E | 275 | 27 | Lay-in |
| 28F | 400 | 27 | Containerized cargo/Other cargo |
| 29 | 800 | 40 | Containerized cargo/Cruise |
| SOUTHPORT | | | |
| 30 | 900 | 44 | Containerized Cargo |
| 31, 32 | 2,000 | 44 | Containerized Cargo |
| 33A | 800 | 44 | Containerized Cargo |
| 33B | 400 | 44 | Containerized Cargo (Ro/Ro) |
| 33C | 400 | 44 | Containerized Cargo (Ro/Ro) |
| Total | 25,222 | | |

* For current depths, please consult pilots' website.

Source: http//www.pepilots.com/navigation.htm

# Table P-3: Existing Building Inventory

| Location/Description | Address | City | Yr Blt | Sq Ft | Existing use |
|---|---|---|---|---|---|
| Terminal #18 (Bldg 18) | 1901 SE 32 Street | Hollywood | 1964 | 259,370 | Cruise terminal |
| Northport Parking Garage | 1901 Eisenhower Blvd | Ft Lauderdale | 1994 | 146,700 | Parking garage |
| Midport Garage & Ops (Bldg 20) | 2020 Eller Drive | Hollywood | 1994 | 715,897 | Parking garage |
| Terminal (Bldg 21) | 2021 Eller Drive | Hollywood | 1967 | 138,700 | Cruise terminal |
| Warehouse/Terminal (Bldg 29) | 2200 SE 35 Street | Hollywood | 1991 | 80,200 | Cruise terminal/whse |
| Administration Building | 1850 Eller Drive | Ft Lauderdale | 1987 | 81,700 | Office |
| Warehouse/Terminal (Bldg 2) | 1801 SE 18 Street | Ft Lauderdale | 1957 | 85,504 | Cruise terminal/whse |
| Terminal (Bldg 25) | 2025 Eller Drive | Hollywood | 1987 | 86,000 | Cruise terminal |
| Warehouse/Terminal (Bldg 26) | 2026 Eller Drive | Hollywood | 1987 | 115,518 | Cruise terminal |
| Warehouse (Bldg 81) | 3501 Mcintosh Rd | Hollywood | 2001 | 81,858 | Warehouses/offices |
| Foreign Trade Zone Warehouse (Bldg A) | 3500 Block Mcintosh Rd | Hollywood | 1977 | 204,659 | Warehouses/offices |
| Warehouse/Terminal (Bldg 19) | 2019 Eller Drive | Hollywood | 1966 | 95,000 | Cruise terminal/whse |
| Terminal (Bldg 4) | 1800 SE 20 Street | Ft Lauderdale | 1987 | 100,405 | Cruise terminal/whse |
| Warehouse/Terminal (Bldg 1) | 1800 SE 18 Street | Ft Lauderdale | 1958 | 75,778 | Cruise terminal/whse |
| Maintenance Facility Bldg (Bldg ?) | 2101 Eisenhower Blvd | Ft Lauderdale | 1990 | 13,850 | Maintenance/Office |
| Terminal (Bldg 22/24) | 2022/24 Eller Drive | Hollywood | 1968 | 46,439 | Cruise terminal |
| Offices & Warehouses (Bldg 28) | 2051 Se 35 Street | Hollywood | 1966 | 37,049 | Office |
| Public Safety Bldg & Fire Station | 1901 Eller Drive | Hollywood | 1988 | 21,558 | Fire station/Public Safety |
| Seabulk Bldg-Office (Bldg 27) | 2200 Eller Drive | Hollywood | 1989 | 38,758 | Office |
| Crane Transformer Vault& Maint Bldg (Bld | 2050 SE 42 Street | Hollywood | 1993 | 6,530 | |
| Foreign Trade Zone Warehouse (Bldg F) | 3500 Block Mcintosh Rd | Hollywood | 1988 | 92,231 | Warehouse |
| Crowley Cargo Trans Admin Bldg (100) | 4300 Mcintosh Road | Hollywood | 1990 | 31,000 | Office |
| Security Operations Ctr | 1901 Eller Drive | Hollywood | 2003 | 5,424 | BSO Offices |
| Howard Amman Office Bldg (Bldg 611) | 2550 Eisenhower Blvd | Ft Lauderdale | 1964 | 20,346 | Office |
| Foreign Trade Zone Warehouse (Bldg E) | 3500 Block Mcintosh Rd | Hollywood | 1982 | 59,675 | Warehouse |
| Crowley Cargo Maintenance(#110) | 4300 SE 18 Avenue | Hollywood | 1990 | 7,500 | Maintenance facility |
| Foreign Trade Zone Warehouse (Bldg B) | 3500 Block Mcintosh Rd | Hollywood | 1977 | 23,830 | Warehouse |
| APM Terminal Cargo Yard Buildings | 4000 Mcintosh Rd | Hollywood | 2005 | 0 | Office |
| Offices (Bldg Otd) | 2049 SE 35 Street | Hollywood | N/A | 14,280 | Office |
| Crowley Cargo Maritime Ops(#100) | 4500 SE 20 Avenue | Hollywood | 1990 | 35,610 | Office |
| Plumbers Shop (Bldg 64) | 1500 SE 24 Street | Hollywood | 1960 | 9,559 | Maintenance facility |
| Warehouse (Bldg 6) | 1900 SE 23 Street | Ft Lauderdale | 1960 | 15,970 | Warehouse |
| Utility Building (Bldg 21a) | 2021a Eller Drive | Hollywood | 1967 | 1,600 | |
| Crowley Cargo Produce Insp(#113) | 4230 Mcintosh Rd | Hollywood | 1990 | 2,200 | Produce Inspection |
| Foreign Trade Zone Fire Pump Bldg (D) | 3500 Block Mcintosh Rd | Hollywood | 1977 | 0 | |
| Southport Phase IV "FPL" Vault(Sp) | | Hollywood | 1967 | 0 | |
| Linehandler Building | 3510 SE 19 Avenue | Hollywood | 1993 | 11,779 | Office |
| Public Works Storage/Maint. (Bldg 68) | 1601 SE 22 Street | Ft Lauderdale | 1960 | 7,800 | Maint./Storage whse |
| Crowley Cargo Guard House (#114) | 4190 Mcintosh Rd | Hollywood | 1990 | 0 | Guard house |
| Public Works (Bldg 67) | 1651 SE 22 Street | Hollywood | 1979 | 6,451 | Maint./Storage whse |
| Public Works (Bldg 69) | 1501 SE 22 Street | Ft Lauderdale | 1960 | 4,560 | Maint./Storage whse |
| W/R (Bldg 612) | 1451 SE 22 Street | Ft Lauderdale | 1964 | 3,081 | Maint./Storage whse |
| Building 65 | 1300 SE 26 Street | Hollywood | 1960 | 3,637 | Office/warehouse |
| Transformer Vault (Bldg 28a) | 2028a Eller Drive | Hollywood | 1977 | 9,072 | FPL Transformer Vault |
| W/R Continental Cement (Bldg 613) | 2800 Eisenhower Blvd | Ft Lauderdale | 1985 | 0 | |
| Public Works Welding Shed (Bldg 66) | 2101 Eisenhower Blvd | Ft Lauderdale | 1990 | 1,200 | |
| Single wide trailer - GFC - SE 28th St. | Eller Drive | Ft Lauderdale | N/A | 0 | Office |

| | | | | | |
|---|---|---|---|---|---|
| Railroad Scale House (Bldg 66b) | 1501 SE 24 Street | Ft Lauderdale | 1962 | 0 | |
| Transformer Vault (Bldgs 34, 48, 55) | | Ft Lauderdale | 1967 | 0 | |
| Rest Rooms (Bldgs 11 and 12) | | Ft Lauderdale | 1999 | 0 | |
| Building 46/47 (CVB) | 1850 Eisenhower Blvd | Ft Lauderdale | 1984 | 41,649 | |
| U.S. Customs House | 1580 SE 24th Street | Hollywood | 1939 | 5,472 | Office |
| Foreign Trade Zone (Bldg C) | 3400 Mcintosh Rd | Hollywood | 1987 | 1,200 | Office |

Source: Port Everglades Department 2011

## B. Inventories of Natural Resources

This section includes inventories of vegetative cover, wetlands, wildlife habitats, living marine resources, and other local natural resources.

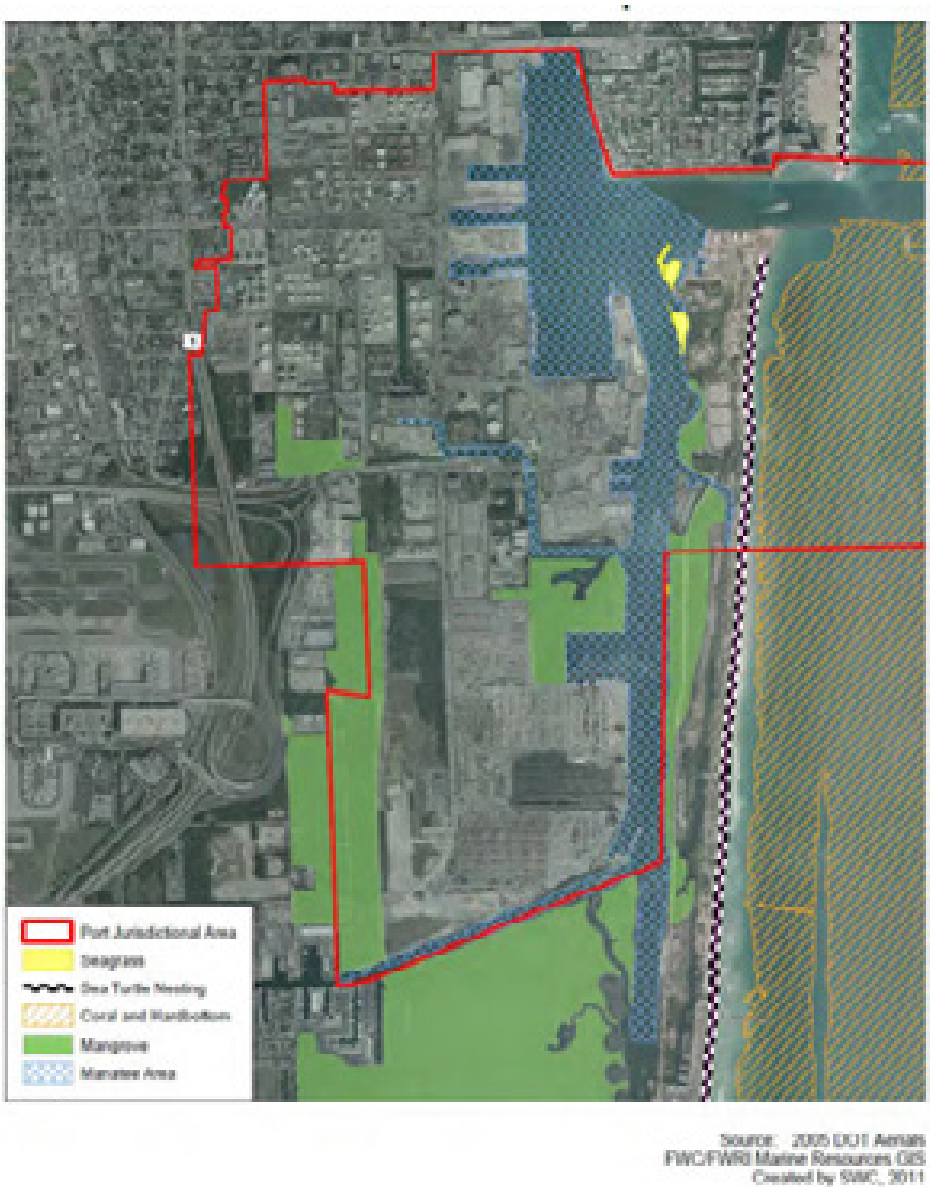
1. Vegetative cover, wetlands, and wildlife habitats. Figure P-8 shows the locations in the PJA of existing vegetative cover associated with mangrove forest concentrations. This cover includes a mature mangrove stand to the west and north of the Southport Turning Notch. This area is encumbered by a 57-acre Conservation Easement issued to the Florida Department of Environmental Protection (FDEP).

   As discussed in Part III, the Port has obtained FDEP approval to initiate procedures for the eventual release of 8.7 acres of the easement for the Southport Turning Notch expansion, which is included in the 5-Year Master Plan. Also, included in the 5-Year Master Plan is the creation of approximately 16.5 acres of mangrove wetlands in uplands adjacent to the Notch to replace the 8.7-acre easement being released. Several other mangrove concentrations in the PJA are shown on Figure P-8. In addition, port entrances, roadways, office buildings, passenger terminals, and parking facilities are landscaped with native and ornamental plant species.

   a. *Listed species*. Portions of the PJA serve as habitat for various listed species. The following have been reported in the Port Everglades area (see Figure P-4 in Element 1 of the *Port Everglades Master/Vision Plan*):

      - West Indian manatee (*Trichechus manatus*).
      - Johnson's seagrass (*Halophila johnsonii*).
      - Three species of sea turtles—loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*).
      - Wood stork (*Mycteria americana*).
      - Small-toothed sawfish (Pristis pectinata).
      - Brown pelican (Pelecanus occidentalis).
      - Least tern (Sterna antillarum).
      - Peregrine falcon (Falco perigrinus).
      - White ibis (Eudocimus albus).
      - Elkhorn coral (Acropora palmata).
      - Staghorn coral (Acropora cervicornis).

Figure P-8: Natural Resources




The waters surrounding Port Everglades also serve as habitat for the West Indian manatee, a federally listed endangered species. Port Everglades, designated as a manatee sanctuary by state statutes, is one of about two dozen manatee wintering sites designated as manatee protection zones. Manatees congregate in the vicinity of the Port at locations such as the FPL Discharge Canal and Intracoastal Waterway next to the Conservation Easement. Manatees also visit portions of West Lake Park south of the Port property.

The beach and dune areas of Dr. Von D. Mizell-Eula Johnson State Park serve as sea turtle nesting areas. The locations of these wildlife habitats in the PJA are shown on Figure P-8; however, not all of these areas have been designated as critical habitat for these species under federal or state regulations.

b. *Wildlife habitat*. In addition to listed species such as manatees and sea turtles, the waters and lands in and around Port Everglades provide habitat for a variety of other plant and animal wildlife. Numerous species of mammals, fish, and birds take refuge in the mangroves, canals, and trees that surround the Port. The waters to the south of the Port, including the waters bordering West Lake Park and the Dania Cut-Off Canal, are considered essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act of 2002 (67 FR 2343).

2. Living marine resources. Portions of the PJA support live corals and seagrasses, in addition to providing shelter for fish, invertebrates, and other juvenile marine organisms. Marine game fish such as snook, tarpon, barracuda, and jacks also share the coastal habitat; however, land-based fishing is not permitted on Port property in the PJA.

a. *Coral*. The Outer Entrance Channel, which leads into Port Everglades from the Atlantic Ocean, acts as habitat for coral species such as Siderastrea siderea and Stephanocoenia intersepta. The hard-bottom areas further off shore exhibit live growth, with turf algae being the most dominant, followed by macro-algae, sponges, octocorals, scleractinians, zonathids, and tunicates. This marine habitat is regulated by federal, state, and county environmental protection agencies. In addition, two Acropora coral species were listed in 2006 as threatened under the federal Endangered Species Act and critical habitat was designated in 2008 along the outer edge of the Port's Entrance Channel.

Benthic assessments performed in September 2007 directly north of Port Everglades included an assessment for the presence of Acropora coral colonies at 20 different locations. These included sites along the northern border of the Port's Entrance Channel. The study documented live Acropora coral colonies at three out of the twenty sites surveyed. The colonies were located in the northwest portion of the study area, about 0.25 miles northwest of the Entrance Channel. In addition, hard-bottom habitat assessments performed at Port Everglades documented high coverages of turf algae and less than 1 percent live coverage for other species of coral (see Section 1.12.7 of Element 1 of the Port Everglades Master/Vision Plan for more details).

b. *Seagrasses*. Though limited, areas in the waters surrounding Port Everglades provide habitat for a variety of seagrasses, including the endangered marine plant, Halophila johnsonni (Johnson's grass) (see Figure 6.2-8 of Element 6 in the Port Everglades Master/Vision Plan).

3. Other natural resources. The mangrove areas shown in Figure P-8 are the locations of Local Areas of Particular Concern (LAPC) designated by Broward County in the PJA. LAPCs are environmentally sensitive lands containing native vegetative communities. Prior to final permit approval for any proposed development that may affect or include land designated as a LAPC, the Broward County Land Development Code requires the preparation of an environmental impact statement. Should a proposed development negatively impact the resource, appropriate mitigation will be required.

## C. Areas Subject to Coastal Flooding

The " Flood Plains, Flood-Prone Areas, and Coastal High-Hazard Area" Figure of the Broward County Land Use Plan Map Series shows the areas in the PJA that are subject to coastal flooding. As indicated by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (12011CO307F and 12011CO219F), most of the PJA is located in Flood Zone AE. An area of Midport around the intersection of Eller Drive and Eisenhower Boulevard is in Zone X (outside the 500-year flood plain); a second Midport area, east of Eisenhower Boulevard and centered on Spangler Boulevard is in Zone VE. In addition, the beach and dune portion of the PJA, located in Dr. Von D. Mizell-Eula Johnson State Park, is designated Flood Zone VE.

## D. Inventory of Historic Resources

The term "historic resources" refers to all areas, districts or sites containing properties listed on the Florida Master Site File, the National Register of Historic Places, or designated by a local government as historically, architecturally, or archaeologically significant. The former U.S. Customs House, located at the southwest corner of Spangler Drive and Eisenhower Boulevard, is listed in the Florida State Master Site File (Site BD00210).

## E. Estuarine Pollution Sources

Potential sources of pollution in the PJA include stormwater outfalls maintained by the PED, petroleum piers that may leak historical petroleum contamination into the harbor if breached, the petroleum storage tank areas and connecting pipelines, and the Florida Marine Patrol boat

storage and repair facility. No marine vessel is totally leak-free. Residual pollution may occasionally be traced to ships that illegally discharge bilge water or spill petroleum products into the Port's berth and harbor area. Several other land uses in or adjacent to the PJA, such as the U.S. Naval Surface Weapons Center, the Nova Southeastern University Oceanographic Center, the U.S. Coast Guard Station, and the residential area along the north side of the Port's Entrance Channel may contribute to the existing sources of pollution. In addition to activities occurring on the Port, water from areas to the north, west, and south pass through the harbor. As such, these waters may contain stormwater generated from associated roadways, parking lots, marinas, and residential areas located outside of the PJA. These sources of discharges have not been identified with regard to any impact on the water quality in the PJA.

## F. Natural Disaster Planning Issues

This section addresses hurricane evacuation planning and post-disaster redevelopment planning as they pertain to the PJA. The Natural Disaster Component of the Coastal Management Element provides general natural disaster planning information.

1. Hurricane evacuation planning. This subsection addresses the areas in the PJA requiring evacuation, the number of persons requiring evacuation, the transportation routes and constraints on evacuation routes, and the time needed to evacuate during a 100-year storm event or a Category 3 storm event.

    a. *Hurricane vulnerability zone*. The Hurricane Vulnerability Zone comprises the areas the regional or local hurricane evacuation plan delineates as requiring evacuation. It includes areas requiring evacuation in the event of a 100-year storm or a Category 3 storm event. The entire PJA is located in the Hurricane Vulnerability Zone.

    *b.* *Number of persons requiring evacuation, hurricane shelter and shelter spaces available*. There are no residential areas in the PJA. Thus, there are no persons requiring an evacuation shelter. Port personnel, such as employees of Public Works, Public Safety, Administration, and other divisions of the PED, must evacuate following the securing of the premises in accordance with the Port Everglades Hurricane Procedure & General Disaster Plan & Continuity of Operations Manual, revised April 20, 2011. Essential Port personnel are required to remain on standby at their homes during a storm event, while Public Safety personnel coordinate operations at the Broward County Emergency Operations Center in accordance with the Broward County Emergency Operations Plan and the above-referenced *Port Everglades Hurricane Procedure & General Disaster Plan & Continuity of Operations Manual.*

c. *Evacuation routes, transportation, and hazard constraints.* Evacuation routes are those routes designated by county civil defense authorities or the regional evacuation plan for the movement of persons to safety in the event of a hurricane. Eller Drive, which directly connects the Port with the Florida Intrastate Highway System (FIHS), serves as the primary evacuation route in the PJA. The eastern terminus of I-595 begins at Eller Drive, providing direct access to I-95, I-75, and Florida's Turnpike. The secondary evacuation route is Spangler Drive/SR 84, which connects with U.S. 1 and I-95.

The primary transportation constraint on evacuation routes is the volume-to-capacity ratio on the internal and external roadway system; the widening of Eller Drive has helped reduce this constraint on the internal system. The primary hazard constraints on the primary and secondary evacuation routes are the rate and height of flooding caused by the storm tides associated with hurricane storm events.

d. *Evacuation times*. Port personnel are to be evacuated prior to the attainment of flood stage. It is estimated that the securing of Port facilities will be completed at least 12 hours prior to projected landfall. In addition, the Harbormaster will strongly advise and recommend that all vessels in port leave well in advance of the approaching hurricane; however, the decision to remain in port or ride out the hurricane at sea rests with a vessel's master. Vessels remaining in port must comply with the U.S. Coast Guard's requirements, as listed in their Hurricane and Natural Disaster Plan. Requests for berths approximately 24 hours prior to the hurricane's anticipated arrival are handled on a case-by-case basis.

2. Post-disaster redevelopment. Port Everglades provides essential transportation and cargo storage/distribution services to the South Florida region and serves as a primary facility for the collection, storage, and distribution of materials necessary for regional post-disaster redevelopment following a major storm event. It is expected that any damaged port facilities will be rapidly reconstructed to conditions that existed prior to the hurricane.

a. *Existing and proposed uses in coastal high-hazard areas*. The Coastal High-Hazard Area refers to the evacuation zone for a Category 1/2 hurricane. According to the "Flood Plains, Flood-Prone Areas and Coastal High-Hazard Area" Map in the Broward County Plan Use Plan Map Series, all existing and proposed uses in the PJA would be affected by a Category 1 or 2 storm event, requiring implementation of the Port Everglades Hurricane Procedure & General Disaster Plan & Continuity of Operations Manual upon the issuance of a

hurricane watch by the National Hurricane Center and the Broward County Emergency Management Division.

b. *Structures with a history of repeated damage.* No structures in the PJA with a history of repeated damage have been identified.

c. *Inventory of infrastructure in Coastal High-Hazard Area.* All Port uses and infrastructure shown on Figure P-3 are located in the Coastal High Hazard Area.

## G. Inventory of Beach and Dune Systems

The Dr. Von D. Mizell-Eula Johnson State Park includes an approximately 150-foot-wide beachfront with no well-formed dune structures. This broad, flat beach is popular for swimming and sunning. When driving on the beach was banned, sand dunes, anchored by sea oats and other rare beach plants, did, however, begin to reform. FDEP, together with the Natural Resources Planning and Management Division of the Broward County Environmental Protection and Growth Management Department (EPGMD), are directly responsible for the maintenance of the beach areas in the PJA.

1. Past trends in erosion and accretion. Sand material has historically been accreting on the north side of the Port Everglades Entrance Channel jetties, with erosion occurring on the south side of the jetties. Sand also accumulates along the south side of the north jetty and a western section of the Entrance Channel.

2. Shore protection structures. Shore protection structures in the PJA include the concrete and steel bulkheads that form the ship berths and marginal wharfs, the riprap shoreline that protects the mangrove forest bordering the Southport Turning Notch, and the rock jetties that protect the Port Everglades Entrance Channel.

3. Effects of shore protection structures. The jetties lining the Port's Entrance Channel are composed of large boulders that help maintain channel project depth. Due to the prevailing southerly littoral current, sand material is deposited on the north side of the jetties, with scouring occurring on the south side of the jetties. The riprap that lines the Southport Turning Notch prevents erosion in the adjacent mangrove forest by breaking the wave action from tides, winds, and passing ships; prevents flotsam and jetsam from collecting in the mangrove area; and provides additional habitat for aquatic species.

4. Identification of existing and potential beach nourishment areas. The beach area in the Dr. Von D. Mizell-Eula Johnson State Park, located south of the Entrance Channel jetties, experiences historic erosion due to the location of the jetties and the effect of the southerly littoral current. This area continues to be a location for potential beach renourishment. For example, in recent years, a rock spur was built from the Port's south

jetty and two rock T-head groins were built just south of the jetty to accommodate beach fill. These structures serve to stabilize the beach at that very dynamic location without adverse down drift impacts. About 50,000 cubic yards of sand were removed from a shoal that was beginning to obstruct the navigation channel, and the material was placed on the beach at the park. Port Everglades, which once owned the northern portion of the Dr. Von D. Mizell-Eula Johnson State Park, donated this land to the State of Florida; therefore, the PED does not maintain the beach areas in the PJA. The Natural Resources Planning and Management Division of the EPGMD provides for beach nourishment together with the FDEP and the U.S. Army Corps of Engineers (ACOE). Historic dredging information indicates that maintenance dredging material from the Port Everglades Harbor and channels is not suitable for beach renourishment.

## H. Inventory of Public Access Facilities

Since the events of September 11, 2001, public access to Port Everglades is restricted, based on state and federal statutes.

1. Public access points. The beaches in the PJA, which are located in the Dr. Von D. Mizell-Eula Johnson State Park, are accessible by the public. These beaches have guarded swimming areas, public rest rooms and showers, picnic facilities, public dockage and boat ramps, and an Environmental Education Center, built by the Port to promote environmental awareness. As the Port is no longer an unrestricted open port, those wishing to access the Port must enter by one of four security gates -- located on Eller Drive, Spangler Boulevard, Eisenhower Boulevard and McIntosh Road -- and show required identification. The locations of these gates are marked with an S on Figure P-3.

2. Private property open to public. In addition to the four Port-operated security gates, shown on Figure P-3, individual security gates at private or leased terminals in Midport and Southport, control access to these properties on the Port. As the Convention Center is currently in the restricted zone, everyone attending events there must show some form of identification. The PED does provide opportunities for controlled public access to the Port, subject to advance registration, during Fleet Week, when Navy ships are berthed at the Port, and for other special events.

3. Parking facilities. The PED maintains several parking facilities. These include the 2,500-space Northport parking garage, which serves the Broward County Convention Center and the passenger terminals at Northport, and the 2,000-space Midport parking garage, which serves the passenger terminals at Midport. Surface parking is also provided at Port-owned buildings for use by Port staff, tenants, and visitors to the Port for business purposes; these buildings include the Port Administration Building, the

Public Safety Building, the Port Maintenance Division facility, the Amman Building, the Seabulk Building, the Foreign-Trade Zone, and various passenger terminals, such as Cruise Terminal 18, which has approximately 1,000 spaces. Parking is also provided for the longshoremen/stevedores serving the cruise and cargo vessels.

4. Coastal roads and facilities providing scenic overlooks. Several Port roadways, including Eller Drive, Eisenhower Boulevard, SE 19th Avenue, and SE 32 Street, provide scenic views of the working harbor, but these are no longer available for unrestricted public access. Marinelli Gardens, located on the north side of Eller Drive, just west of the FPL Discharge Canal, includes parking and picnic tables along the canal. North Ocean Drive, located in the Dr. Von D. Mizell-Eula Johnson State Park, provides access to the oceanfront beaches, with overlooks of the Port, the Intracoastal Waterway, and Whiskey Creek. A paved, lighted jetty at the north end of the park provides excellent fishing and an opportunity to view ships arriving at and departing from the Port.

   On the eastern shore of the Intracoastal Waterway, four marina-type facilities are operated by governmental and educational agencies. A boat-launching ramp/dock is maintained in Dr. Von D. Mizell-Eula Johnson State Park for transient park visitors. In addition, the U.S. Coast Guard, the U.S. Navy, and Nova Southeastern University operate facilities for the exclusive use of their vessels. The only boat ramp in the PJA is located in the Dr. Von D. Mizell-Eula Johnson State Park. This ramp is part of the park's public dock facility. The only public dock in the PJA is also located in the Dr. Von D. Mizell-Eula Johnson State Park.

5. Marinas, boat ramps, and public docks. The Broward Sheriff's Office maintains a floating dock in the FPL Discharge Canal for moving their harbor patrol boats and the Florida Marine Patrol operates a dry storage and repair facility adjacent to the canal. The Port also permits the temporary lay-in of large privately-owned yachts at several berths.

6. Fishing areas and piers. Port Everglades is designated as a manatee sanctuary by state statute. As such, fishing in the PJA is prohibited except in the Dr. Von D. Mizell-Eula Johnson State Park and along the south jetty of the Port's Entrance Channel. There are no fishing piers in the PJA; the nearest fishing pier is located in the City of Dania Beach, adjacent to the southern portion of the park, which is outside of the PJA.

7. Open space. The only beachfront open space in the PJA is located in the Dr. Von D. Mizell-Eula Johnson State Park, which is managed by the FDEP.

## I. Inventory of Infrastructure

1. Roadways. Figure P-9 identifies the roadways in the PJA and their connections to the regional highway network. The Port is located at the eastern terminus of I-595, which connects with I-95, Florida's Turnpike, and I-75 -- all components of the state's Strategic Intermodal System (SIS) -- as well as with other major arterials such as U.S. 1, U.S. 441 (SR 7), and SR 84. U.S. 1 also connects the Port with FLL, just a few minutes away. From the regional highway network, Port Everglades has three points of access:
    *a.* Eller Drive, which connects with I-595. This southernmost east-west access to the Port is the road most traveled by trucks headed to and from the Southport container facility and by buses and passenger vehicles headed to and from the Port's Midport cruise terminals.
    *b.* Spangler Boulevard, which is a continuation of SR 84, and enters the Port from the west, just to the north of the Midport area.
    *c.* Eisenhower Boulevard, which runs north and south, unlike the other two access roads, provides access to the Port from its northernmost edge, SE 17th Street/SR A1A. As the main entrance to Northport, this road serves the Convention Center, the Northport parking garage, and three of the Port's cruise terminals.

    In addition to Eller Drive, Eisenhower Boulevard, and Spangler Boulevard, internal roads serving various terminals and other Port facilities include SE 14th Avenue, SE 19th Avenue, McIntosh Road, SE 20th Street, SE 28th Street, SE 18th Avenue, SE 22 Street, SE 25th Street, SE 26th Street, SE 30th Street, SE 32nd Street, SE 35th Street, and SE 36th Street. Ocean Drive, located in Dr. Von D. Mizell-Eula Johnson State Park provides access to beaches, shoreline parking, and the marine facilities operated by the U.S. Coast Guard, the U.S. Navy, and Nova Southeastern University.
2. Bridges or causeways. The 17th Street Causeway Bridge, which borders the PJA on the north, is a drawbridge spanning the Intracoastal Waterway. The original 1950s bridge, which had a 25-foot clearance, has been rebuilt. The new bridge opened in April 2002. This new structure includes wider traffic lanes, bicycle lanes, and a 55-foot vertical clearance to reduce the frequency of opening the span for passing boats. In the PJA, a PED-maintained fixed bridge along Eller Drive spans the FPL Discharge Canal in Midport. A second bridge has been built over the FPL Discharge Canal to connect the dockside of the Midport area with the backlands west of the canal in Southport; this bridge eliminates the need for container traffic traveling between the two locations to leave and then reenter through the security area. A fixed bridge maintained by the state is located in Dr. Von D. Mizell-Eula Johnson State Park along Ocean Drive, the main park roadway that spans Whiskey Creek.

Figure P-9: Existing Roadways, Ingress and Egress Points


3. Sanitary sewer facilities. The PED owns and operates the sanitary sewer transmission lines and lift stations in the PJA; these are maintained by the Public Works Division, with the exception of the property located in the Dr. Von D. Mizell-Eula Johnson State Park, which is served by an on-site treatment facility. The locations of these sanitary sewer facilities are illustrated on Figure P-10. In accordance with an adopted Large User Agreement between the PED and the City of Fort Lauderdale, the City treats the sewage at the G.T. Lohmeyer Plant, which has an operating capacity of 55.7 million gallons per day (mgd) maximum 3-month average daily flow. Between October 2009 and September 2010, the PJA average daily flow was .124 mgd. Approximately 20 percent

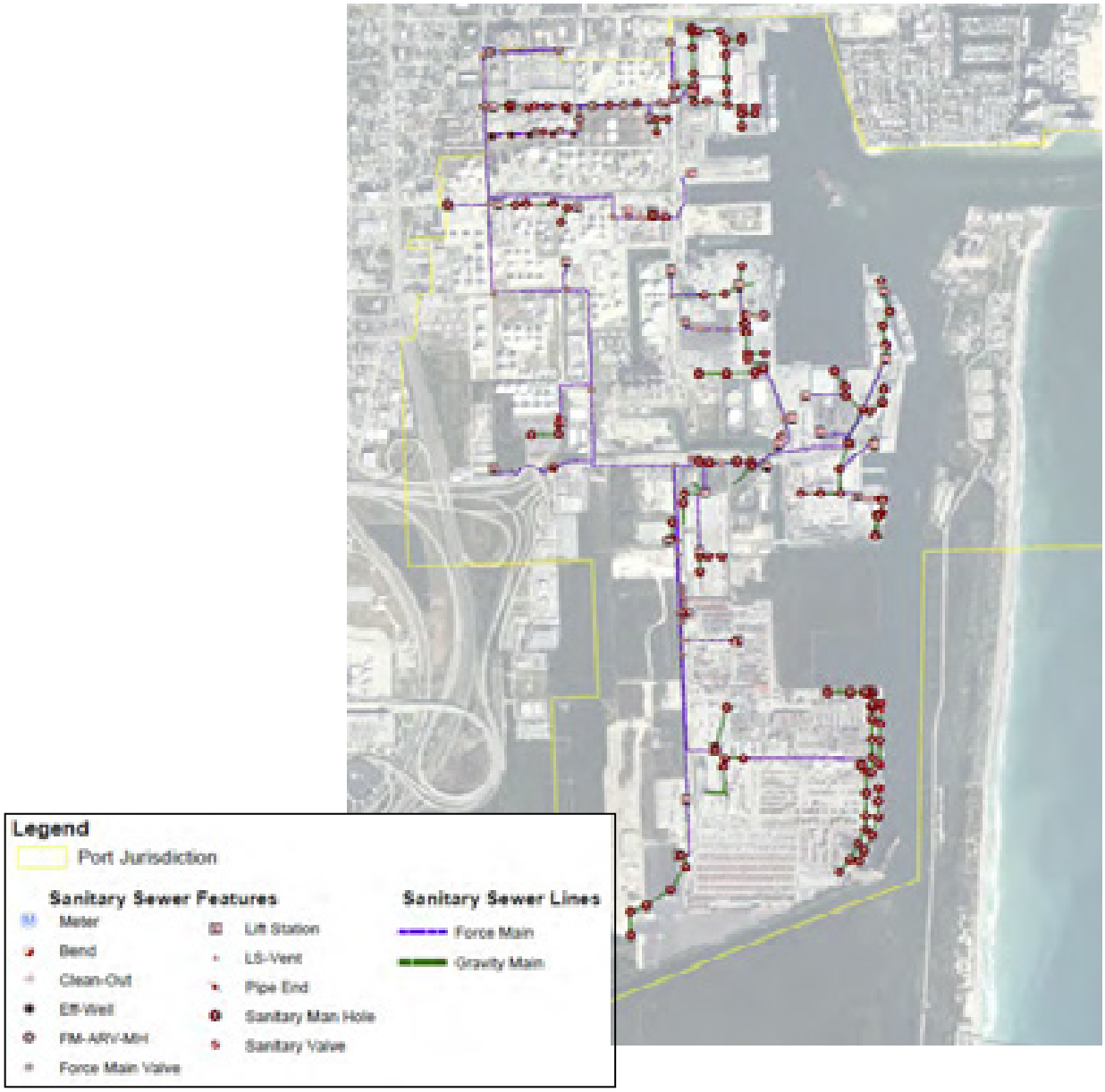
of the PJA is currently not served by wastewater collection or advanced treatment systems. These areas are primarily located in the petroleum tank farms, the I-595 right-of-way, and open space and recreation uses. The non-serviced areas rely on temporary facilities or small septic tank systems.

4. Potable water facilities. The PED owns and operates the potable water transmission lines in the PJA. These lines are maintained by the Public Works Division, with the exception of the property located in the Dr. Von D. Mizell-Eula Johnson State Park. The locations of these lines are illustrated on Figure P-11. In accordance with an adopted Large User Agreement between the Port and the City of Fort Lauderdale, the City supplies potable water to the Port. Water is delivered from either the Peele-Dixie or the Fiveash Water Treatment Plant and enters the Port's distribution system through five master meters. The meters and maximum delivery capacity are located at S.E. 17th Street (19,000 gallons per day (gpd)), S.E. 20th Street (271,000 gpd), S.E. 24th Street (103,000 gpd), S.E. 28th Street (207,000 gpd), and Eller Drive (835,000 gpd). Based on daily flow data from the City's master flow meters for March 8, 2010 through March 14, 2010, the Port's average daily demand is 1.4 mgd.

5. Man-made drainage facilities. Port Everglades owns and maintains the man-made drainage facilities in the PJA. This system is maintained in accordance with a National Pollution Discharge Elimination System (NPDES) permit in cooperation with the FDEP as delegated by the U.S. Environmental Protection Agency (EPA). There are two types of drainage systems in the PJA: one is piped and the other uses surface water discharge through ditches and swales. Drainage facilities in the PJA are identified on Figure P-12. (The PED is currently updating this figure; the revised figure will be included in the component as soon as it is available.)

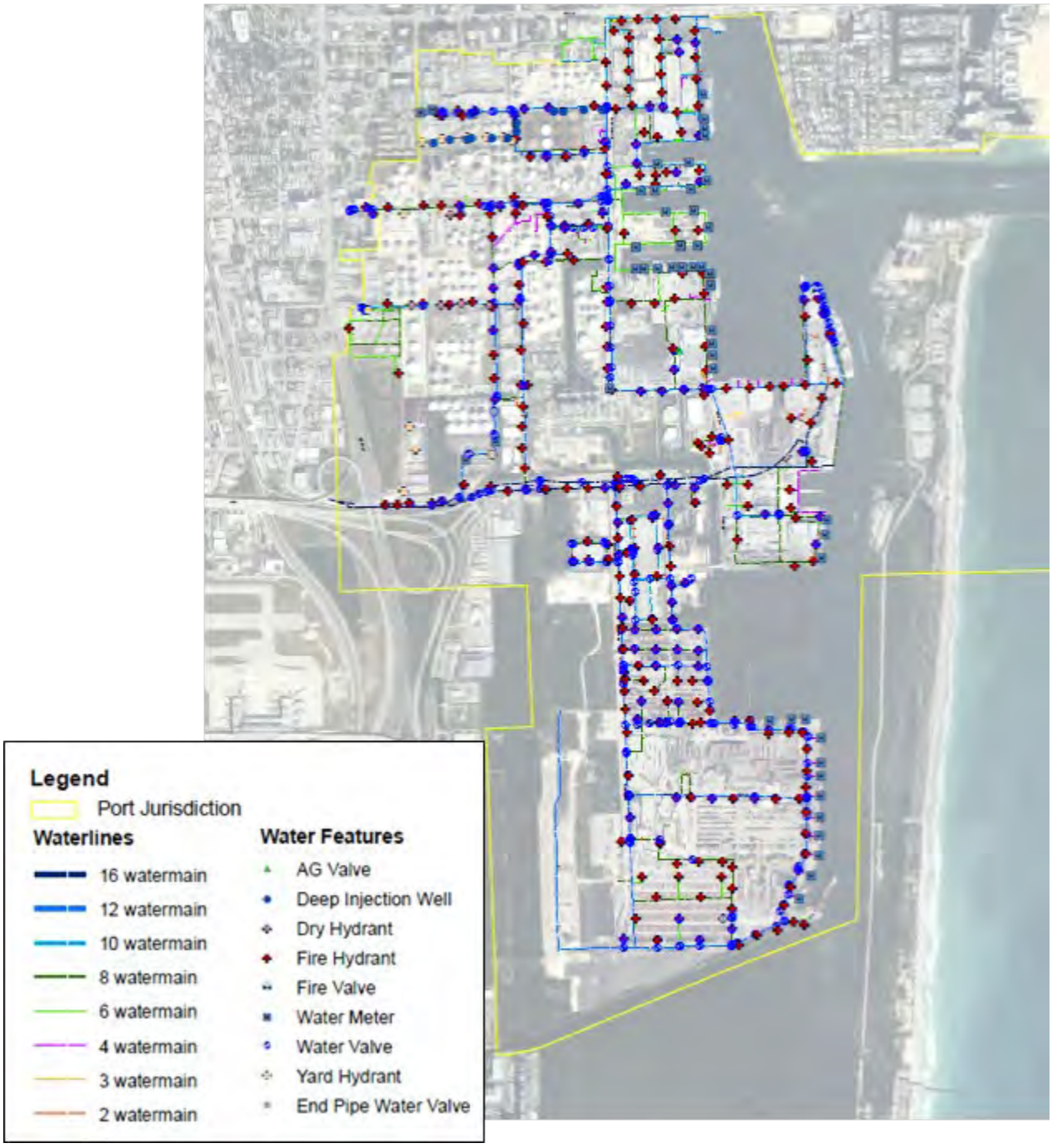
6. Solid waste facilities. The Port Everglades Public Works section hauls away a major portion of the solid waste generated by the Port. More than a dozen firms are authorized to haul waste for private owners and operators in the PJA. The solid waste collected in dumpsters is transferred to the Southwest Regional Landfill or the South County Resource Recovery Facility. The wastes generated by the foreign-flag ships that call at the Port are disposed of by several privately contracted haulers. The respective cruise lines contract with several franchised companies for the pick-up and disposal of the waste from their ships, which is hauled away to various locations out of the county.

Figure P-10: Sanitary Sewer Facilities



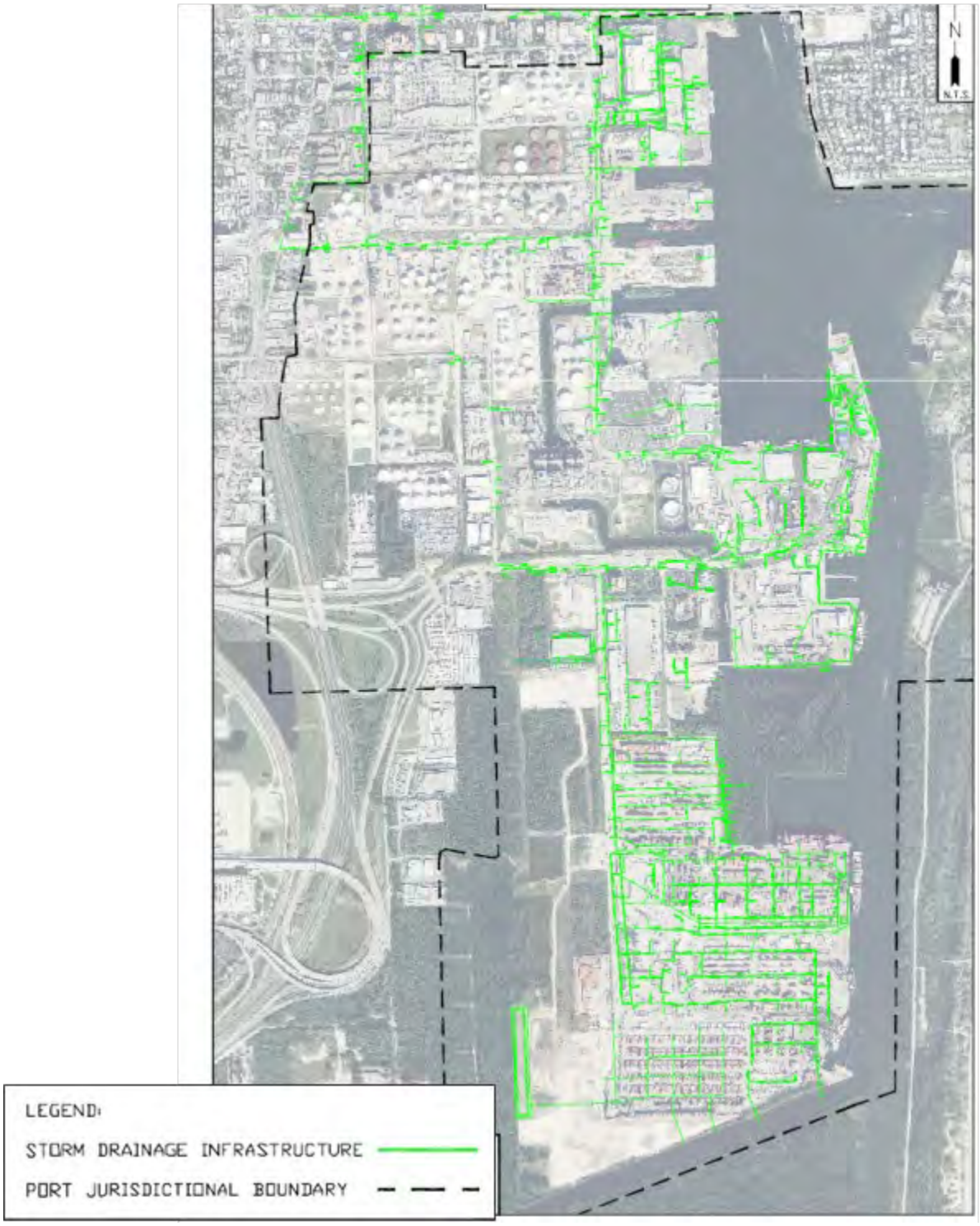

Source: Public Works Department, Seaport Engineering and Construction Division

Figure P-11: Potable Water Facilities




Source: Public Works Department, Seaport Engineering and Construction Division

Figure P-12: Drainage Facilities




Source: Public Works Department, Seaport Engineering and Construction Division

7. Railroad facilities. Port Everglades is served by an internal railroad network that is owned by the PED and maintained by the Florida East Coast (FEC) Railway, per an existing agreement. As Figure P-13 shows, the main rail line accesses the Port along Eller Drive then turns north to the west of SE 14th Avenue, branching to spurs to the east; these spurs are no longer operational. The FEC maintains a rail cargo yard west of Andrews Avenue and south of SR 84, outside the PJA. This yard serves as a trailer-on-flat-car (TOFC) and container-on-flat-car (COFC) transfer facility, with containers and trailers drayed between the Port's cargo ships and the FEC railroad system. The on-port, near-dock ICTF to be built during the 5-year planning period, shown in red on Figure P-13, will make these transfers more efficient, expedite cargo movements, and reduce truck traffic.

## J. Inventory of Deepwater Port Factors

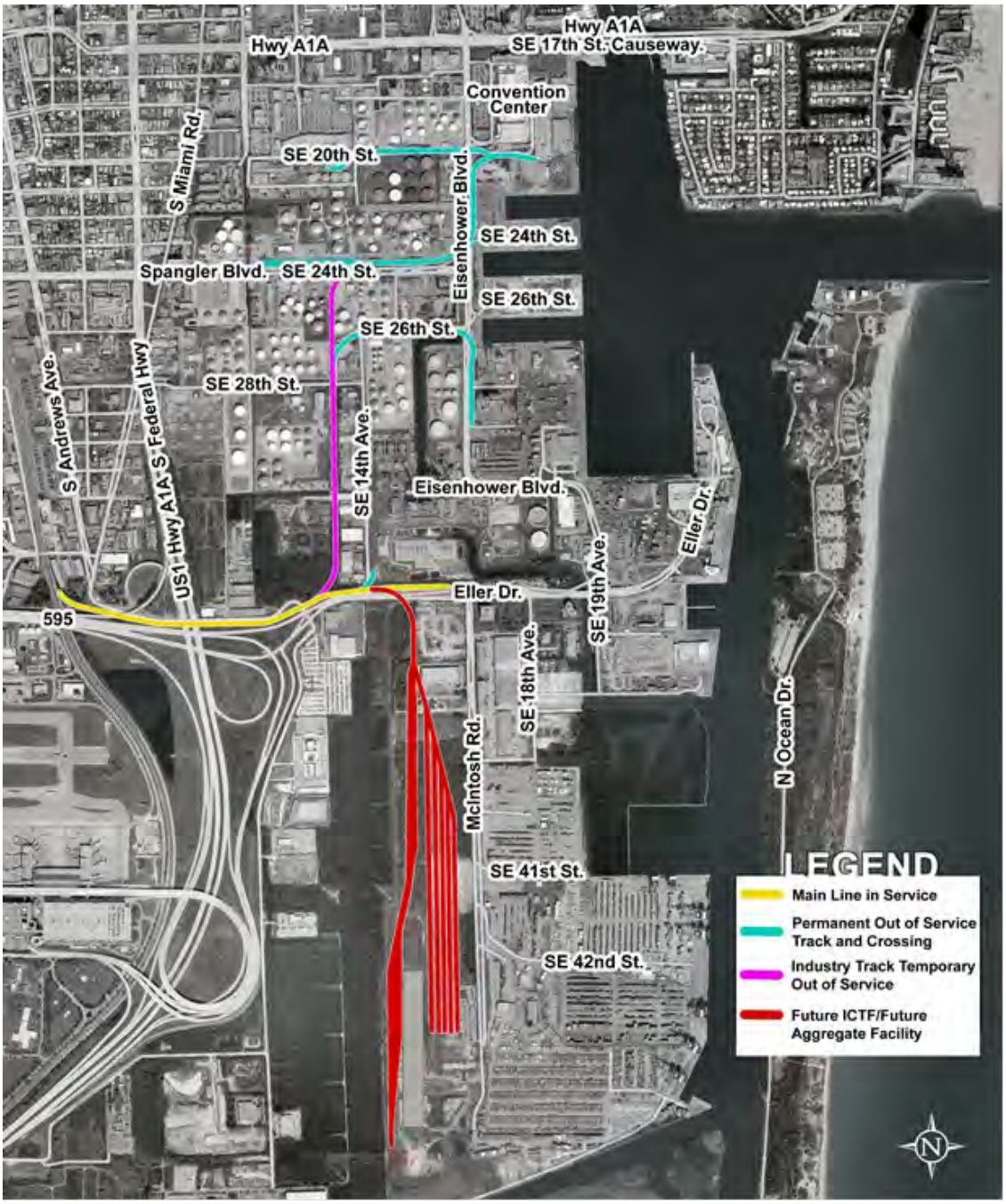
1. Economic base. Port Everglades plays a vital role in the South Florida region, annually contributing an estimated $13.9 billion to the local and regional economy and generating more than 143,000 local and regional jobs. Table P-4 illustrates the Port's waterborne commerce activity between 2001 and 2010. The Port is the second busiest cruise port in the world, with over 3.7 million passengers in FY 2009/2010, and ranks 12th among the mainland U.S. container ports, moving 793,227 TEUs (twenty-foot equivalent container units) in FY 2009/2010. The Port also supplies a 12-county region with gasoline, fuel oil, and aviation fuel. Other commodities handled by the Port include cement and clinkers, steel coils and rebar, aggregates, and gypsum. Trucks, trailers, tractors, automobiles, buses, and yachts and other boats are also shipped through the Port.

2. Landside transportation needed to support Port Everglades. Figure P-9, shown previously, identifies the ingress and egress points in the Port for motorized traffic. These points include Eller Drive at I-595, Spangler Boulevard/SR 84 at U.S. 1, and Eisenhower Boulevard at SE 17th Street/SR A1A, which directly connect the Port to the FIHS and SIS. The eastern terminus of I-595 in the PJA, provides ingress and egress at Eller Drive. I-595 intersects with I-95, Florida's Turnpike, and I-75 to the west of the PJA. Spangler Boulevard, which becomes SR 84 at U.S. 1, intersecting with I-95 to the west of the PJA, provides a secondary access to the FIHS/SIS.

3. In-water facilities. The in-water facilities at Port Everglades, including the Port's three slips and thirty-five primary berths, several of which have Ro/Ro ramps, are shown on Figure P-7 (see Part II.A.3). The Port has more than 25,000 lineal feet of bulkhead.

4. Maintenance of in-water facilities. The PED is responsible for maintaining project depths within 100 feet of the bulkheads, within all slips, within the last 1,000 feet of the Intracoastal Waterway between the "knuckle" or curve at Midport to the Dania Cut-Off Canal, and within the southern extension of the main turning basin. The ACOE is responsible for maintaining the project depths in the remainder of the PJA. The Port conducts depth soundings to monitor any depth changes, which may be caused by siltation or propeller backwash. Port Everglades Harbor has not experienced a need for frequent maintenance dredging activities; however, the Port does require periodic depth maintenance in Slips 1, 2, and 3.

Figure P-13: Rail Facilities



# Table P-4: Waterborne Commerce Report

*UNAUDITED*

**Port Everglades Waterborne Commerce Chart FY 2010-2001**

| FISCAL YEAR | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Operating Revenue** | **124,653,452$** | **114,441,818$** | **121,169,061$** | **112,500,017$** | **107,577,863$** | **105,858,262$** | **112,476,658$** | **89,386,458$** | **88,916,308$** | **79,393,979$** |
| **Expenses** | **73,950,966$** | **73,235,677$** | **73,093,351$** | **72,111,017$** | **69,117,148$** | **65,232,415$** | **56,488,710$** | **53,817,229$** | **49,176,240$** | **42,444,470$** |
| **Gross Margin** | **50,702,486$** | **41,206,141$** | **48,075,710$** | **40,389,000$** | **38,460,715$** | **40,625,847$** | **55,987,948$** | **35,569,229$** | **39,740,068$** | **36,939,509$** |
| **TOTAL SHIP CALLS** | **4079** | **4,251** | **5,226** | **5,496** | **5,510** | **5,901** | **6,389** | **5,853** | **5,484** | **5,572** |
| Container Ships | 1830 | 1,980 | 2,197 | 2,270 | 2,185 | 1,988 | 1,890 | 1,880 | 1,859 | 2,128 |
| Cargo Ships | 113 | 105 | 157 | 202 | 268 | 247 | 231 | 213 | 196 | 220 |
| Petrol. Tanker/Barge | 661 | 683 | 727 | 732 | 744 | 751 | 763 | 798 | 748 | 768 |
| Cruise Ships | 1015 | 1,007 | 1,676 | 1,852 | 1,763 | 2,362 | 2,854 | 2,215 | 1,963 | 1,793 |
| Navy/USCG | 29 | 34 | 22 | 39 | 29 | 18 | 25 | 17 | 22 | 42 |
| Other bunkers/tugs | 431 | 442 | 447 | 401 | 521 | 535 | 626 | 730 | 696 | 621 |
| **CRUISE PASSENGERS** | **3,674,226** | **3,139,820** | **3,227,770** | **3,409,946** | **3,239,154** | **3,801,464** | **4,075,406** | **3,375,671** | **3,485,857** | **3,072,343** |
| Single Day | 360,018 | 302,866 | 591,059 | 719,888 | 779,470 | 1,113,101 | 1,400,110 | 1,050,174 | 1,030,395 | 1,106,189 |
| Multi-Day | 3,314,208 | 2,836,954 | 2,636,711 | 2,690,058 | 2,459,684 | 2,688,363 | 2,675,296 | 2,325,497 | 2,455,462 | 1,966,154 |
| Cruise Revenue | 45,724,190$ | 37,428,549$ | 35,217,120$ | 31,483,362$ | 28,146,431$ | 30,000,619$ | 30,601,167$ | 25,223,188$ | 25,613,224$ | 20,398,597$ |
| **CONTAINER CARGO (tons)** | **5,216,831** | **5,204,103** | **6,584,747** | **6,060,149** | **5,688,442** | **5,076,403** | **4,145,394** | **3,633,610** | **3,425,269** | **3,907,890** |
| TEUS loaded | 552,781 | 551,862 | 697,808 | 665,729 | 624,524 | 572,342 | 486,598 | 415,186 | 394,966 | 446,233 |
| TEUS Total | 793,227 | 796,160 | 985,095 | 948,680 | 864,030 | 797,238 | 653,628 | 569,743 | 554,041 | 621,421 |
| Container Revenue | 29,473,963$ | 28,711,223$ | 33,867,064$ | 28,556,927$ | 25,393,178$ | 24,192,949$ | 20,487,292$ | 18,106,809$ | 18,021,927$ | 15,596,973$ |
| **TOTAL PETROLEUM (tons)** | **15,483,856** | **15,337,063** | **16,143,971** | **17,486,726** | **17,566,394** | **18,338,378** | **17,585,603** | **16,958,171** | **16,005,275** | **16,776,992** |
| Barrels | 109,380,437 | 108,356,216 | 113,941,485 | 122,979,685 | 123,479,901 | 128,842,410 | 123,734,414 | 119,100,503 | 112,416,933 | 117,909,362 |
| Petroleum Revenue | 25,486,535$ | 23,537,174$ | 23,620,073$ | 23,756,489$ | 22,946,933$ | 22,945,117$ | 22,734,391$ | 19,803,802$ | 18,721,965$ | 19,100,805$ |
| **TOTAL BULK (tons)** | **511,467** | **566,820** | **895,147** | **1,752,974** | **2,954,310** | **2,848,333** | **2,854,588** | **2,535,057** | **2,395,950** | **2,138,654** |
| Aggregate | 129,965 | 138,189 | 278,497 | 304,456 | 475,083 | 607,016 | 491,834 | 343,421 | 326,053 | 268,780 |
| Cement/Clinkers | 264,211 | 306,727 | 494,054 | 1,432,837 | 2,465,753 | 2,222,492 | 2,333,142 | 2,164,610 | 1,829,240 | 1,762,274 |
| Tallow | 13,188 | 13,105 | 13,710 | 12,312 | 13,473 | 18,778 | 11,555 | 16,003 | 15,873 | 16,900 |
| Gypsum | 104,103 | 55,061 | 108,886 | 50,437 | 0 | 0 | 18,056 | 11,023 | 137,194 | 90,700 |
| Bulk Revenue | 925,567$ | 1,090,407$ | 1,599,476$ | 3,251,766$ | 5,661,670$ | 4,836,366$ | 4,595,168$ | 3,986,867$ | 3,774,584$ | 3,449,788$ |
| **TOTAL BREAK BULK (tons)** | **69,960** | **67,462** | **91,007** | **302,301** | **376,535** | **279,139** | **297,678** | **161,195** | **189,785** | **200,111** |
| Steel/Coils/Rebar | 15,192 | 15,523 | 17,660 | 175,361 | 256,271 | 159,353 | 150,951 | 76,471 | 139,091 | 120,650 |
| Lumber | 78 | 176 | 1,473 | 22,071 | 48,143 | 36,871 | 43,778 | 40,539 | 30,792 | 49,894 |
| Board Feet | 58 | 130 | 1,091 | 16,349 | 34,388 | 21,477 | 32,429 | 30,029 | 22,809 | 36,959 |
| Plywood | 0 | 0 | 133 | 2,719 | 38,895 | 25,339 | 47,445 | 22,289 | 11,591 | 9,615 |
| Break Bulk Revenue | 872,967$ | 886,826$ | 1,670,354$ | 2,803,198$ | 2,798,064$ | 2,228,132$ | 2,147,521$ | 1,318,299$ | 1,616,911$ | 1,466,058$ |
| **TOTAL RO/RO-FLO/FLO (tons)** | **181,169** | **172,361** | **240,129** | **196,014** | **152,549** | **125,166** | **104,167** | **87,862** | **101,046** | **119 081** |
| Trucks/Trailers | 34,105 | 40,903 | 69,712 | 57,390 | 28,729 | 23,400 | 18,536 | 17,454 | 23,595 | 31,198 |
| Tractors | 79,210 | 65,255 | 69,552 | 52,089 | 45,462 | 26,630 | 18,812 | 14,160 | 14,553 | 17,977 |
| Yachts/Boats | 54,396 | 53,871 | 75,729 | 63,999 | 57,668 | 32,866 | 42,940 | 37,310 | 36,121 | 34,816 |
| Autos | 12,972 | 11,314 | 23,845 | 20,184 | 16,983 | 23,491 | 22,104 | 14,393 | 23,713 | 31,343 |
| Buses | 485 | 1,018 | 1,291 | 1,720 | 3,708 | 1,917 | 1,775 | 2,223 | 3,034 | 3,747 |
| **NAVY REVENUE** | **360,961$** | **275,564$** | **291,499$** | **501,215$** | **436,146$** | **236,337$** | **415,837$** | **108,235$** | **76,408$** | **323,774$** |
| **WATERBORNE COMMERCE** | **21,640,144** | **21,503,720** | **24,227,435** | **26,400,271** | **27,114,362** | **27,159,194** | **25,462,798** | **23,870,023** | **22,732,854** | **23,744,118** |

5. Management of dredged material. Limited upland areas are available to the Port for the disposal of dredged materials. With the exhaustion of possible alternative locations to place fill on land, other than a 6-acre site in the southwest corner of the Port, the EPA and ACOE have suggested ocean dredged material disposal sites (ODMDS). In a meeting between regulatory agencies in November 2004, the tentative site depicted in Figure P-14 was selected. This ODMDS is a one-nautical-mile by one-nautical-mile square located four nautical miles off the Broward County coast, with the center of the area at 26 07.00 N Latitude and 80 01.50 W Longitude. The bathymetric elevations range from 195 meters to 215 meters deep. This ODMDS has not previously been used as a disposal area.

   Three ODMDS management goals were specified by the agencies at the 2004 meeting: marine environmental protection, beneficial use of dredged material whenever possible, and documentation of disposal activity at the site. Disposal levels have been limited in the past at the nearby interim site to no more than 30,000 cubic yards annually. The ACOE is conducting a study to expand the ODMDS to accommodate the additional 11 million cubic yards to be generated by the planned deepening and widening activities. Selection criteria for upland dredge disposal sites. . The selection of upland dredge disposal sites in the PJA is to be restricted to Port-owned property. Minimal social, cultural, or other ancillary non-Port-related activities are expected to be impacted by the location and development of an upland dredge disposal site, since Port-owned property is considered industrial in nature and is located within the influence of saltwater groundwater. Upland dredge disposal is, however, expected to be minimal.

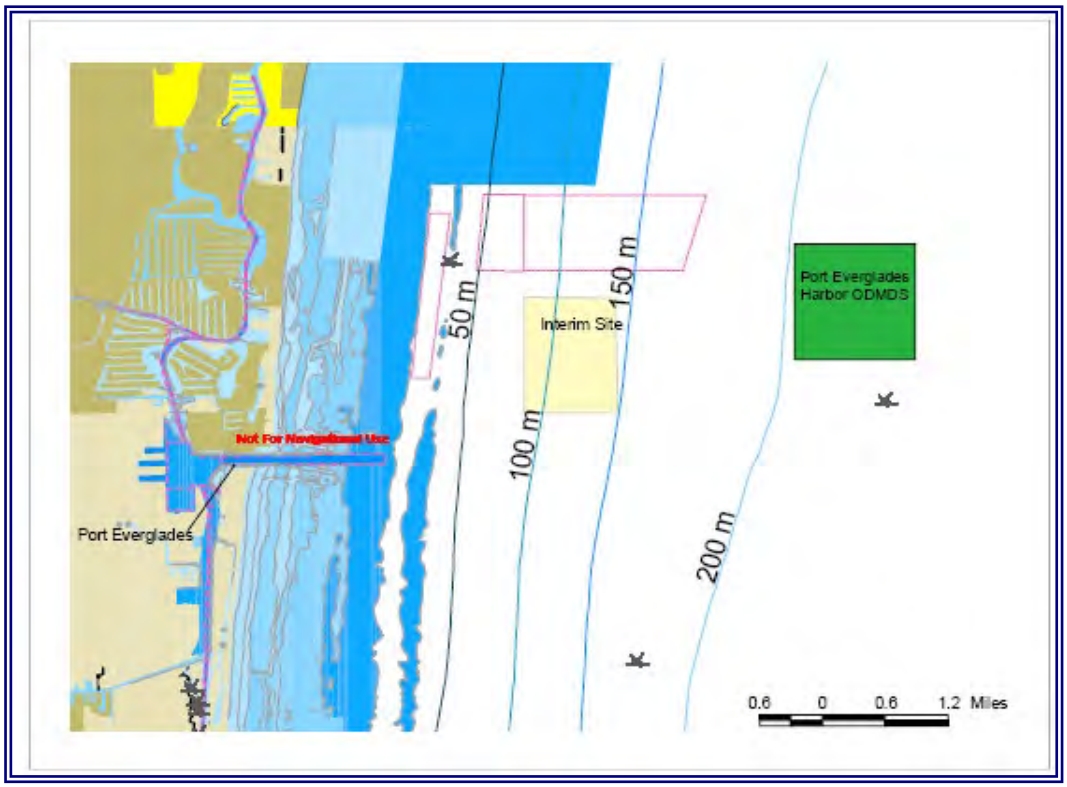
6. Selection criteria for upland dredge disposal sites. The selection of upland dredge disposal sites in the PJA is to be restricted to Port-owned property. Minimal social, cultural, or other ancillary non-Port-related activities are expected to be impacted by the location and development of an upland dredge disposal site, since Port-owned property is considered industrial in nature and is located within the influence of saltwater groundwater. Upland dredge disposal is, however, expected to be minimal.

7. Hazardous material handling and cleanup. Procedures for the handling and disposal of regulated or hazardous materials found on Port property are included in the Port Tariff. The Port generates small amounts of regulated waste from operations such as container crane maintenance, vehicle maintenance, painting, and other minor activities. The Port provides for the disposal of these materials through a contract with a licensed disposal company to handle these substances.

8. Handling and cleanup of petroleum products. Port Everglades serves as the primary port-of-entry for petroleum products in South Florida. These petroleum products are off-loaded from vessels to privately owned oil tank storage facilities through at-dock manifolds and underground pipelines. Petroleum transfers are carried out by the Port's private sector users in accordance with applicable state and federal regulations. An established notification protocol involving federal and state agencies as well as the Port in the event of a spill.

   Over the years, petroleum product has accidentally been discharged from petroleum facilities, including underground pipelines and storage tanks, forming plumes of free-phase and dissolved petroleum product in the ground and ground water. To facilitate environmental investigation, assessment, and remediation of historical petroleum contamination on Port lands, several of the petroleum terminal operators with facilities located in the PJA have formed a non-profit corporation called the Port Everglades Environmental Corporation (PEECO).

Figure P-14: ACOE and EPA Ocean Dredge Material Disposal Site
November 2004




Source: U.S. Army Corps of Engineers. Depths in meters.

## K. Maintenance and Expansion Program

The Port Everglades Master/Vision Plan identifies projects in Northport, Midport, and Southport to meet the anticipated demand in its core business lines: containerized cargo, liquid bulk (petroleum) dry bulk (crushed rock/aggregates), and cruise. This section presents forecasts for each of these business lines over the 5- and 10-year planning horizons, followed by a summary of the projects proposed to meet the forecasted demand. This information provides the context for the subsequent analysis of Port conditions and impacts in Part IV.

### 1. Economic Assumptions

The economic assumptions used to identify projected needs at the Port over the 5-, 10-, and 20-year planning horizons were prepared by specialized industry professionals who were part of the consulting team tasked with updating the Port's Master Plan.

### 2. Foreseeable Changed in Shipping Technologies

*a. Changes in shipping technologies.*

Cruise shipping. The predominant trend in passenger ships is the continuing development of large-capacity megaships, as exemplified by the two 5,400-passenger ships, Royal Caribbean Cruise Line's Oasis of the Seas and the Allure of the Seas, the world's largest cruise ships, which began year-round cruising from Port Everglades in 2009 and 2010, respectively. The Port expanded Cruise Terminal 18, the largest single-ship terminal in the world, to serve these ships. In addition, the Port completed a 15-year agreement with Carnival Corporation that guarantees a minimum of 25.5 million passenger movements over the life of the contract, with the Port providing major renovations to upgrade four existing cruise terminals over the next three years. As the homeport for these and other ships, such as the Celebrity Equinox, MSC Poesia, Silver Seas Silver Spirit, Seabourn Odyssey, all of which arrived in the 2009/2010 season, Port Everglades is expected to become the No. 1 cruise port in the world in the next few years.

The cruise industry forecasts continued growth of approximately 6.6 percent in 2011. Twelve new ships joined the fleet in 2010 and fourteen new ships will be launched in 2011, several of which have already begun or will be homeporting at Port Everglades. The attractiveness of Port Everglades as a cruise port is confirmed by feedback from cruise line stakeholders and an assessment of the Port's overall cruise tourism infrastructure (both soft and hard).

The assessment of the Port's future passenger and vessel throughput, berth demand, and utilization for future cruise operations resulted in the following key conclusions:

i. The larger ships in the cruise fleet will require longer berths to support them.

ii. Larger terminals, with supporting landslide infrastructure, will also be needed to support these bigger ships.

iii. The Port should continue to manage existing berths and work with cruise line partners to increase weekday us, taking the burden off weekend infrastructure requirements.

iv. Much of the growth opportunities will depend on addressing the infrastructure requirements of future cruise vessels entering the Caribbean region.

Cargo shipping. Port Everglades, as part of the South Florida "Gateway to the Americas," conducts significant trade with the countries in Latin America and the Caribbean. In recent years, approximately 85 percent of the Port's container activity was dedicated to this trade. Honduras, Guatemala, Costa Rica, Brazil, and Colombia were the Port's top trading partners in FY 2009/2010.

Growth in Asian Import Market and All-Water Service. Import cargo from Asia continues to fuel the growth in the U.S. container trade, historically dominated by the West Coast ports; but events in the past decade have resulted in increased diversification to all-water services of containerized cargo via various U.S. East Coast ports. A significant share of Asian cargo consumed in Central and South Florida moves intermodally via the West Coast ports; this cargo represents an all-water service market for the Port to target, particularly with the expansion of the Panama Canal in 2014. To target this market, the Port should pursue the infrastructure -- water depth, berths, cranes, storage capacity, and circulation system -- needed to accommodate ships carrying up to 7,000 TEUs.

East Coast competitors of Florida's seaports, have been penetrating the Central and South Florida markets, primarily due to the growth of all-water services. This penetration is also a target for Port Everglades. The Port should continue to market global carriers in this trade and target the Central and South Florida accounts that are currently moving through other East Coast ports as well as using intermodal service via West Coast ports.

Latin American and Caribbean Export Market. The South Florida ports -- Everglades, Miami, and Palm Beach -- have historically dominated the Latin American and Caribbean export markets. This domination has been facilitated by the concentration of Latin American- and Caribbean-related businesses located in South Florida, including export distribution and consolidation centers, and a strong local truck market. Free trade agreements with Chile and DR-CAFTA (the Dominican Republic, Belize, El Salvador, Honduras, Nicaragua, Guatemala, and Costa Rica) strengthen and sustain the Latin American and Caribbean economies that rely on this U.S. export market.

Port Everglades' favorable geographic location makes it an ideal port-of-call for cargo shipping lines serving Latin America and the Caribbean Basin. The Port also serves as a transshipment point for the transfer of containerized cargo between Latin America/Caribbean Basin ports and those in Europe. The Port Everglades Master/Vision Plan addresses these current opportunities as well as the future opportunities anticipated with the opening of the new Panama Canal locks in 2014. Proposed projects in the 5- and 10-year planning periods to develop the Port's container-handling capacity include the expansion of the Southport Turning Notch, the addition of two container cranes, the development of the near-dock ICTF, and improvements to McIntosh Road to facilitate truck traffic in and out of the container yards. As current Ro/Ro operations give way to more Lo/Lo operations, the Port is also preparing for these and other changes in technology.

*b*. *Changes in port operations*. The federal and state security mandates following the events of 9/11 required the Port to implement significant new measures to protect Port facilities, tenants, users, and the local community from potential threats. The Port has also implemented several "green" initiatives in response to growing concern about global climate change.

FLL Height Restrictions. Port Everglades is uniquely located only two miles from the FLL. Both the Broward County Aviation Department (BCAD) and the PED have developed master plans that recommend expansions of their respective facilities and operations to meet the projected needs for the airport and seaport services that are vital to the regional economy. Flight arrival and departure patterns from FLL, including the north runway and the new 9,000-foot south runway that is being designed extend over portions of Southport, the site of the Port's planned expansion of containerized cargo operations over the next ten years. The flight patterns of planes using these runways restrict the height of

structures as well as vessels located under the flight paths. In developing the Port Everglades Master/Vision Plan, the PED coordinated extensively with the BCAD as to the optimum locations for berthing the Super Post-Panamax ships expected to call at the Port once the expansion of the Panama Canal is complete, and for siting the new cranes that will serve these ships. It is understood that Federal Aviation Administration (FAA) approval will be needed prior to implementation of any projects in these Port areas which could penetrate FLL's approach and departure surfaces. Based on the work completed, the PED has submitted applications to the FAA for approval of the proposed berth and crane locations.

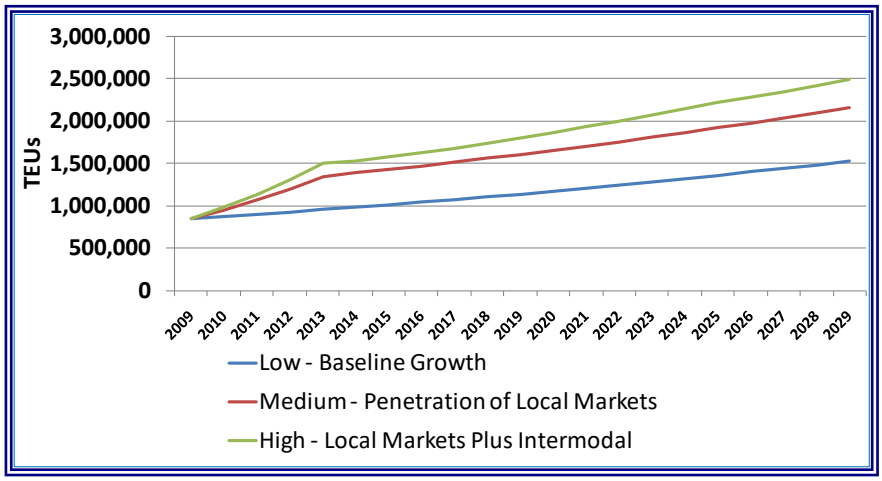
Airport-Seaport Connectivity. A second area of collaboration between the PED and the BCAD involves the close link between the seaport and the airport regarding the transport of cruise passengers. Nearly sixty percent of the Port's multi-day cruise passengers arrive via FLL. The majority of these passengers arrive and depart on Saturdays and Sunday, creating the potential for significant congestion, especially as the Port serves more megaships with over 5,000 passengers each, many of whom are from abroad. Passengers currently transfer from the airport to the seaport terminals by buses under contract with the individual cruise lines. Concurrently with the preparation of this Master/Vision Plan, the PED and the BCAD, in conjunction with the Florida Department of Transportation (FDOT) jointly conducted a Project Development & Environment Study for the Broward County Intermodal Center and Automated People Mover (APM) system, followed by an Environmental Assessment, which is 95 percent complete. A public hearing on the Environmental Assessment was held in June 2009; but, since August 2009, the process has been on hold, pending development of a complete funding plan. Once potential funding is identified, the county and FDOT may restart the process and proceed to obtain a Finding of No Significant Impact, which would then allow the county to seek federal funds for the project.

The Port's Master and Vision Plans are compatible with the recommended alternative for the APM system and right-of-way for the system has been preserved on Port property. The two proposed stations for a future APM coincide with both the Midport and Northport cruise passenger intermodal centers. The APM station at Northport will serve the Broward County Convention Center as well as Cruise Terminals 2 and 4. All alternatives included a universal baggage system that will automatically transfer passengers' baggage to their respective ships.

c. *Estimates of types and volumes of commodities to be handled.* The Port's markets for containerized cargo, non-containerized cargo (dry bulk and neo-bulk), and liquid bulk (petroleum) are fully discussed in Element 3 of the Port Everglades Master/Vision Plan. Specific forecasts for the planning milestones, as prepared by the specialized industry professionals who were part of the consulting team, are summarized below.

Containerized cargo. Based on the estimated FY 2008/2009 containerized volume and interviews with Port Everglades' tenants, Martin Associates identified low, medium, and high growth scenarios for the Port over the 20-year planning period. The low scenario container forecast by terminal assumes a 3 percent growth of base cargo and no new market penetration. The medium scenario assumes a 50 percent capture of the local truck hinterland market and a 25 percent capture of the Central Florida market by 2015, with a 3 percent growth thereafter. The high scenario assumes the capture of the local truck hinterland and Central Florida market shares as well as an initial 10 percent additional intermodal market, growing to 15 percent as the Port's proposed ICTF develops. By 2029, the unconstrained container throughput at Port Everglades is projected to range between 1.5 million and 2.5 million TEUs. The low (baseline), medium, and high container forecasts through the 2029 planning horizon are shown in Figure P- 15.

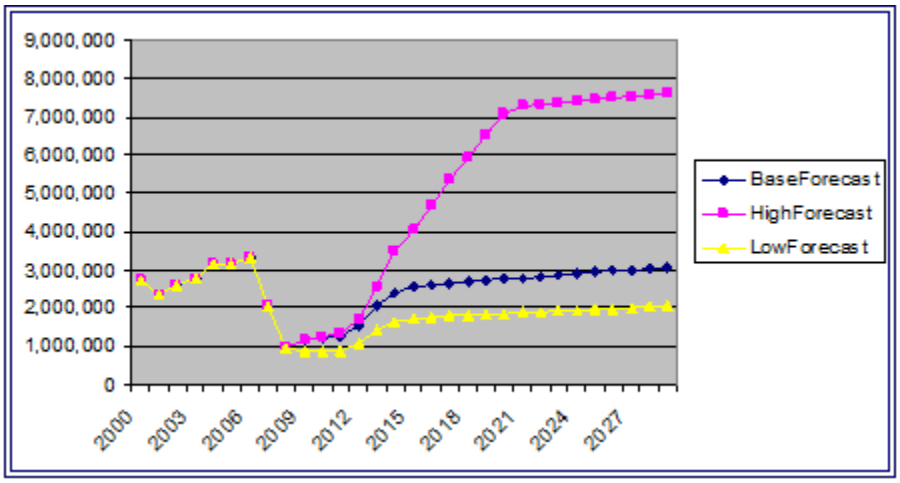
Figure P-15: Low/Medium/High Container Forecast




*Non-containerized cargo (dry bulk and neo bulk).* The overwhelming proportion of the dry bulk cargoes handled through Port Everglades is related to the

construction industry, which experienced dramatic declines as the recession hit the local, regional, and statewide economies. Similarly, the largest proportion of the neo-bulk cargoes is related to the construction industry, including steel (rebar and sheets) and, previously, lumber. Figure P-16 shows the base, high, and low forecasts for the dry bulk and neo-bulk cargoes at the Port, through the 2029 planning horizon, as prepared by Michael L. Sclar Associates, Inc.

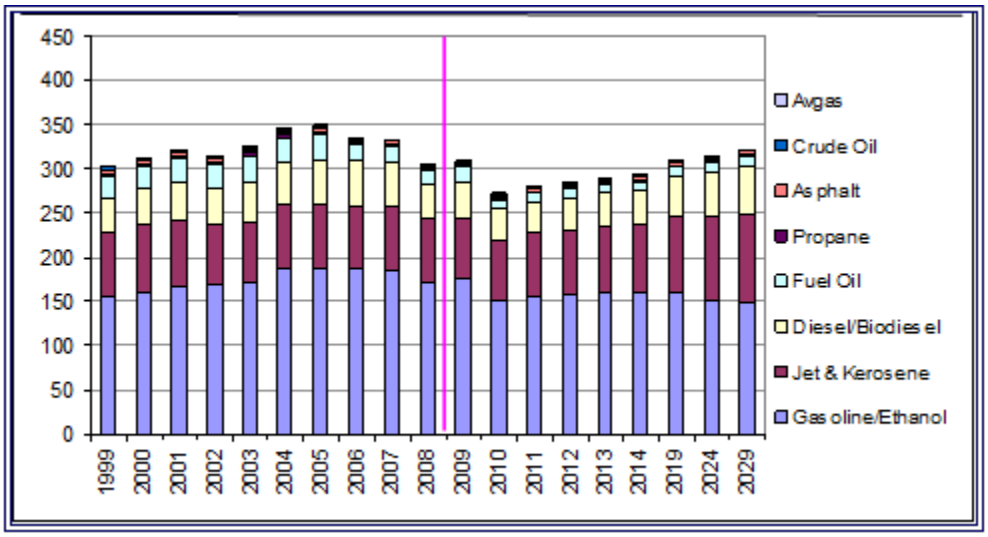
Figure P-16: Base, High, Low, and Needs Non-Containerized Cargo Forecast




On the downside, these forecasts reflect the decline in the local and regional construction industry during the recessionary period; on the upside, they reflect the eventual addition of two to four million tons of crushed rock to replace high quality local sources that may be affected by permitting issues. The dry bulk and neo-bulk markets for Port Everglades are projected to recover to 92.1 percent of the peak 2006 levels by 2029 under the base line forecast. Continued depressed tonnages and more muted recovery result in a low forecast that reaches only 61.9 percent of the peak 2006 levels. Under the high forecast, Port Everglades' dry bulk and neo-bulk cargoes reach 7.6 million tons or 229.1 percent of the peak volumes in 2006.

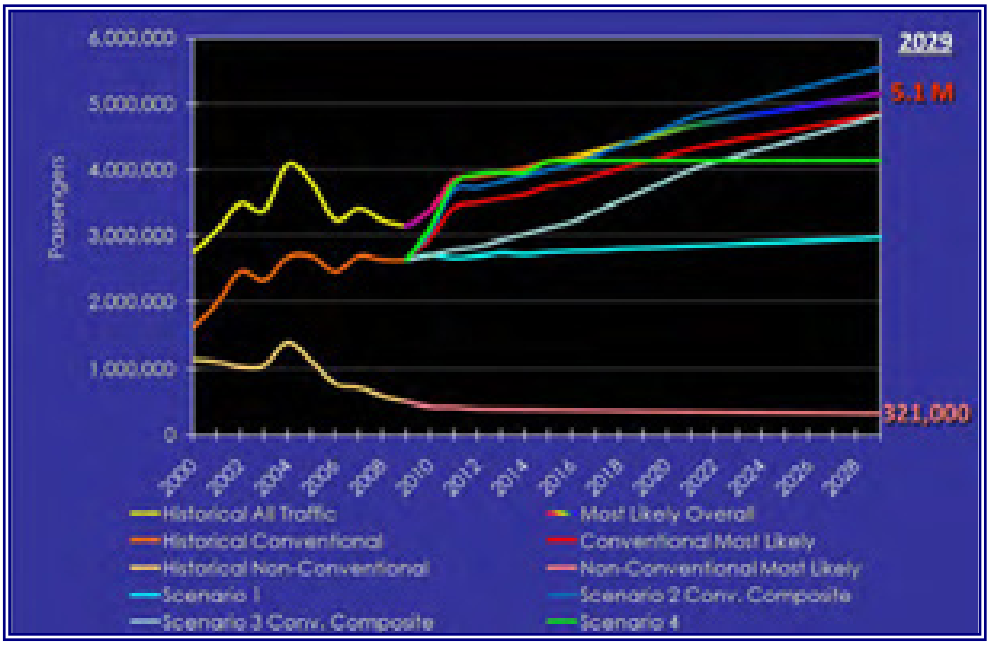
Liquid bulk cargo (petroleum). Purvin & Gertz, which conducted the Petroleum Sector Strategy Study for Port Everglades in 2005, updated that study for the Port Everglades Master/Vision Plan. Figure P-17 summarizes the petroleum throughput forecast for the Port through the 2029 planning horizon. Total throughput volumes are expected to grow from just over a projected 300,000 barrels per day in 2008 to 323,000 barrels per day by 2029.

Figure P-17: Petroleum Product Forecast (Barrels per Day)




d. *Projected number of passengers to be handled.* The projections of multi-day and daily cruise passenger embarkations, as developed by Bermello Ajamil & Partners, Inc., are illustrated in Figure P-18. The number of revenue cruise passengers embarking and disembarking from the Port is expected to increase steadily from a total of 3.67 million in FY 2010 to 4.0 million in 2015 and 4.47 million in 2019, reaching 5.16 million at the end of the 20-year planning period in 2029.

Figure P-18: Revenue Cruise Passenger Forecast



e. *Summary of market forecasts for the 5-, 10-, and 20-year planning horizons.* Table P-5 summarizes the market forecasts for each of the Port's business lines at the Plan milestones: 2014, 2019, and 2029.

Table P-5: Summary of Market Forecasts by Business Line for the Plan Milestones

| Business Line | 5-Year Plan | 10-Year Plan | 20-Year Plan |
|---|---|---|---|
| Containerized Cargo (TEUs) | 1,541,258 | 1,786,740 | 2,401,230 |
| Non-Containerized Cargo (Dry/Neo-bulk) (Tons) | 3,476,035 | 6,517,482 | 7,625,627 |
| Liquid Bulk Cargo (Petroleum) (Tons) | 15,199,717 | 16,026,912 | 16,699,008 |
| Cruise (Revenue Passengers) | 4,014,910 | 4,471,527 | 5,161,118 |

f. *The need expansions to in-water and on-land facilities.* The needed expansions to in-water and on-land facilities are identified in the 5-Year Master Plan and 10-Year Vision Plan. These expansions are described in detail in Element 5 of the Port Everglades Master/Vision Plan and summarized in the next section (III.C).

g. *The infrastructure required to meet anticipated needs.* The infrastructure required to meet the landside access needs of projected cargo and passenger demands include: the future development of an APM/Airport-Seaport Connector to ease the transfer of passengers between the airport and seaport terminals; the construction of a near-dock ICTF to enhance rail access for containerized cargo, the construction of the Eller Drive Overpass to facilitate rail operations; the ongoing realignment of McIntosh Road to alleviate truck congestion and delays, and the construction of a By-Pass Road to allow non-Port-related traffic to access the Convention Center without passing through Port security. With the exception of the APM, which is awaiting a final design decision and funding plan, these infrastructure requirements are included in the Port Everglades Capital Improvements Program and in the FDOT District 4 Work Program for FY 2012-2016.

## 3. Deepwater Port Master/Vision Plan

*a. Future port expansion for an initial five-year period.*

*In-water facilities.* The Port Everglades Master/Vision Plan identifies several in-water projects in Northport, Midport, and Southport to improve capacity and accommodate the projected demands for passengers and cargo through 2015 and 2019.

i. Northport in-water facility projects in the 5-year planning period include the following:

- New and reconfigured bulkheads at Berths 9 and 10 in Slip 1. The Port's bulkhead replacement schedule is based on the findings of the Bulkhead Study Update and Cathodic Protection System Evaluation for Port Everglades Berths 1 through 29, prepared by Halcrow in August 2010. All three slips (1, 2, and 3) in Northport need to be reconfigured to accommodate future longer and wider petroleum tankers; but only the initial widening of Slip 1 will take place during the 5-year period.

- Slip 2 Westward Lengthening. Slip 2 lengthening to the west will increase the slip from 900 linear feet (LF) to 1,150 LF to accommodate larger cruise ships.

ii. Midport in-water facility projects in the 5-year planning period include the following:

- Tracor Basin Finger Pier Replacement with Catwalk + Dolphin. The Tracor Basin in Midport is used to berth tugboats. The existing finger pier will be replaced with a steel girder catwalk, with a dolphin at the front, to allow for vessel mooring.

iii. Southport in-water facility projects in the 5-year planning period include the following:

- Upland Enhancement. The Port's upland enhancement project, to be initiated in the 5-year planning period, consists of creating approximately 16.5 acres of mangrove wetlands on an uplands site adjacent to the Turning Notch in exchange for releasing 8.7 acres of the existing Conservation Easement at the west end of the existing Notch (see discussion in Part IV).

- Westlake Mitigation. In addition to easement replacement, the impacts caused by removal of the 8.7 acres of mangroves must be mitigated in accordance with local, state, and federal environmental permitting requirements. The Port proposes to accomplish this mitigation at West Lake Park, and has shared the design and permitting costs of restoration activities at West Lake with the BCAD to provide mitigation credits for impacts associated with needed expansion at the Port and other county properties.

- Turning Notch Expansion (Contract 1). The Turning Notch expansion at the existing 42-foot water depth is to be broken into two contracts. Contract 1, to be implemented in the 5-year planning period, will cover the waterside expansion work, including excavation, dredging, and bulkhead construction; the related landside work, is programmed for a separate Contract 2 and will begin near the end of the 5-year planning period.

- In addition to the above projects at specific locations of the Port, the 5-Year Master Plan includes continuing expenditures for the ACOE Deepening and Widening Design of the Port's harbor and channels.

*Landside facilities*.

i. Northport landside projects in the five-year planning period include the following:

- By-Pass Road. At Port Everglades, where once the public could pass through the Port to reach local destinations, post-9/11 security mandates eliminated this access. The phased By-Pass Road is a concept that has been designed to allow the public to travel between the intersection at Eisenhower Boulevard and 17th Street to U.S. 1 without passing through a Port security gate. It essentially "carves out" the Convention Center from the Port, thus allowing the public direct access to the Convention Center from 17th Street. Phase 1 of this project shifted the Port's security checkpoint to the south by approximately 1,500 feet. In addition to offering swift, direct access to the Convention Center, Phase 1 construction enabled the Port to retain a security checkpoint on Eisenhower Boulevard, thus continuing to allow cruise passengers and others wishing to enter the Port access from 17th Street. Phase 2 is in

design and expected to be constructed prior to the opening of the Convention Center Hotel.

- Improvements to Cruise Terminals 2 and 4. Renovations to Cruise Terminal 2 are required due to changes in defining the Port-secured area from the public space at and around the Convention Center; these renovations will allow simultaneous embarkation and disembarkation processing. Improvements to Cruise Terminal 4 are necessary to accommodate larger passenger ships and increase the baggage-handling area in the terminal.

- New Petroleum Tank Farm. The existing terminal, which was built during World War II, will be rebuilt as a modern terminal by the operator the County chooses through a competitive selection process. The new oil terminal at the Port is expected to store various petroleum products.

ii. Midport landside projects in the five-year planning period include the following:

- Improvements to Cruise Terminals 19, 21, an 26. These improvements are needed to increase the respective terminals' capacity to accommodate larger cruise ships and enhance passenger flows and other aspects of the embarkation and debarkation processes, in accordance with the Port's long-term agreement with Carnival Corporation.

- Cruise Terminal 18 Parking Garage. This new facility will add 1,600 structured parking spaces above a passenger intermodal zone to serve the Port's Midport cruise passengers and provide 400 spaces for employee parking.

iii. Southport landside projects in the five-year planning period include the following:

- ICTF Tracks and Storage Yard. A near-dock ICTF will be built to transfer international intermodal containers between ship and rail, and the reverse. Currently such containers must be drayed to and from the Port to off-Port rail terminals, either at Andrews Avenue in Fort Lauderdale or in Hialeah in Miami-Dade County. The ICTF project consists of initially bringing a new rail track under the Eller Drive Overpass (scheduled for construction in FY 2011) with a second track to be provided later if demand warrants. The new rail track expands into five working tracks

totaling approximately 15,000 LF to service up to an 8,000-LF train. The total ICTF area, including the tracks, is approximately 35 acres; the marshaling area (between McIntosh Road and the easternmost track) is approximately 17 acres.

- McIntosh Road Improvements. McIntosh Road is the entry road to the Southport contain terminals. The realignment project creates a loop road with through lanes and lanes for de-acceleration, queuing, and acceleration The design, which maximizes turning radii and mandates right-hand turns, also provides lanes for making a U-turn at two places, eliminating the need for vehicles to go through the security gate twice. Appropriate signage will be provided for all truck routes.

- Super Post Panamax Crane (1). In the 5-ear Master Plan, the Port will purchase one 100-foot-gauge Super Post-Panamax crane to serve the lightly loaded Post-Panamax vessels currently calling at the Port. The crane will be able to serve 22-row-wide container vessels and will be specially designed as a low-profile crane to meet the FAA height restrictions. This is the first of five cranes the Port will be purchasing over 20 years to handle the forecast container volume.

  Table P-5 shows the capital improvement projects proposed in the 5-Year Master Plan and Table P-6 shows the Port's complete capital improvement program for the five-year period. (The latter table includes projects other than the infrastructure projects in the Master Plan.). Figure P-19 illustrates the Port's 5-Year Master Plan. The full-size map is available on the Port website at http://www.broward.org/Port/MasterPlan/Documents (see Page ES-36 in the Executive Summary).

## Table P-6: 5-Year Master Plan Capital Improvements Projects

| 5-Year Master Plan | Years 2011 - 2015 | Estimated Cost (Millions) |
|---|---|---|
| Northport | Slip 1 New Bulkheads and Reconfiguration - Phase 1 | $ 55.00 |
| | By-Pass Road - Phase 1 | $ 6.00 |
| | By-Pass Road - Phase 2 | $ 30.00 |
| | Cruise Terminal #2 Improvements | $ 4.20 |
| | Cruise Terminal #4 Improvements | $ 13.00 |
| | New Petroleum Tank Farm | $ 75.00 |
| | Slip 2 Westward Lengthening | $ 23.00 |
| Midport | Cruise Terminal #19 Improvements | $ 11.43 |
| | Cruise Terminal #21 Improvements | $ 5.05 |
| | Cruise Terminal #26 Improvements | $ 13.32 |
| | CT #18 Parking Garage | $ 32.00 |
| | Tracor Basin Finger Pier Replace with Catwalk+Dolphin | $ 5.20 |
| Southport | McIntosh Road Improvements | $ 11.20 |
| | Upland Enhancement | $ 11.00 |
| | Westlake Mitigation | $ 12.60 |
| | Super Post Panamax Crane (1) | $ 12.00 |
| | Turning Notch Expansion - Contract 1 | $ 67.08 |
| | ICTF- Rail & Yard | $ 42.00 |
| Port-wide | ACOE Deepening and Widening Design | $ 4.00 |
| | ACOE Deepening and Widening Construction (Depending on schedule) | $ 20.00 |
| **Total** | | **$ 453.08** |

## Table P-7: Total 5-Year Capital Improvement Program

| FY 2011 to 2015, 5-Year Capital Improvement Plan ($ Millions) | | | | | | |
|---|---|---|---|---|---|---|
| | FY11 | FY12 | FY13 | FY14 | FY15 | Total |
| General Infrastructure | 6.550 | 8.550 | 7.550 | 7.550 | 7.550 | 37.750 |
| Master Plan Projects | 43.350 | 80.882 | 80.248 | 103.750 | 48.300 | 356.530 |
| ACOE Dredging Project | - | 0.500 | 0.500 | - | 20.000 | 21.000 |
| Other Port Capital Improvements | 44.304 | 13.898 | 15.993 | 7.953 | 7.787 | 89.935 |
| Total | 94.204 | 103.830 | 104.291 | 119.253 | 83.637 | 505.215 |

Figure P-19: 5-Year Master Plan Future Land Use


*b. Future port expansion for the ten-year period.*

*In-water facilities*. The in-water facility projects proposed for implementation in the 10-year planning period are summarized below by Port area.

i. Northport projects in the 10-year planning period include the following:

- Berths 1, 2, and 3 New Bulkheads. New bulkheads will be constructed for Berths 1, 2, and 3, based on recommendations in the previously cited Bulkhead Study.

ii. Midport projects in the 10-year planning period include the following:

- Berths 16, 17, and 18 New Bulkheads. New bulkheads will be constructed for Berths 16, 17, and 18, based on recommendations in the Bulkhead Study.

iii. Southport projects in the 10-year planning period include the following:

- Turning Notch Expansion (Contract 2). Contract 2 of the Turning Notch expansion covers the landside work, including wharf construction, crane rails, utilities and filling.

In addition to the above projects at specific locations of the Port, the 10-Year Master Plan includes continuing expenditures for the ACOE Deepening and Widening. Project construction is scheduled to start in January 2015 and be completed by January 2017.

*Landside facilities.*

i. Northport landslide projects in the ten-year planning period include the following:

   - Cruise Terminal 4 Parking Garage. A new 1,680-space structured parking facility will be built west of Cruise Terminal 4 and over a passenger intermodal zone to serve future parking needs for both Cruise Terminals 2 and 4

     Cruise Terminal 4 Parking Garage. A new 1,680-space structured parking facility will be built west of Cruise Terminal 4 and over a passenger intermodal zone to serve future parking needs for both Cruise Terminals 2 and 4

ii. Midport landslide projects in the ten-year planning period include the following:

   - Multimodal Facility – Phase 1. This passenger intermodal center will integrate an at-grade intermodal zone, or ground transportation area, with a structured parking facility above to serve all the Midport cruise terminals. In the 10-Year Vision Plan, the first phase of the multimodal facility will be built, which will include a structured parking facility with approximately 2,000 parking spaces.

iii. Southport landside projects in the ten-year planning period include the following:

   - Crushed Pock Aggregate Terminal. This facility is envisioned to meet a portion of Florida's needs for crushed rock aggregate with supplies imported from off-shore locations. The vessel carrying the crushed rock aggregate will be unloaded at one of the newly constructed berths in the expanded Turning Notch onto a conveyor belt, which will transfer the

product via an underground conveyance, crossing McIntosh Road, for storage inside a covered warehouse. From there, the product will be loaded directly onto rail cars, operating on the new set of rail tracks located west of the ICTF tracks.

- Foreign-Trade Zone plus U.S Customs and Borer Protection Relocation. A new Foreign-Trade Zone (FTZ) facility and a new facility to house the U.S. Customs and Border Protection (CBP) inspection services will be constructed west of McIntosh Road in the Port-secured area on an approximately 21-acre site. The proximity of the new FTZ facility to the new CBP facility will improve the traffic flow in and out of Southport in support of the Port's growing cargo throughput.

- Super Post-Panamaz Cranes (2). Two additional ship-to-shore 100-foot gauge gantry cranes will be added to Southport to serve larger vessels.

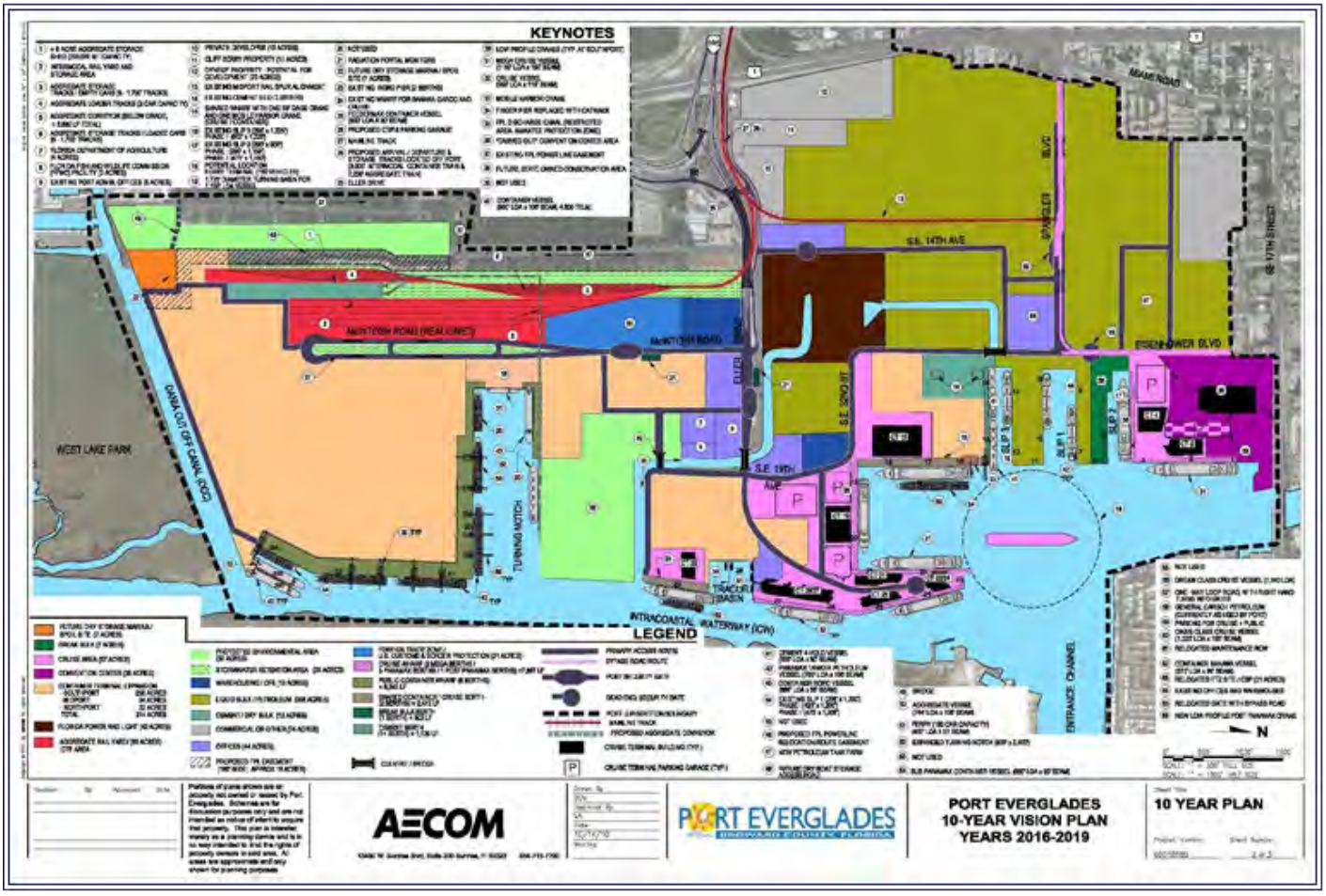
- Container Yard Improvements. After the Turning Notch is expanded, the increase in Southport cargo throughput will require storage densification in the container yard. This project installs the necessary site infrastructure to accommodate future rubber-tired gantry cranes to increase container storage densification in the Southport terminal yards.

Table P-8 summarizes the capital improvement projects proposed in the 10-Year Vision Plan and Figure P-20 illustrates the Port's 10-Year Vision Plan. The full-size 10-Year Vision Plan map is available on the Port website at http://www.broward.org/Port/MasterPlan/Documents (see Page ES-39 in the Executive Summary).

Table P-8: 10-Year Vision Plan Projects

| 10-Year Vision Plan | Years 2016 - 2019 | Estimated Cost (Millions) |
|---|---|---|
| Northport | Berth 1, 2, 3 New Bulkheads | $ 31.00 |
| | CT#4 Parking Garage | $ 32.00 |
| Midport | Berth 16, 17, 18 New Bulkheads | $ 32.00 |
| | Multimodal Facility - Phase 1 | $ 35.00 |
| Southport | Turning Notch Expansion - Contract 2 | $ 28.81 |
| | Crushed Rock Facility | $ 55.00 |
| | Foreign Trade Zone + Customs & Border Protection Relocation | $ 44.41 |
| | Super Post Panamax Cranes (2) | $ 24.00 |
| | Container Yard Improvements | $ 30.00 |
| Port-wide | ACOE Deepening and Widening | $ 235.00 |
| **Total** | | **$ 547.22** |

Figure P-20: 10-Year Master Plan Future Land Use



c. *In-water facility maintenance for at least a ten-year period.*

On January 5, 1996, the ACOE issued Permit 1989002282 (IP-EJ) REISSUANCE, which allows the Port to conduct maintenance dredging of berths and slips. This permit, valid until 2016; is currently being modified to include the upland disposal site in the southwest corner of Southport. The permit would either be renewed or extended closer to the time of the current expiration, most likely for another ten years. The state FDEP permit is being reauthorized to use the same disposal site; the Broward Environmental Protection Division has already modified their permit to include this disposal location.

# ANALYSIS REQUIREMENTS

## A. Existing Land Use Analysis

1. Conflicts among shoreline uses. There are no identified conflicts among shoreline uses in the PJA, the result of the following actions covering the entire PJA: the adoption of the Port Everglades Transportation Area land use designation by the Broward County Land Use Plan; the adoption of a unified zoning district; the designation of the Port Everglades Development District (PEDD) by the municipalities of Fort Lauderdale, Hollywood, and Dania Beach; and the adoption of an Interlocal Agreement, dated May 6, 1994, between Broward County and the three municipalities, which specifies jurisdictional responsibilities in the PJA.

2. Need for water-dependent and water-related uses. On March 1, 2011, the Broward County Board of County Commissioners adopted the Port Everglades Master/Vision Plan. This document replaces the previous Port Everglades Master Plan Update 1995-2005, adopted by the PED on November 28, 1995 and incorporated into the Broward County Comprehensive Plan as the Deepwater Port Element in 1997. It also updates a more recent plan adopted by the Board in 2007, but not integrated into the Deepwater Port Component. The Port Everglades Master/Vision Plan recommends that several water-dependent and water-related capital improvements be made in the PJA to meet projected demands through the 5- and 10-year planning horizons. These are discussed in Part III.C above.

## B. Natural Resources Analysis

1. Vegetative cover, wetlands, and wildlife habitats.

*Vegetative Cover and Wetlands*. The ACOE, FDEP, South Florida Water Management District and the EPGMD regulate any dredging and filling activity within mangrove habitats. It is the purpose and intent of these agencies to ensure no net loss in the function and value of existing wetland habitats. Therefore, any adverse impacts to existing mangroves are regulated by avoidance as the first priority, minimization as the second priority, and mitigation as the third priority.

The future land use designation of the Port Everglades Transportation Area will have no direct impact on vegetative cover in the PJA. The Port has, however, obtained FDEP approval to initiate procedures for the eventual release of 8.7 acres of the existing conservation easement for the Southport Turning Notch expansion project, which is included in the 5-Year Master Plan. Also included in the 5-Year Master Plan is the proposed creation of approximately 16.5 acres of mangrove wetlands within uplands adjacent to the Southport Turning Notch to replace the 8.7-acre easement being released.

*Listed Species*. The Port is committed to addressing the protection of wildlife within its property and along the waterways. This commitment includes implementation of federal, state, county, and local species protection plans, adherence to special construction techniques and/or guidelines that address wildlife concerns, and participating in scientific programs associated with resource protection.

The Florida Manatee Sanctuary Act of 1978 established the entire state of Florida as a "refuge and sanctuary for manatees" and allowed for the enforcement of boat-speed regulations in manatee-designated protection zones. The West Indian manatee is protected federally by both the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Port Everglades is one of about two dozen manatee wintering sites designated as manatee protection zones.

Removal of the dry-stack boat storage facility from its former site on the FPL Discharge Canal eliminated the 400 boats that previously entered the warm waters of the canal to access the facility. The elimination of this boat traffic helps safeguard the federally protected manatees and their young who frequent these waters as well as the manatee nursery in this portion of the canal.

Many steps are being taken to protect the West Indian manatee during dredging projects and from routine boating traffic in the canals. The Port's dredge protection plan includes these guidelines to ensure manatee protection:

- Contractors are informed of manatee permit stipulations and life history traits prior to construction.

- A safety zone in which all work ceases upon sighting of a manatee is established approximately 300 yards from a drill or blast rig.
- Manatee observers and side-scan sonar are utilized to monitor the presence of manatees within safety zones.
- Manatee warning signs are placed on all waterborne equipment.
- All water traffic proceeds at slow speed.
- Appropriate agencies are contacted in the event of injury or death to manatee individuals.

Other initiatives include year-round recording of manatee sightings on observation logs; installation of manatee-grating devices on outfall pipes; installation of fenders on the sides of vessels, which provide adequate space at berth to prevent the wedging of manatees between the dock and hull of a vessel; prohibiting recreational access to the FPL Discharge Canal; and supporting manatee research. In addition, the approximately 16.5-acre mangrove easement created in the 5-Year Master Plan will provide a buffer between upland Port activities and the area most frequented by manatees. Finally, the continued enforcement of no fishing and no wake boat speeds will help protect the seasonal manatee population in the PJA.

The PED also continues to protect the endangered sea turtle species that utilize the nearby waters and beaches of Dr. Von D. Mizell-Eula Johnson State Park. The beaches and dunes along the eastern margin of the Port have long been recognized as sea turtle nesting grounds. Coastal lighting in developed areas has been shown to impact the activities of nesting turtles, prompting changes to and reduction of the Port's lighting systems.

To curb interaction with crawling and nesting turtles along the beach adjacent to the Port, changes have been made to diminish the intensity of lights in the Midport area visible from the park to the east. Dockside lighting at Berths 24 through 27 and 29, both pole- and building-mounted, have been adjusted downward to safely light the dock areas while limiting scatter. Circuits have been reconfigured with controls added to the building automation system for the roof-level parking deck at Terminal 29, the Midport parking garage, and the decorative lighting on the Harbormaster Tower. Lighting in these facilities as well as in the planned new garage is scheduled to remain fully turned off when not in use for the duration of turtle nesting season.

*Wildlife Habitat*. Impacts to waters and lands in and around Port Everglades, which provide habitat to various wildlife species, are strictly controlled by federal, state, county,

and local regulations. The waters to the south of the Port, including the waters bordering West Lake Park and the Dania Cut-Off Canal, are considered essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act of 2002 (67 FR 2343). These essential fish habitats supply the necessary waters and substrate to fish for spawning, breeding, feeding, and growth to maturity.

Widening the navigation channels with environmentally friendly bulkheads, that is, bulkheads that do not penetrate the water surface, wherever possible, will allow tidal flows to be maintained at the shoreline and critical habitat areas. The Port will also continue to participate in the Broward County Reef Tire Removal Program, a joint venture between county, state, and federal entities which will remove from nearby coastal waters approximately 700,000 tires originally intended to form artificial reef habitat.

2. Living marine resources. The existing riprap placed along the eastern shore of the Intracoastal Waterway and the Southport Turning Notch provides structures that attract marine life and will continue to be monitored and maintained by the Port.

   Existing coral habitat in the Port area is regulated by federal, state, and county environmental protection agencies; however, recommendations discussed in the Port Master Plan are not expected to impact living coral resources.

   The waters surrounding Port Everglades provide habitat for a variety of seagrasses, including Halophila johnsonni (Johnson's grass), Halophila decipiens (Paddle grass), and Halodule wrightii (Cuban shoal grass). In 1998, H. johnsonni was listed as an endangered marine plant. Adverse impacts to seagrasses are regulated in the same manner as mangroves and other coastal wetland plants by federal, state, and county environmental protection agencies. In 2009, seagrass distribution was mapped for the Port's harbor area by Dial Cordy and Associates, Inc. updating information from 2006. Comparison of the 2009 mapping results (see Figure 6.2-8 in Element 6 of the Port Everglades Master/Vision Plan) and the draft Tentatively Selected Plan outlined by the ACOE (see Figure P-17 later in this section) indicates that seagrass distribution in the Port area will be impacted by activities associated with the 10-Year Vision Plan.

   Based on preliminary evaluations, widening of the Southport Access Channel, as well as the corner, or Widener, section on the northeast end of the South Access Channel will directly impact approximately two to three acres of Johnson's grass and Paddle grass. Mitigation credits will be allocated from the West Lake Park comprehensive restoration project discussed in Element 5 of the Port Everglades Master/Vision Plan to offset impacts associated with the deepening and widening of Port channels. In addition to

the direct impacts, any secondary impacts resulting from proposed deepening and widening activities would also be subject to regulation. Regulation may include, but not be limited to, turbidity containment efforts and monitoring during those activities.

3. Other natural resources. The future land use designation of the Port Everglades Transportation Area will not have direct impact on LAPCs in the PJA. An environmental impact statement for any proposed development that may affect or include land designated a LAPC will continue to be required by the Broward County Land Development Code prior to the issuance of any development orders.

## C. Analysis of Areas Subject to Coastal Flooding

The entire operating area of the PJA is designated either Flood Zone AE, X, or VE by the FEMA Flood Insurance Rate Maps. Therefore, all future development and redevelopment in the PJA will be subject to the conditions and code requirements for the PJA in the FEMA Flood Insurance Program.

1. Sea level rise and coastal flooding. Changes in sea level have the potential to massively reconfigure geomorphology, change tidal variation, alter salinity patterns, and impact ecological processes in South Florida's coastal habitats, including wetlands, mangrove forests, and seagrass beds.

   Though sea-level rise rates have historically been measured from 5 to 10 centimeters per 100 years, that rate has accelerated tenfold in the past hundred years. With the influences of global climate change, sea levels are predicted to rise 0.5 feet by 2050 and 1.1 feet by 2100. The effects of that rate of change may not be inherently visible within the context of the Port's 20-Year Vision Plan, but it is imperative that long-term planning strategies look toward the future.

   To anticipate the eventual effects of global climate change on the Port's shoreline, EPGMD mapped the incremental effects of sea level increases adjacent to the Port, identifying areas at risk for sea level rise in one-foot increments; up to three feet. Most of the areas shown affected by the rise are low-lying with existing vegetation, including mangroves, in the environmentally protected areas. Also affected by sea level rise are the shallow seagrass beds present in various locations in the vicinity of the Port.

2. Sea level rise and mangroves. Mangrove communities are highly productive systems, providing valuable habitat for fisheries, shorebirds, marine mammals, snakes, and crocodiles. Many of the world's marine species, including important coastal fisheries, rely on coastal wetlands for at least part of their life cycle. The complex root systems of mangroves serve as refuge for large numbers of species, as well as providing stabilization for sediments, thereby reducing coastal erosion and improving water clarity. Coastal mangrove tracts can provide protection from storm surges to adjacent

land and human populations, and prevent damage to freshwater ecosystems and agricultural areas from saltwater intrusion.

As sea levels rise, the seaward and landward margins of the mangrove community migrate inland to maintain their preferred environmental conditions, including period, frequency, and depth of inundation; and salinity. Depending on the ability of mangrove species to colonize new habitat at a rate that keeps pace with the rate of relative sea level rise, the slope of adjacent land, and the presence of obstacles to landward migration such as seawalls and other shoreline protection structures, some sites will revert to a narrow mangrove fringe or lose the mangrove community altogether (Gilman et al., 2006).

Sea level rise has a direct impact on the frequency and duration of inundations and drying periods of coastal mangrove wetlands, which support a community of small marsh fishes critical as a food source to wading birds such as wood storks, egrets, and roseate spoonbills. Regular periods of water level recession serve to concentrate the fish assemblages in densities adequate to support wading bird nesting. Landward salinity intrusion is another impact of higher sea levels in coastal wetlands. It is a major factor limiting distribution and abundance of various fish species, submerged aquatic vegetation, and estuarine alligator and crocodile populations.

Based on EPGMD's analysis, a one-foot rise in sea level will impact the vast majority of mangrove communities in the Port area. Development of the land surrounding the mangrove pockets in Port Everglades prevents the natural landward migration of the mangrove communities with rising sea levels; however, the projected time frame for a one-foot sea level rise exceeds that of even the 20-Year Vision Plan.

3. Sea level rise and seagrasses. A major impact on seagrasses of changes resulting from sea level rise will be the redistribution of existing habitats. Distribution changes will result from the effects of salinity change on seed germination, propagule formation, photosynthesis, growth, and biomass (Short and Neckles, 1999).

   Changes in water depth also impact the flow patterns and deposition of sediments in and around seagrass beds. Alteration of the sediment composition is expected to cause shifts in community structure. Some species have been shown to persist in nutrient-rich sediments high in organic content, whereas others occur in patches characterized by more sandy sediments. An increase in the deposition of sandy beach and offshore sediments in seagrass beds can be expected to promote a shift in species composition. Increased water depth will impact the amount of light reaching existing seagrass beds, thereby affecting productivity, and could result in community decline.

4. Sea level rise and underground stormwater systems. Other areas that could be affected by the rise in sea level are the underground stormwater management systems consisting of exfiltration piping and trenches that are used to filter surface water runoff. These systems need to be above the water table to filter pollutants from the stormwater runoff. Underground exfiltration systems are typically used in paved parking areas and container storage yards to maximize the paved area for use by Port operations.

## D. Analysis of Historic Resources

Only one building in the PJA has been identified as containing historic resources. The former U.S. Customs House, once federally owned, but transferred to the Broward County in 2004, is listed in the Florida Master File (Site BD00210). Florida's Historical Resources Division determined the property to be eligible for designation on the National Register of Historic Places, but no action has been taken to pursue this eligibility Any future discovery and preservation of historic or archeological resources in the PJA will be subject to applicable local, state, and federal regulations.

## E. Estuarine Pollution Analysis

1. Assessment of general conditions. Port Everglades does not function in the classical definition of an estuary. This man-made port facility receives waters from the south via the Intracoastal Waterway, from the west via the Dania Cut-Off Canal, and from the north by way of the New River system. All land in the Port is bulkheaded except for the FPL cooling water intake and discharge canal and a 50-acre mangrove area in Southport, which is protected by riprap. The Port has conducted sediment analysis, chemical analysis of the water column, and macroinvertebrate investigations associated with dredging projects or for scientific study. Data indicate that, for all parameters studied, the health of the Port's environment is within the standards set by local, state, and federal agencies; however, the Port has no control on the quality of the water that enters the Port through the referenced water systems.

2. Assessment of development and redevelopment. As discussed in IV.B.1 Natural Resources Analysis, the Port has obtained FDEP approval to initiate procedures for the eventual release of 8.7 acres of the existing mangrove conservation easement to expand the Southport Turning Notch and create additional dock space. Also included in the 5-Year Master Plan is the proposed creation of approximately 16.5 acres of mangrove wetlands within uplands adjacent to the Southport Turning Notch to replace the 8.7-acre easement being released. Mitigation credits will be allocated from the West Lake Park comprehensive restoration project, to offset impacts associated with the Turning Notch expansion. In addition to the direct impacts, any secondary impacts resulting from proposed deepening and widening activities would also be subject to

regulation. Regulation may include, but not be limited to, turbidity containment efforts and monitoring during those activities.

Reducing traffic congestion and trip generation as part of the 5-Year Master Plan, will reduce air emissions throughout the Port and the region. Importing crushed rock aggregate will reduce the existing environmental issues with the present quarries in Florida. The new crushed rock facility, planned as part of the 10-Year Vision Plan, will be enclosed for dust containment and not generate any air pollutants from the rock.

Also in the 10-Year Vision Plan, expanding the three slips at Northport and reducing the widths of Piers 1 and 2 will remove a portion of the petroleum contamination currently contained in the Pier bulkheads. Any remaining product will be contained within new bulkheads with greater lifespan and durability.

3. Assessment of the impact of facilities proposed in the Transportation and Infrastructure Elements of the Broward County Comprehensive Plan upon water quality, circulation patters, and accumulation of contaminants in sediments. It is anticipated that the facilities proposed in the Transportation and Infrastructure Elements will have no significant impact on the water quality, circulation patterns, and accumulation of contaminants in sediments located in the PJA.

4. Actions needed to remedy existing pollution problems. The non-profit PEECO, representing the majority of petroleum terminal operators in the PJA, has identified areas of concern that exhibit free-floating petroleum product landward of the Port's bulkheads. In cooperation with the Port, PEECO has worked with the FDEP and has prepared a Contamination Assessment Report, conducted a comprehensive Environmental Risk Assessment, and conducted initial remediation activities in the Port-owned common areas containing underground petroleum pipelines. Subsequent activities involving PEECO, the Port, and FDEP have centered around ongoing free-phase petroleum hydrocarbon removal from the ground on the petroleum piers using state funds from the Inland Protection Trust Fund.

5. Regulatory programs used to maintain or improve estuarine quality. The PED will continue to pursue the maintenance of estuarine quality through the implementation of the Port's NPDES permit, which requires the water quality management of stormwater runoff in the PJA and will continue to install pollution-retardant structures in all new drainage facilities in accordance with best available construction technology practices.

   Section 27 of the Broward County Code specifies pollution regulations which are enforced by the EPGMD. These regulations enforce the provisions of the Federal Clean

Air and Clean Water Acts in Broward County, which include the PJA. All requests for construction and maintenance dredging will follow federal, state, and county dredge and fill permitting procedures, which require the application of turbidity controls during dredge and fill activities along the waterfront.

The Port's Oil Spill Contingency Plan is fully coordinated with the U.S. Coast Guard, the South Florida Regional Planning Council, the Florida Marine Patrol, the Broward County Emergency Management Division, the Broward County Sheriff's Office, and the Port Everglades Public Safety Division. This coordination is managed by the Port Everglades Cleanup Committee, which maintains oil spill response equipment on a full-time basis. The Port's Public Safety Division also maintains its own equipment and serves as the first line of defense in the event of an oil spill.

## F. Analysis of Natural Disaster Planning Issues

### 1. Analysis of hurricane evacuation planning.

a. *Hurricane vulnerability zone*. All of the PJA is located in Broward County's Hurricane Vulnerability Zone. Deepwater ports, by definition, are constructed in coastal areas. In South Florida, all coastal areas are subject to periodic hurricane impacts. Hurricane preparedness, hurricane mitigation, and post-disaster redevelopment will continue to be significant considerations when developing operation plans and capital improvements programs in the PJA.

b. *Number of persons requiring evacuation*. Residential uses are not permitted in the PJA; therefore, it is anticipated that no residents will require evacuation from the PJA due to an anticipated hurricane storm event. Ships in port will be encouraged by the Harbormaster to evacuate the Port well before the arrival of the storm. The crews are expected to accompany their ships that leave port. The evacuation of Port Everglades' employees and tenants will occur in accordance with the Port Everglades Hurricane Procedure & General Disaster Plan & Continuity of Operations Manual.

c. *Number of persons requiring public hurricane shelter*. Residential uses are not permitted in the PJA; therefore, it is anticipated that no residents will require public hurricane shelters due to an anticipated hurricane storm event. Ships in port will be encouraged by the Harbormaster to evacuate the Port well before the arrival of the storm. The crews are expected to accompany their ships that leave port. The evacuation of Port Everglades' employees and tenants to their homes will occur in accordance with the Port Everglades Hurricane Procedure & General Disaster Plan & Continuity of Operations Manual.

d. *Number of shelter spaces available.* Port Everglades is located entirely in the Hurricane Vulnerability Zone; consequently, there are no existing or proposed shelter spaces in the PJA.

e. *Evacuation routes*. It is anticipated that Eller Drive and Spangler Boulevard will continue to serve as the primary hurricane evacuation routes in the PJA. These two roadways provide direct access to the FIHS/SIS, which will be relied on to transfer personnel, commercial vehicles, and equipment away from the Hurricane Vulnerability Zone. The widening of Eller Drive to a 4-lane roadway has improved the PED's ability to evacuate the PJA in a timely manner.

f. *Transportation and hazard constraints on evacuation routes*. The primary constraint on the PJA evacuation routes is the susceptibility to flooding. Heavy rainfall, high tides, and storm surge associated with a hurricane could impact the availability of Eller Drive and Spangler Boulevard for use as evacuation routes. It is, therefore, imperative that the PED and Port tenants secure their premises and evacuate their employees well before the inundation of the Port's evacuation routes by heavy rains and storm surge from an impending hurricane.

g. *Evacuation times*. The Port Everglades Hurricane Procedure & General Disaster Plan & Continuity of Operations Manual anticipates that all Port administration and Port tenant personnel would be evacuated at least 12 hours before the anticipated landfall of a hurricane. This would allow sufficient time to evacuate the Port before the evacuation routes become impassible from flooding and storm surge.

2. Estimate of the projected impact on hurricane evacuation planning.

a. *Anticipated population density*. Residential uses are not permitted in the Port Everglades Transportation Area future land use category of the Broward County Land Use Plan; therefore, no population density is anticipated in the PJA.

b. *Special needs of the elderly, handicapped, and hospitalized.* Residential uses are not permitted in the Port Everglades Transportation Area land use category of the Broward County Land Use Plan; therefore, no special needs of the elderly, handicapped, and hospitalized are anticipated in the PJA.

c. *Other special needs of the existing and anticipated populations.* Residential uses are not permitted in the Port Everglades Transportation Area land use category of the Broward County Land Use Plan; therefore, no special needs of the existing and future populations are anticipated in the PJA.

3. Measures that could be adopted to maintain or reduce hurricane evacuation.

The PED is carrying out the following measures:

a. Maintenance of Eller Drive as the primary evacuation route, together with close coordination between the PED and the Broward County Emergency Management Division, to insure the maintenance or reduction of hurricane evacuation times in the PJA.

b. Annual reviews and updates of the Port Everglades Hurricane Procedure & General Disaster Plan & Continuity of Operations Manual, together with the participation by Port Everglades staff in Broward County's annual hurricane simulation exercises, to further the maintenance of effective hurricane preparedness in the PJA.

c. A policy encouraging the early dismissal of non-essential Port personnel as a means of reducing hurricane evacuation times.

4. Post-Disaster redevelopment analysis.

a. *Existing and proposed land use in high-hazard areas*. All existing and proposed land uses in the PJA are located in the Coastal High-Hazard Area. Therefore, following a major storm event, it is anticipated that most of the Port infrastructure would require redevelopment. Port Everglades is vital to the maintenance of South Florida's economy, necessitating the reconstruction of all damaged structures and infrastructures in the PJA to pre-storm conditions.

b. *Structures with a history of repeated damage*. There are no structures in the PJA with a history of repeated damage from coastal flooding or hurricanes; therefore, no action regarding this concern is required.

c. *Coastal or shore protection structures*. Coastal or shore protection structures in the PJA include the jetties along the Port Everglades Entrance Channel, riprap along the shoreline of the Southport Turning Notch, and the vertical bulkheads that protect the berths in the PJA from prop wash. All of these structures would be affected by storm surge and high velocity waves during a hurricane storm event. Port Everglades is vital to the maintenance of South Florida's economy, necessitating the reconstruction of all damaged coastal or shore protection structures in the PJA to pre-storm conditions. The USACE is responsible for maintaining the entrance channel jetties, while the PED is responsible for maintaining the riprap and bulkheads in the PJA.

d. *Infrastructure in high-hazard areas.* All infrastructure in the PJA is located in the Coastal High-Hazard Area. Following a major storm event, all of the Port's above-ground infrastructure could require redevelopment. Port Everglades is vital to the maintenance of South Florida's economy, necessitating the reconstruction of all damaged structures and infrastructure in the PJA to pre-storm conditions.

e. *Beach and dune conditions.* The PJA's beaches and dunes are located entirely in the Dr. Von D. Mizell-Eula Johnson State Park. The park includes an approximately 150-foot wide beach with small secondary dune structures. This beach area would be subject to storm surge and high velocity waves during a hurricane storm event, which could drastically alter the location and amount of sand along the beach. The low beach elevation and insignificant dune structures could result in a breach of the ocean into the Intracoastal Waterway during the storm's high tide. The FDEP is responsible for the maintenance of state-owned parks and beaches and should coordinate with the Natural Resources Planning and Management Division of the EPGMD in developing a contingency plan for beach renourishment following a storm event.

5. Analysis of measure to reduce exposure to hazards.

a. *Relocation.* There are no residential uses requiring relocation in the PJA. The port and water-dependent non-residential uses in the PJA, by their nature, cannot be relocated. Such uses as ship berths, passenger and cargo terminals, petroleum storage tanks, cement storage silos, bulk and container cargo yards, warehouses, and administrative offices must remain in the PJA to insure the Port's and the South Florida region's continued economic viability. It is expected that any hurricane-related damage to these uses would be expediently repaired to their pre-storm conditions to reduce any resultant long-term economic loss.

b. *Structural modification.* No modifications to existing structures are recommended. All structures in the PJA have been built in accordance with existing building codes and will be rebuilt to pre-storm conditions in accordance with current building codes.

c. *Public acquisition*. No public acquisition of privately owned property in the PJA is recommended for the purpose of reducing the impact of natural hazards to the general public.

6. Coastal high-hazard area

    a. *Analysis of the potential for relocating threatened infrastructures.* All infrastructure in the PJA is located in the Coastal High-Hazard Area. It is anticipated that much of the Port's infrastructure would require redevelopment following a major storm event. Port Everglades is vital to the maintenance of South Florida's economy, necessitating the reconstruction of all damaged structures and infrastructure in the PJA to pre-storm conditions. It can be concluded that, to preserve and protect the regional economy, there is no potential for relocating threatened infrastructure located in the PJA.

## G. Beach and Dune Analysis

1. Past trends in erosion and accretion. Sand material has historically been accreting on the north side of the Port Everglades Entrance Channel jetties with erosion occurring on the south side of the jetties. Consequently, approximately 7,000 cubic yards per year of sand material are deposited in the vicinity of the Port Entrance Channel. To date, this has not restricted or impaired navigational operations. In addition, winter storms tend to erode the beaches to the south, requiring periodic renourishment.

2. Effects of shore protection structures. The Port Everglades Entrance Channel is lined by rock jetties composed of large boulders that aid in maintaining channel project depth. Due to the prevailing southerly littoral current, sand material is deposited on the north side of the jetties with scouring occurring on the south side of the jetties.

3. Measures which could protect or restore beaches. The beaches in Dr. Von D. Mizell-Eula Johnson State Park could be protected and restored by implementing an ongoing system that would transfer sand across the Port Everglades Entrance Channel between the north and south jetties. The Port Everglades Inlet Master Plan, prepared by Coastal Technology Corporation for the Broward County Department of Natural Resource Protection, dated March 1994, recommended several alternatives for addressing the beach accretion and erosion at the inlet. They include:

    a. the continuance of the ACOE project to place 288,000 cubic yards of sand every six years along the park to achieve 100 percent sand bypassing;

    b. the installation of a sand trap to provide for future mechanical bypassing of southerly movement;

    c. exploration of the feasibility of importing Aragonite sand for beach nourishment;

d. the placement of a combined spur structure and offshore breakwater immediately south of the southern jetty; and

e. consideration of the removal of a portion of the northern jetty to create a weir to reduce the accretion to the north.

Research has since been conducted on the characteristics and extent of submerged marine resources that could be affected by a sand transfer plan, resulting in a report dated April 2008 titled, "Broward County Port Everglades Sand Bypass Project: Benthic Habitat Mapping and Assessment." This report did not contain evaluation of project alternatives. The PED, however, continues to encourage and coordinate with the EPGMD with respect to constructing a sand bypass system to transport sand from the north side of the Port's Entrance Channel north jetty to the south side of the south jetty.

## H. Capacity and Need for Public Access Facilities

### 1. Analysis of the capacity and need for public access facilities.

a. *Public access points to beach or shoreline through public lands.* The beaches and shoreline in the PJA are located in the state-owned and maintained Dr. Von D. Mizell-Eula Johnson State Park. Public access to beaches and the ocean front is presently adequate. No deficiencies are identified which would require improvements to increase public access to beaches and the shoreline in the PJA.

The security measures imposed by state and federal mandates have restricted public access to the Port itself. In addition, U.S. CBP regulations require that the Port control public access to the dockside areas. Even had these measures not been imposed, unlimited public access to the working harbor area of the Port poses a danger to public safety and must be controlled. Port operations involve the use of specialized off-road equipment, which may cause delays in normal traffic flow in the PJA. In addition, dock-side operations include the use of heavy equipment, such as gantry cranes, mobile stick cranes, hustler tractors, and port packer front-end loaders which facilitate the loading, unloading, storage, and movement of cargo and containers.

b. *Private property open to the general public.* The only private property in the PJA which was once open to the general public -- the popular restaurant called "Burt and Jacks" -- is no longer on the Port. Because of the present federal and state security mandates, no other such private property open to the general public is envisioned.

c. *Other legal means of public access*. Access to Port Everglades, which was once an open port, is now controlled by four manned security gates, in compliance with federal and state security mandates. The general public, therefore, no longer has unlimited legal access to the PJA, but must show appropriate identification and have a specific Port-related purpose for accessing the Port.

d. *Parking facilities*. To accommodate the anticipated needs of the cruise passengers sailing on the larger ships calling at the Midport terminals, the 5-Year Master Plan includes a new parking garage at Terminal 18, which will add 1,600 structured parking spaces above a passenger intermodal zone, with 400 spaces for employee. In the 10-Year Vision Plan, a new 1,680-space structured parking facility will be constructed west of Cruise Terminal 4 and over a passenger intermodal zone to serve future parking needs for Cruise Terminals 2 and 4.

e. *Coastal roads and facilities providing scenic overlooks*. The PJA contains several roads that provide scenic overlooks of the working harbor; these are not, however, accessible to the general public. In addition, the Port maintains Marinelli Gardens, a small park located at Eller Drive on the FPL Discharge Canal. Scenic overlooks are not, however, compatible with commercial port operations, particularly in the era of heightened security; therefore, no additional scenic overlooks are recommended in the working harbor area.

f. *Marinas*. The privately owned and operated dry marina, previously located in the PJA has moved from the Port; but a small parcel in the southwest corner of the Port has been identified for a potential dry-storage facility in the future. The Florida Marine Patrol operates a dry storage and repair facility adjacent to the FPL Discharge Canal. In addition, small boat docks are maintained by the U.S Navy, the U.S. Coast Guard, and Nova Southeastern University at the northern end of J Dr. Von D. Mizell-Eula Johnson State Park. These operations are expected to continue without impact to Port operations or living marine resources.

g. *Boat ramps*. The only public boat ramps in the PJA are located in the Dr. Von D. Mizell-Eula Johnson State Park. A boat ramp is also located at the Florida Marine Patrol facility, which is utilized exclusively for patrol boats. Public boat ramps are not compatible with commercial port operations and are not recommended within the working harbor area.

h. *Public docks*. The only public dock in the PJA is located in the Dr. Von D. Mizell-Eula Johnson State Park. Public docks are not compatible with commercial port operations and are, therefore, not recommended within the working harbor area.

i. Fishing piers. There are no fishing piers in the PJA; however, there is a catwalk along the south jetty of the Port Everglades Entrance Channel which may be accessed for fishing. As the PJA is a manatee sanctuary, designated by state statute; fishing is a prohibited use. Further, fishing piers are not compatible with commercial port operations and are, therefore, not recommended within the working harbor area.

j. Fishing area. As the PJA is a manatee sanctuary, designated by state statute; land-based fishing is a prohibited use west of the east line of the Intracoastal Waterway. It is recommended that land-based fishing continue to be prohibited in the PJA, with the exception of the catwalk along the south jetty of the Port Everglades Entrance Channel. In addition, fishing from small boats is not compatible with the navigation of large ships and tugs in a confined harbor.

2. Coordination of above analysis with Recreation and Open Space Element and the County-Wide Manatee Protection and Boat Facility Siting Plan (if applicable). The PJA includes portions of the municipalities of Fort Lauderdale, Hollywood, Dania Beach, and unincorporated Broward County. In accordance with the Interlocal Agreement dated May 6, 1994 between Broward County and the affected municipal jurisdictions, the Port will continue to be responsible for maintaining access to facilities in the PJA, consistent with federal and state security mandates. The PJA includes the marina-like facilities operated by the U.S. Coast Guard, the U.S. Navy, and Nova Southeastern University in the northern portion of the Dr. Von D. Mizell-Eula Johnson State Park, these are not public facilities.

## I. Infrastructure Analysis.

1. Analysis of existing infrastructure.

i. *Demand upon, capacity of, and areas served by roadways*. Table P-9 provides a traffic analysis for the roadways in the PJA for 2011. The PED's traffic count data from March 2011 was used to calculate the existing Level of Service (LOS). All roads in the PJA currently operate at a LOS of C or better.

## Table P-9: Existing Roadway Level of Service

| 2011 | Roadway Segment | | | | Two-Way Daily Traffic Volumes | | | Daily Levels of Service | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | No. of | Daily | Friday | Saturday | Sunday | Average Friday | Saturday | Sunday |
| Roadway | From | To | Lanes | Capacity | VPD | VPD | VPD | LOS | LOS | LOS |
| Eisenhower Boulevard | SE 12 Street | SE 20 Street | 4LD | 31,000 | 6,097 | 6,097 | 9,024 | C | C | C |
| Spangler Boulevard | U.S. 1 | Eisenhower Boulevard | 4LD | 31,000 | 6,378 | 6,378 | 9,179 | C | C | C |
| SE 14 Avenue | Eller Drive | North | 2LD | 14,200 | 1,733 | 1,733 | 1,941 | C | C | C |
| Eller Drive | McIntosh Road | SE 19th Street. | 4LD | 31,000 | 6,119 | 4,358 | 7,111 | C | C | C |
| McIntosh Road | Eller Drive | South | 4LD | 31,000 | 9,305 | 9,305 | 1,185 | C | C | C |

ii. *Demand upon, capacity of, and areas served by bridges or causeways.* A 4-lane bridge along Eller Drive spans the FPL Discharge Canal. This bridge was expanded from a 2-lane bridge to a 4-lane bridge as part of the widening of Eller Drive. A newly constructed bridge also spans the FPL Discharge Canal to facilitate truck traffic between Midport and Southport and eliminate the need for trucks and other vehicles to pass through security between the two destinations. The rebuilt 17th Street Causeway Bridge, with its higher vertical clearance, helps relieve congestion in proximity to the Port.

iii. *Demand upon, capacity of, and areas served by sanitary sewer facilities*. The adopted Large User Agreement between the City of Fort Lauderdale and the PED obligates the City to accommodate all existing and future sewage treatment demand in the PJA throughout the planning period. It is anticipated that the sewage treatment plant serving the Port will have adequate available capacity to meet Port needs through the 2015 and 2019 planning horizons.

iv. *Demand upon, capacity of, and areas served by potable water facilities.* The adopted Large User Agreement between the City of Fort Lauderdale and the PED obligates the City to accommodate all existing and future potable water demand in the PJA throughout the planning period. It is anticipated that the potable water plants serving the Port will have adequate available capacity to meet Port needs through the 2015 and 2019 planning horizons.

v. *Demand upon, capacity of, and areas served by solid waste facilities*. Since Port Everglades has not experienced any difficulties in solid waste collection and disposal, it may be assumed that capacity exists to handle the Port's existing needs. Due to the long-term capacity of the Southwest Regional Landfill and

the South County Resource Recovery Facility, it is expected that there will be sufficient capacity to accommodate Port Everglades' anticipated solid waste demands through the 2015 and 2019 planning horizons.

vi. *Demand upon, capacity of, and areas served by man-made drainage facilities*. Maintaining its drainage system in accordance with an NPDES permit, Port Everglades expects it will be able to accommodate all existing and anticipated drainage demand in the PJA without impacting natural resources. Periodic flooding along some of the Port's internal roadways and upland areas during peak rainstorm events may, however, require additional improvements and maintenance. It is recommended that the Port continue to monitor the man-made drainage system to identify and mitigate inadequate drainage conditions when they occur.

vii. *Demand upon, capacity of, and areas served by public shore protection structures*. The jetties along the Port Everglades Entrance Channel have been adequately protecting the channel's 45-foot project depth, which is necessary for the continued economic viability of the Port. The riprap shore-protection structures placed along the Southport Turning Notch have been adequately protecting the upland areas from erosion resulting from waves and boat wakes. It is expected that these upland areas will continue to be protected during the planning period; the design of the Turning Notch expansion will take this need into consideration.

viii. *Demand upon, capacity of, and areas served by beach renourishment projects*. As recommended in the previous Deepwater Port Component, the PED is continuing to encourage and coordinate with the EPGMD with respect to constructing a sand bypass system to transport sand from the north side of the Port's Entrance Channel north jetty to the south side of the south jetty.

2. Analysis of future infrastructure needs.

a. *2015 future needs for facilities*. Table P-10a provides a traffic analysis of the roadways in the PJA for the 5-Year Master Plan (2015). A growth rate of 1.8 percent was utilized and calculated by the consultant from Element 3 of the Port Everglades Master/Vision Plan. After accounting for the growth in cargo and cruise businesses, all roads in the PJA will operate at an LOS of C or better.

## Table P-10a: Projected 2015 Roadway Level of Service

| 2014 | Roadway Segment | | | | Two-Way Daily Traffic Volumes | | | Daily Levels of Service | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | No. of | Daily | Friday | Saturday | Sunday | Average Friday | Saturday | Sunday |
| Roadway | From | To | Lanes | Capacity | VPD | VPD | VPD | LOS | LOS | LOS |
| Eisenhower Boulevard | SE 12 Street | SE 20 Street | 4LD | 31,000 | 6,430 | 6,430 | 9,517 | C | C | C |
| Spangler Boulevard | U.S. 1 | Eisenhower Boulevard | 4LD | 31,000 | 6,727 | 6,727 | 9,681 | C | C | C |
| SE 14 Avenue | Eller Drive | North | 2LD | 14,200 | 1,828 | 1,828 | 2,047 | C | C | C |
| Eller Drive | McIntosh Road | SE 19th Street | 4LD | 31,000 | 6,453 | 4,596 | 7,500 | C | C | C |
| McIntosh Road | Eller Drive | South | 4LD | 31,000 | 9,813 | 9,813 | 1,250 | C | C | C |

b. *2019 future needs for facilities.* Table P-10b provides a traffic analysis of the roadways in the PJA for the 10-Year Vision Plan (2019). A growth rate of 2.61 percent was utilized and calculated by the consultant from Element 3 of the Port Everglades Master/Vision Plan. After accounting for the growth in cargo and cruise businesses at the Port, all roads in the PJA will operate at an LOS of C or better.

## Table P-10b: Projected 2019 Roadway Level of Service

| 2019 | Roadway Segment | | | | Two-Way Daily Traffic Volumes | | | Daily Levels of Service | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | No. of | Daily | Friday | Saturday | Sunday | Average Friday | Saturday | Sunday |
| Roadway | From | To | Lanes | Capacity | VPD | VPD | VPD | LOS | LOS | LOS |
| Eisenhower Boulevard | SE 12 Street | SE 20 Street | 4LD | 31,000 | 7,315 | 7,315 | 10,826 | C | C | C |
| Spangler Boulevard | U.S. 1 | Eisenhower Boulevard | 4LD | 31,000 | 7,652 | 7,652 | 11,012 | C | C | C |
| SE 14 Avenue | Eller Drive | North | 2LD | 14,200 | 2,079 | 2,079 | 2,329 | C | C | C |
| Eller Drive | McIntosh Road | SE 19th Street | 4LD | 31,000 | 7,341 | 5,228 | 8,531 | C | C | C |
| McIntosh Road | Eller Drive | South | 4LD | 31,000 | 11,163 | 11,163 | 1,422 | C | C | C |

c. *2029 future needs for facilities.* Table P-10c provides a traffic analysis of the roadways in the PJA for the 20-Year Vision Plan (2029). A growth rate of 1.23 percent was utilized and calculated by the consultant from Element 3 of the Port Everglades Master/Vision Plan. After accounting for the growth in cargo and cruise businesses at the Port, all roads within the PJA will operate at an LOS of C or better.

## Table P-10c Projected 2029 Roadway Level of Service

| 2029 | Roadway Segment | | | | Two-Way Daily Traffic Volumes | | | Daily Levels of Service | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | No. of | Daily | Friday | Saturday | Sunday | Average Friday | Saturday | Sunday |
| Roadway | From | To | Lanes | Capacity | VPD | VPD | VPD | LOS | LOS | LOS |
| Eisenhower Boulevard | SE 12 Street | SE 20 Street | 4LD | 31,000 | 8,266 | 8,266 | 12,234 | C | C | C |
| Spangler Boulevard | U.S. 1 | Eisenhower Boulevard | 4LD | 31,000 | 8,647 | 8,647 | 12,444 | C | C | C |
| SE 14 Avenue | Eller Drive | North | 2LD | 14,200 | 2,349 | 2,349 | 2,631 | C | C | C |
| Eller Drive | McIntosh Road | SE 19th Street | 4LD | 31,000 | 8,296 | 5,908 | 9,641 | C | C | C |
| McIntosh Road | Eller Drive | South | 4LD | 31,000 | 12,615 | 12,615 | 1,607 | C | C | C |

The following traffic and circulation improvements will result from Plan implementation over the 5- and 10-year planning horizons:

- Constructing the By-Pass Road and relocating the Port's security gate will mitigate traffic congestion on U.S. 1, between Spangler Boulevard and 17th Street and on 17th Street between U.S. 1 and Eisenhower Boulevard.
- Relocating the existing security gate on Eisenhower Boulevard further south will eliminate non-Port traffic from queuing at that gate.
- Carving out the Broward County Convention Center from the Port's secured area will eliminate the existing traffic that flows through the Port to and from the center.
- Routing buses, taxis, and privately-owned vehicles (POVs) to/from Cruise Terminal 2 over the By-Pass Road rather than through the Port's security gates will alleviate peak cruise traffic congestion.
- Developing the ICTF, programmed in the 5-Year Master Plan, to move containers by rail in lieu of by truck will eliminate 171,500 annual truck trips at full operational use.
- Developing the crushed rock aggregate facility, programmed in the 10-Year Vision Plan, will allow some of Florida's needs for this commodity to be fulfilled without generating additional truck trips. Since the rock will leave the Port by rail, the import of this commodity will not generate additional truck trips. The facility will transport 4 million tons of crushed rock by rail, rather than using the 200,000 trucks that would otherwise be needed. The use of rail, therefore, will eliminate 400,000 truck trips to/from the Port and the regional roadway system.
- Locating CBP inspection facility inside the secured Port area will reduce traffic through the Eller Drive gate.
- Adding a new parallel road and cruise passenger intermodal center south of Cruise Terminal 19 will reduce taxi and POV traffic on East Eller Drive and eliminate bus traffic from that roadway segment.

- Entering buses into a centralized intermodal facility at 19th Avenue, west of East Eller Drive, will reduce traffic on that roadway segment.
- Reconfiguring the McIntosh Road alignment and road section with separate queue lanes and only right-hand turns into each container terminal will alleviate congestion on that critical road.
- Developing the first phase of the cruise passenger intermodal center at Midport, programmed in the 10-Year Vision Plan, and the second phase, to be developed in the 20-Year Vision Plan, will have positive cumulative effects on the circulation of cruise-related vehicles. The intermodal center will eliminate buses traveling farther east on Eller Drive to alleviate traffic congestion in front of the cruise terminals on the Midport peninsula. Baggage trucks from FLL will deliver and pick-up baggage at each cruise terminal. Provision trucks will also access the wharfs directly for each cruise terminal.

d. *Fiscal impact of estimated costs*. The FDOT FY 12-16 Amended Final Tentative Work Program (as of 04/07/11) includes several intermodal improvements that will facilitate road and rail traffic and circulation through the Port. The high-priority Eller Drive Overpass, which will provide grade separation and enhance circulation, is scheduled to begin in 2011. Construction of the on-Port rail and ICTF is programmed to start in 2012 and continue into 2013. Construction of the phased By-Pass Road is programmed to begin in 2012. The McIntosh Road realignment is under way. In addition to these intermodal improvements, the Work Program also includes portwide dredging, cruise terminal improvements, and new bulkheads at Berths 9 and 10.

e. *Funding sources/phasing of any needed improvements*. The intermodal transportation projects included in the FDOT FY 12-16 Amended Final Tentative Work Program will be funded from a number of sources. The Eller Drive Overpass is funded with district and SIS funds ($48 million); the ICTF is funded with a combination of district and SIS program grants ($18 million); the By-Pass Road will be funded with a combination of district and Transportation Regional Incentive Program (TRIP) funds ($11 million); and the McIntosh Road Realignment is being funded with district, SIS, and FSTED program funds ($5.7 million). The Port's match of the grant funds for specific projects is included in the capital improvements program.

### 3. Deepwater Port Infrastructure.

a. *Landside transportation needed to support Port Everglades*. The primary entrance to Port Everglades is Eller Drive, which directly connects to I-595 at SW 14th

Avenue. I-595 is being significantly remodeled through a public/private partnership from east of I-75 to west of I-95. The eventual implementation of the APM between FLL and the Port will facilitate the transfer of cruise passengers between airport and seaport terminals. This project is, however, not currently programmed, as a funding plan and final design have not yet been identified.

Spangler Boulevard and Eisenhower Boulevard also serve as primary accessways into the PJA. The previously described By-Pass Road will be constructed to achieve a pre-911 condition.

The FEC provides rail access to the PJA along Eller Drive. The main line turns north just west of SE 14th Avenue, branching to several spurs to the east, as shown previously on Figure P-13. As part of the Port's 5-Year Master Plan, the construction of the near-dock ICTF will facilitate the transfer of containers from shop to rail.

b. *In-water facilities*. The in-water facilities to be improved during the 5- and 10-year planning periods are identified in III.C.

c. *Maintenance of in-water facilities*. Port Everglades will continue to perform regular depth soundings throughout the long-term planning horizon to monitor the siltation rate and depth changes at the Port's berths and in the turning basins. These facilities will be maintained when the project depth requirements may become compromised through siltation, seawall undermining, and prop backwashing.

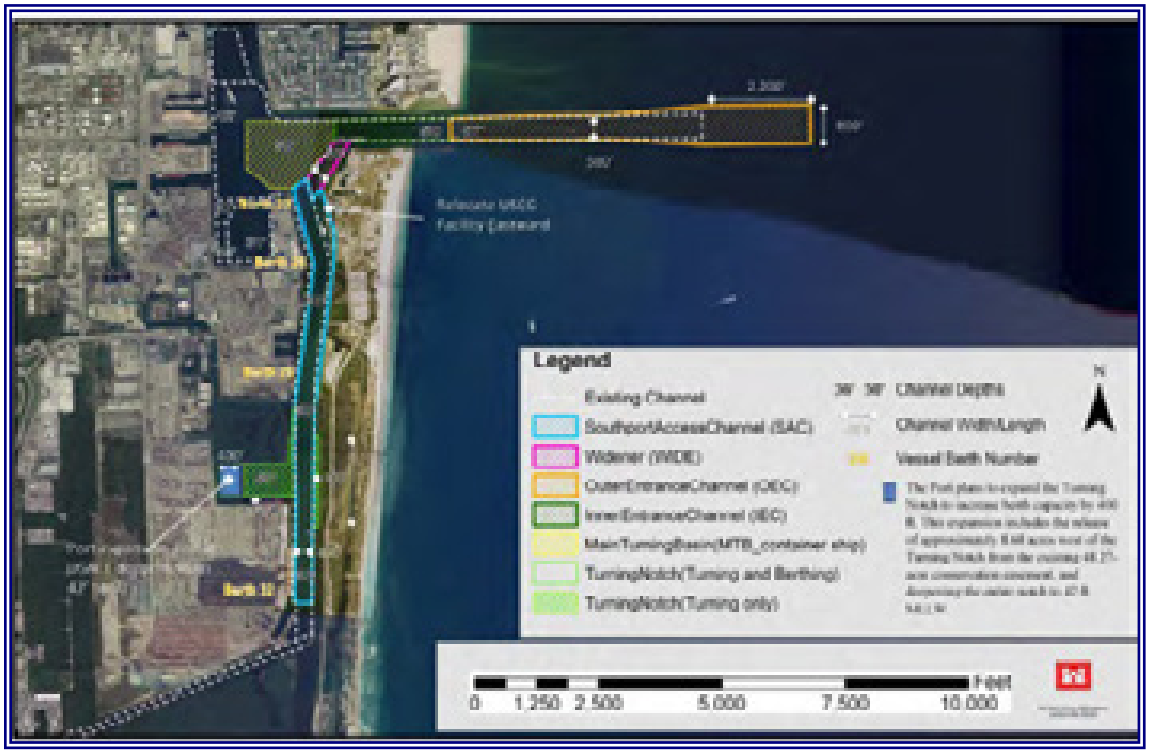
   Maintenance of the Port's bulkheads is essential to its continued economic viability. The previously cited Bulkhead Study Update and Cathodic Protection System Evaluation for Port Everglades Berths 1 through 29, completed in 2010, provides scheduling recommendations for the replacement of existing bulkheads; these recommendations have been followed in the scheduling of new bulkheads over the 5-, 10, and 20-year planning periods in the Port Master/Vision Plan.

d. *Management of dredged material.*

   i. Dredging for harbor and channel deepening and widening. The ACOE is conducting a detailed study of Port facility improvements that includes deepening and widening the Entrance Channel and deepening areas of the Port itself, pending review and approval by the ACOE South Atlantic Division

and Headquarters for public release. As shown in Figure P-21, these improvements include:

Figure P-21: ACOE Draft Tentatively Selected Plan




- Deepening and widening the Outer Entrance Channel (OEC) from an existing 45-foot project depth over a 500-foot channel width to 57 feet by 800 feet for a flared extension and extending 2,200 feet seaward.
- Deepening the Inner Entrance Channel (IEC) from 42 feet to 50 feet.
- Deepening the ship simulator-optimized portion of the Main Turning Basin (MTB) from 42 feet to 50 feet.
- Widening the rectangular shoal region to the southeast of the MTB (Widener) by about 300 feet and deepening to 50 feet.
- Widening the South Access Channel (SAC) in the proximity of Berths 23 to 26, referred to as the knuckle, by about 250 feet and relocating the United States Coast Guard (USCG) facility easterly on USCG property.
- Shifting the existing 400-foot-wide SAC about 65 feet to the east from approximately Berth 26 to the south end of Berth 29 to provide a transition back to the existing federal channel limits.

- Deepening the SAC from about Berth 23 to the south end of Berth 32 from 42 feet to 50 feet.

- Deepening the Turning Notch, including the Sponsor-expanded portion from 42 feet to 50 feet with an additional 100-foot widening parallel to the channel on the eastern edge of the SAC over a length of about 1,845 feet.

- Widening the western edge of the SAC for access to the Southport Turning Notch from the existing federal channel edge near the south end of Berth 29 to a width of about 100 feet at the north edge of the Turning Notch.

ii. The Southport Turning Notch expansion at existing water depth is the sole responsibility of the sponsor, the Port. As of March 30, 2011, the ACOE schedule for conducting the remaining phases of the study and implementing construction of these improvements is as follows:

- Finalize draft feasibility report, November 4, 2011.

- End public comment on draft report, February 12, 2012.

- File Environmental Impact Statement (EIS), January 13, 2013.

- EIS Record of Decision (ROD), September 13, 2013.

- Federal funding appropriate for project, November 14, 2013.

- Advertise dredging contract (contingent on funding), September 14, 2014.

- Award dredging contract, December 18, 2014.

- Initiate construction, June, 2018.

iii. Management of dredged material. Because of inadequate upland dredge disposal areas and the ACOE's conclusions that the Port requires an off-shore site for the disposal of both maintenance and construction dredged materials, the Port Everglades Harbor ODMDS was designated by EPA Region 4 in February 2005. An Environmental Impact Statement was completed in 2004 in support of this designation. The existing ODMDS, previously shown in Figure P-14, is an approximately one square nautical mile, located approximately four nautical miles east-northeast of the Port

Everglades Harbor. This site is located on the upper continental slope on the western edge of the Florida Current and consists of primarily soft-bottom habitat in water depths of 195 to 215 meters (640 to 705 feet).

The ODMDS was designed for the disposal of maintenance material projects not to exceed 500,000 cubic yards, as the Site Management and Monitoring Plan developed in 2004 for the Port Everglades Harbor ODMDS placed project volume restrictions of 500,000 cubic yards until capacity modeling was completed. In 2009, the ACOE initiated capacity modeling for the proposed deepening and widening project at Port Everglades and results have indicated that the existing ODMDS is insufficient in size to contain the footprint from this project. EPA and the ACOE have initiated the process of expanding the existing Port Everglades ODMDS.

There are two possible sit configurations and no action option:

- No Action Alternative: The No Action Alternative is defined as not designating an expansion of the Port Everglades ODMDS, pursuant to Section 102 of the Marine Protection, Research and Sanctuaries Act. This would lead to continued use of the existing site for the placement of material from operations and maintenance dredging; and/or the emergency one-time designation of a site by the ACOE under Section 102 of the Act for the dredged material generated by the proposed Port expansion.

- East-West Disposal Release Zone Alternative: This configuration was designed based on an east-west oriented disposal release zone. This expanded configuration encompasses the existing ODMDS. It shares the same southern and eastern borders and extends north and west to the red one-centimeter contour line (see Figure P-14). This expanded site is approximately four square nautical miles.

- North-South Disposal Release Zone Alternative: This configuration was designed based on a north-south oriented disposal release zone. This expanded configuration encompasses the existing ODMDS. It shares the same southern and eastern borders as the existing site and extends north and west to the blue one-centimeter contour line. This expanded site is approximately four square nautical miles.

Both alternative configurations are within the boundaries of previous surveys collected during the original site designation as well as routine monitoring conducted by the EPA.

The goal of the site selection process is to select a location that minimizes the risk of harm to the marine environment and human health, and facilitates the necessary dredging and subsequent placement of dredged material. The site must meet selection criteria specified in EPA's Ocean Dumping Regulations. Compliance with the requirements of the National Environmental Policy Act (NEPA) is an integral part of the site designation process. The NEPA document will present information to evaluate the suitability of potential sites and disposal alternatives. It will be based on available information as well as new information collected and developed specifically for this site expansion and designation and will succinctly document the considerations made in selecting the specific configuration of the ODMDS. EPA and the ACOE are currently conducting applicable studies and working cooperatively in the collection of additional field data required for the preparation of an Environmental Assessment supporting the site expansion.

The projected schedule for completion of major ODMDS tasks is as follows:

- ODMDS: October 2011
- Archaeology: February 2012.
- Final EA: April 2012.
- EPA Site Designation: August 2012.

e. *Hazardous material handling and cleanup*. The Port's procedures for the handling and disposal of regulated or hazardous materials in the PJA have been successful in meeting the needs mandated by federal, state, and local government standards. It is recommended that these procedures be annually updated to insure consistency with current plans and procedures of the Broward County Emergency Management Division.

f. *Handling and cleanup of petroleum products*. The Port's procedures for the handling and cleanup of petroleum products in the PJA have been successful in meeting the needs mandated by federal, state and local government standards. It is recommended that these procedures be annually updated to insure

consistency with current standards and protocols as well as the current plans and procedures of the Broward County Emergency Management Division.

4. Requirements for maintaining in-water facilities and for management of dredged material from both maintenance and expansion. Requirements for maintaining in-water facilities and for the management of dredged material from both maintenance and expansion are specified in Sections IV.I.3.c and IV.I.3.d

5. Impact of Port maintenance and expansion.

   a. *Vegetative cover, wetlands, and wildlife habitats*. Port maintenance and expansion proposed in the Port Master/Vision Plan will have minimal impact on the existing natural resources in the PJA. The proposed water-dependent and water-related Port infrastructure improvements occur on urban land that contains no existing natural resources. The Southport Turning Notch expansion will proceed once FDEP accepts the initial mitigation program as productive and the required permits are issued.

   b. *Beaches and Dunes*. Port maintenance and expansion plans proposed in the Port Master/Vision Plan will have no impact on existing beaches and dunes in the PJA, which include only the northern beachfront of Dr. Von D. Mizell-Eula Johnson State Park. It is expected that any beach erosion associated with the impact of the Port Everglades Entrance Channel jetties will be continually monitored by the FDEP and the Natural Resources Planning and Management Division of the EPGMD. Short-term storms tend to be more damaging to beaches and dunes than the ongoing littoral drift.

   c. *Submerged lands*. Port maintenance and expansion plans proposed in the Port Master/Vision Plan will have minimal impact on submerged lands in the PJA. The Port owns the submerged lands in the PJA that are not owned by the State of Florida. It is expected that no submerged lands in the PJA will be impacted, with the exception of periodic berth depth maintenance resulting from siltation, undermining by ship and tug propeller backwashing, and debris deposited by loading and unloading ships.

   d. *Floodplains*. Port maintenance and expansion plans proposed in the Port Master/Vision Plan will have minimal impact on floodplains in the PJA. New development and redevelopment in upland portions of the PJA will continue to be constructed in compliance with the standards specified by the building codes and land development regulations of the affected local government.

e. *Living marine resources*. Port maintenance and expansion plans proposed in the Port Master/Vision Plan will have minimal impact on living marine resources. The Plan provides for the continued maintenance of the Port Everglades Entrance Channel jetties and the riprap seawall along the existing Southport Turning Notch, which serves as an underwater structure that promotes the protection and proliferation of living marine resources.

f. The Port Everglades manatee sanctuary, as designated by state statute, will continue to allow the safe haven for the manatees that populate the FPL Discharge Channel during the winter months. The Natural Resources Planning and Management Division of the EPGMD and the FDEP will continue to monitor the beachfront for sea turtle nests. In addition, the protection of off-shore coral reefs will continue to be an important factor in the establishment of an ODMDS by the ACOE and the U.S. EPA.

g. *Water quality*. Port maintenance and expansion plans proposed in the Port Master/Vision Plan will have minimal impact on water quality in the PJA. The proximity of the PJA to the Atlantic Ocean facilitates strong tidal flushing which keeps the Port's water areas relatively free of pollutants.

h. *Water quantity*. Port maintenance and expansion plans proposed in the Port Master Plan will have minimal impact on water quantity in the PJA. The Large User Agreement between the Port and the City of Fort Lauderdale insures there will continue to be adequate potable water available, concurrent with the impact of development in the PJA.

i. *Public access*. Federal and state security measures restrict public access to the Port. The By-Pass Road, Phase 1 of which is included in the 5-Year Master Plan, has been designed to allow the public to travel between the intersection at Eisenhower Boulevard and 17$^{th}$ Street to Spangler Boulevard and U.S. 1 without passing through a Port security gate. It essentially "carves out" the Convention Center from the Port, thus allowing the public direct access to the Convention Center from 17$^{th}$ Street. The public will not, however, have unrestricted access to Port facilities because of security considerations.

j. *Historic Resources*. Anticipated future expansion and operations of Port Everglades will have no impact on historic resources. Any new designation or identification of historic resources in the PJA will be protected, in accordance with the Broward County Code.

k. *Land use and infrastructure of adjacent areas*. The PJA is generally bounded by the 17th Street Causeway to the north, by West Lake Regional Park to the south, by the Atlantic Ocean to the east, and U.S. 1 and FLL to the west. This creates a self-contained, well defined commercial port area. Although it is anticipated that the Port's future expansion and operations will have little impact on adjacent land uses or adjacent infrastructure, it is recommended that compatibility between Port-related uses and any adjacent residential uses be considered by the affected local jurisdiction during the land use amendment and development order review process.

The PED shall continue to coordinate regularly with the BCAD and the FAA to ensure that the new berths and crane locations proposed in the Southport Turning Notch expansion plan are compatible with FLL operations and height restrictions for that area of the Port.

The PJA includes portions of the municipalities of Fort Lauderdale, Hollywood, Dania Beach, and Broward County. The Interlocal Agreement dated May 6, 1994 among these respective jurisdictions identifies roles and responsibilities in the PJA. Chapter 163.3178(2)(k)(5) requires the adoption of a procedure by Broward County and the affected jurisdictions which will resolve any inconsistencies between the respective local government comprehensive plans and the Deepwater Port Component through a dispute resolution process. As provided under Chapter 186.509, FS, this procedure is to be utilized in the event the local government and Broward County are unable to resolve the inconsistencies. The dispute resolution process shall be consistent with the Broward County Intergovernmental Coordination Element.

# IMPLEMENTATION

## A. Authority

1. Chapter 59-1157, Laws of Florida, as amended, defined the PJA and established Por Everglades Authority.

2. Port Everglades Code, adopted by the Port Everglades Authority on June 20, 1991, specifies the powers and duties of the Port Everglades Authority, together with the rules and regulations which apply within the PJA.

3. Chapter 9-429, Laws of Florida, provides for the assumption by the Broward County Board of County Commissioners of the powers and duties of the Port Everglades Authority.

4. Resolution No. 94-1302, adopted by the Broward County Board of County Commissioners, on October 25, 1994, incorporates the rules and regulations of the Port Everglades Authority into the Broward County Administrative Code.

5. Interlocal Agreement between the Municipalities of Hollywood, Fort Lauderdale, Dania Beach, and Broward County, dated May 6, 1994, defines the roles and responsibilities of the affected jurisdictions in the PJA.

6. Port Everglades Development District (PEDD) specifies the zoning regulations applicable in the PJA which have been adopted by the municipalities of Hollywood, Fort Lauderdale, and Dania Beach.

7. Port Everglades Tariff Number 12, Rules and Regulations, Port Everglades, Florida, issued October 1, 2010.

## B. Sources

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*Port Everglades Master/Vision Plan*, AECOM, adopted by the Broward County Board of County Commissioners on March 1, 2011.

Port Everglades Operating Budget for Fiscal Year 2011, Port Everglades Department of Broward County, March 31, 2011.

*Transportation Improvement Program FY 2010/2011-2014/2015*, Broward Metropolitan Planning Organization, July 8, 2010.

BROWARD COUNTY
FLORIDA

# Historic Preservation
## Component Support Document

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Addition – shall mean any new construction that adds mass to an existing historic resource.

Alteration – shall mean any act or process that alters any of the following aspects of a historic resource:

(1) The exterior architectural appearance;

(2) Any interior or exterior feature that has been designated as a historic resource;

(3) Any interior structural feature that is visible from a public right-of-way or a navigable waterway; or

(4) When located within a non-residentially zoned designated historic district, the introduction, placement, or replacement of accessories or other personal property, including, but not limited to, furniture placed outdoors, pushcarts, and mobile or nonmobile vending machines or trolley cars placed on private property.

Archaeological materials cargo – shall mean human skeletal materials or human-manufactured objects, or natural objects altered by human activity, found on or beneath the surface of the ground and shall include, but not be limited to, pottery, basketry, bottles, weapons, weapon projectiles, tools, structural and building ruins, graves, any earthen mounds, middens or landscape features of human manufacture, or any portion or piece of any of the foregoing items. Unmarked human remains and associated burial artifacts and materials that are seventy-five (75) years of age or more are considered archaeological materials for the purpose of this article. Structures, and non-fossilized and fossilized paleontological resources, or any portion or piece thereof, shall not be considered archaeological materials under this article, unless found within an archaeological site, archaeological zone, or during an archaeological salvage excavation. Except as specified in this paragraph, no item shall be treated as a historic resource under this article unless such item is at least one hundred (100) years of age.

Archaeological salvage excavation – shall mean a process designed to prevent activity causing adverse impact on cultural resources by systematic removal of prehistoric or historical cultural remains, in order to acquire the fundamental information necessary for understanding the site within its proper historic context. This process requires an appropriate field survey, excavation, artifact analysis, and curation reports.

Archaeological site – shall mean a location that has yielded or is likely to yield the presence of archaeological materials on or below the ground and information indicating the past use of the site by humans. An archaeological site may be identified using onsite investigations or site-predictive models pursuant to the criteria set forth in Section 5-533 of this Code.

Archaeological zone – shall mean an area that has yielded or is likely to yield largely subsurface information on the prehistory or history of the County based on prehistoric or historic settlement and land use patterns within the County, as determined in consultation with the Broward County Archaeologist and the State of Florida Division of Historical Resources. These zones will tend to conform to certain natural physiographic features that were the focal points for prehistoric and historic activities. Archaeological zones shall be recorded on a Map of Broward County Archaeological Zones to be maintained and amended as necessary by the Historic Preservation Officer.

Board – shall mean the Broward County Board of County Commissioners.

Building – shall mean a structure created to shelter any form of human activity. This may refer to a house, barn, garage, church, hotel, or similar structure. Building may also refer to a historically-related or architecturally-related complex.

Certificate of Appropriateness – (COA) shall mean a permit certificate for plans for specified alteration, rehabilitation, construction, reconstruction, removal, relocation, or demolition of a historic resource submitted by an applicant for historic preservation review. This certificate shall be issued by the Historic Preservation Board.

Certified to Dig – (CTD) shall mean a permit certificate of plans for specific digging projects that are anticipated to yield known or as yet unknown archaeological or paleontological materials in an archaeological or paleontological zone or site designated as a historic resource. This certificate shall be issued by the Historic Preservation Officer.

Certified Local Government – (CLG) shall mean a local historic preservation program which has been certified by the National Park Service and the Florida Department of State, Division of Historical Resources in accordance with the National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.).

Construction – shall mean the erection of an onsite improvement to a designated site or to a building, parcel, or grounds located within a historic resource site, whether the resource is presently improved or unimproved, or hereafter becomes unimproved by demolition or as a result of destruction of an improvement located thereon by fire, windstorm or other casualty, or otherwise.

Contributing resources – shall mean a building, site, structure, or object that adds to the historic, architectural, archaeological, or paleontological significance of a historic district.

Demolition – shall mean any act that destroys in whole or in part a historic resource.

Demolition by neglect – shall mean improper or inadequate maintenance of a historic resource that results in its substantial deterioration and threatens the continued preservation of the historic resource.

DHR – shall mean Division of Historical Resources, a State agency under Florida's Department of State.

Exterior – shall mean all outside surfaces or elements of a building or structure.

Florida Master Site File – (FMSF) shall mean an archive and database of all known archaeological and historical sites and districts recorded within the State of Florida, as maintained by the Florida Department of State, Division of Historical Resources.

Historic District – shall mean an area designated by the Board, located within defined geographic boundaries, which contains two (2) or more contributing resources and which may contain noncontributing resources and vacant land within its boundaries.

Historic Preservation Board – (HPB) shall mean the group of professional individuals appointed by the Broward County Commission (BCC) who possess demonstrated knowledge, experience, and commitment to historic preservation and are charged with performing the duties outlined in BC Ordinance 2014-32 as well as other duties assigned by the BCC. The actions of the HPB shall be complementary to the responsibilities of the State Historic Preservation Office.

Historic Preservation Officer – (HPO) shall mean the staff person appointed by the County Administrator, who is directly responsible for administering this article and for carrying out the duties and responsibilities delegated by the State of Florida CLG Program. Responsibilities and duties of the HPO, as provided in this article, shall include those of the HPO or the HPO's authorized representative. The HPO shall meet the professional qualifications standards of the guidelines and standards of the United States Secretary of the Interior as published in the Code of Federal Regulations, 36 C.F.R. Part 61.

Historic Resource – shall mean a building, structure, object, feature, site, or other real or personal property, excluding living things, of historic, architectural, archaeological, or paleontological value, including an individual resource, contributing resource, or noncontributing resource, or vacant land within a historic district that is individually designated by the Board as a historic resource. Any building, structure, object, site, or other real or personal property previously designated as an Archaeological Cultural Resource Site or Historical Cultural Resource Site under the Broward County Code of Ordinances is hereby defined as a historic resource.

Historic Survey – shall mean a comprehensive listing or inventory of buildings, sites, and structures of any historical, cultural, archaeological, paleontological, or architectural importance in Broward County, Florida.

Integrity – shall mean the authenticity of a resource's historic identity, evidenced by the survival of physical characteristics that existed during the resource's historic or prehistoric period

Mass – shall mean the envelope or cubic footage of the structure, including, but not limited to, all habitable space, garages, attics, storage areas, and porches.

National Register of Historic Places – shall mean the list of historic properties significant in American history, architecture, archaeology, engineering, and culture, maintained by the Secretary of the Interior, as established by the National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.).

New construction – shall mean any new building, structure, object, or addition to a historic resource.

Noncontributing resources – shall mean a resource within a historic district that is not historically or architecturally compatible with contributing resources within the district.

Ordinary Maintenance – shall mean minimal work conducted on a historic resource which specifically stems deterioration and exactly replicates the existing material of the resource in form and substance.

Paleontological resource – shall mean any vertebrate fossils, including bones, teeth, natural casts, molds, impressions, and other remains of prehistoric fauna, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth, except that the term does not include:

(1) any materials associated with an archaeological resource, as defined in Section 3(1) of the Archaeological Resources Protection Act of 1979, 16 U.S.C. 470bb(1); or

(2) any cultural item, as defined in Section 2 of the Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001.

Paleontological site – shall mean a location that has yielded or is likely to yield information important to the understanding and scientific study of paleontological resources. A paleontological site is evidenced by the presence of paleontological materials on or below the ground surface indicating past use by humans.

Paleontological zone – shall mean an area likely to yield largely subsurface information on the prehistory and fossil history of the County based on prehistoric environmental patterns within the County, as determined in consultation with the Florida Museum of Natural History. Paleontological zones will tend to conform to certain geological features and deposits and shall be recorded on a Map of Broward County Paleontological Zones to be maintained and amended as necessary by the HPO

Period of significance – shall mean the period of time from which a historic resource's importance is derived.

Relocation – shall mean the movement of a historic resource, including movement on its own site. Relocation shall also include the introduction of a historic resource or previously non-designated resource onto the site of a historic resource.

Scale of a building – shall mean the ratio of the mass of the building to the total buildable area of the property, as defined by maximum setback, step-back, and height requirements.

SHPO – the State Historic Preservation Office or Officer.

Secretary of the Interior's Standards – shall mean the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings, and Archaeological Documentation, codified at 36 C.F.R. Part 68, and the Archaeological Program, codified at 36 C.F.R. Part 79, published by the United States Department of the Interior, and those guidelines developed by the Secretary of the Interior to guide work undertaken on historic and archaeological resources.

Setting – shall mean the environment in which a historic resource is located, including, but not limited to, the viewshed, water frontage, or streetscape.

Streetscape – shall mean the appearance or view along the public right-of-way adjacent to a historic resource.

Structure – shall mean a man-made object built or constructed for a functional use that is not intended to shelter human activity, such as a fence or a windmill.

Viewshed – shall mean the views to and from a historic resource.

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Historic Preservation Component

The Historic Preservation Component support document provides the data and analysis which led to the development of the goals, objectives and policies provided in the component. The Historic Preservation Component is focused on setting a core vision for the protection, enhancement and preservation of resources, structures, districts and properties of historical, cultural, archaeological, and architectural merit within Broward County. The support document includes inventories of historic and archaeological resources within Broward County, and describes the current plans, programs, and systems in place to realize this vision.

***Figure HP-1: Historical image of Stranahan House on the New River.*** *Source: Fort Lauderdale Historical Society*

***Figure HP-2: Contemporary image of Stranahan House.*** *Source: R. Ferrer*

## INTRODUCTION

### A. General Description

#### 1. Historic Preservation

Historic preservation seeks to protect, conserve and preserve buildings and sites, artifacts, objects, features and cultural landscapes which tell our ongoing story, as we move from the past to the present and on to the future. Preservation serves as a reminder of the fact that we as a community do not exist in a vacuum; that we are the result of a past and that we are part of a continuum.

Preservation allows for re-use and sustainability by rehabilitation, restoration, conservation and adaptive reuse of what's old for new purposes and aims. Preservation also provides lasting economic benefits by way of investment dollars and employment and can be used as a planning strategy for site and neighborhood stabilization. Preservation also can promote tourism and business through the revitalization of historic commercial areas. Lastly, preservation is an important indicator that the past, as well as the present, have consequences and directly affect what's to come.

Florida, and Broward County, have a vitally significant archaeological, historical and developmental record unique to the nation. This is represented by resource sites and activities as diverse and significant as:

- Vero Man Ice Age Site – An archaeological and paleontological site approximately 2 hours to the north of Broward County where the largest collection of human bones dating to the Pleistocene Period (2.5 million years to 11,700 years Before Present) have been found in North America.
- Cutler Fossil Site – A Pleistocene Era sinkhole located in southern Miami-Dade County with prehistoric animal bones and cultural artifacts dating between 12,000 to 10,000 years ago.
- Council Oak – The site where meeting occurred resulting in the Federal recognition of the Seminole Tribe of Florida located within tribal lands in Hollywood, Florida.
- Chitto Tustenuggee (Snake Warrior) Island – The earliest Seminole settlement in South Florida, now a Broward County park, located in Miramar, Florida.
- World famous beaches, springs, wetlands, fishing, boating and flora & fauna that have been the catalyst for out-of-state and international visitors for centuries.
- Saint Augustine – The nation's oldest continuously inhabited city.
- Agricultural production including a world famous citrus industry, significant ranching operations and lands that were considered for decades America's winter fruit and vegetable basket.
- Reclaimed land from wetlands and coastal areas made habitable for farming, growth and development including hundreds of miles of man-made canals for water control, commerce and transportation and for waterfront living. Broward County is a primary example of this monumental undertaking.
- On-going settlement and migration patterns by people of diverse ethnicities, cultures, nationalities and backgrounds adding to a rich regional flavor.

The study, recognition, conservation and valuation of all the above and much more, constitutes the planning tool that is historic preservation in today's world.

### 2. Broward County Historic Preservation

Broward County's historic preservation program has its roots in the adoption of an early historic preservation ordinance and creation of the Broward County Historical Commission (BCHC) in 1974. The Commission and its program spanned a 40-year period serving community and County interests. The BCHC served multiple purposes as a center of historical research and information, collection agency, archive, publisher of historical articles, historical education center, organizer of special events and by working to recognize and protect sites of historical value. By the early 2010's, recommendations were made to move the County to a more regulatory, efficient and focused preservation program centered on regulatory functions, guided by a new preservation ordinance and professional board. State recognition for Broward's new program as a Certified Local Government was also prioritized.

In 2014, Broward County adopted a new historical resources ordinance following the recommendations made by the former Commission. In 2015, the County's new Historic Preservation Board (HPB) had its first meeting formally launching today's preservation program. In 2016, Broward County became Florida's 74th Certified Local Government and by 2017 the HPB completed its first historical resource designations.

## B. Jurisdiction Areas

Broward is composed of 31 municipalities in addition to the Broward Municipal Services District or BMSD (unincorporated Broward County) and Seminole Tribal areas. Currently, the County's historic preservation ordinance is effective Countywide "effective within a municipality to the extent a municipality does not have an ordinance that preserves historical sites and structures and that prohibits ground disturbance of archaeological historic resources." (BC Ord. 2014-32). More specifically, areas served and not served by the County are as follows:

### 1. County Jurisdictions

For historic preservation: Broward Municipal Services District, Coconut Creek, Margate, Hillsboro Beach, Sea Ranch Lakes, Lazy Lake, North Lauderdale, Tamarac, Lauderhill, Sunrise, Southwest Ranches, Cooper City, Pembroke Pines, West Park and Pembroke Park (Figure HP-3)

For archaeological preservation: Broward Municipal Services District, Deerfield Beach, Hillsboro Beach, Coconut Creek, Coral Springs, Margate, Tamarac, North Lauderdale, Lauderhill, Sunrise, Sea Ranch Lakes, Lazy Lake, Cooper City, Pembroke Pines, West Park, Pembroke Park (Figure HP-4)

### 2. Municipal (non-County) Jurisdictions

For historic preservation: Deerfield Beach, Lighthouse Point, Pompano Beach, Parkland, Coral Springs, Oakland Park, Lauderdale Lakes, Lauderdale-by-the-Sea, Wilton Manors, Fort Lauderdale, Plantation, Davie, Weston, Dania Beach, Hollywood, Hallandale Beach, Miramar, Seminole Reservation Lands

For archaeological preservation: Parkland, Pompano Beach, Oakland Park, Lauderdale Lakes, Lauderdale-by-the-Sea, Wilton Manors, Fort Lauderdale, Plantation, Davie, Weston, Dania Beach, Hollywood, Southwest Ranches, Hallandale Beach, Miramar, Seminole Reservation Lands

Several municipalities have supported the own preservation ordinances and boards for many years. Municipalities that have been certified as 'Certified Local Governments' adhere to certain professional standards and representations in their local preservation boards, in addition to maintaining communication and reporting with the State Historic Preservation Office for work progress and activities. CLG communities also share information, workshops, education and have certain advantages in State grant applications. Thus, CLG communities tend to sustain more active, responsive and achievement orientated preservation programs. CLG communities tend to be more successful at preserving important sites from destruction.

### 3. Certified Local Government (CLG) Municipalities within Broward County

As of January 2018, there were 74 Certified Local Governments within Florida. Of the 74 Florida CLGs, 5 are within Broward County.

Locally certified historic preservation programs are:

1 – City of Hollywood (certification date: 8-28-1995)

2 – City of Pompano Beach (certification date: 3-12-2002)

3 – City of Fort Lauderdale (certification date: 10-30-2010)

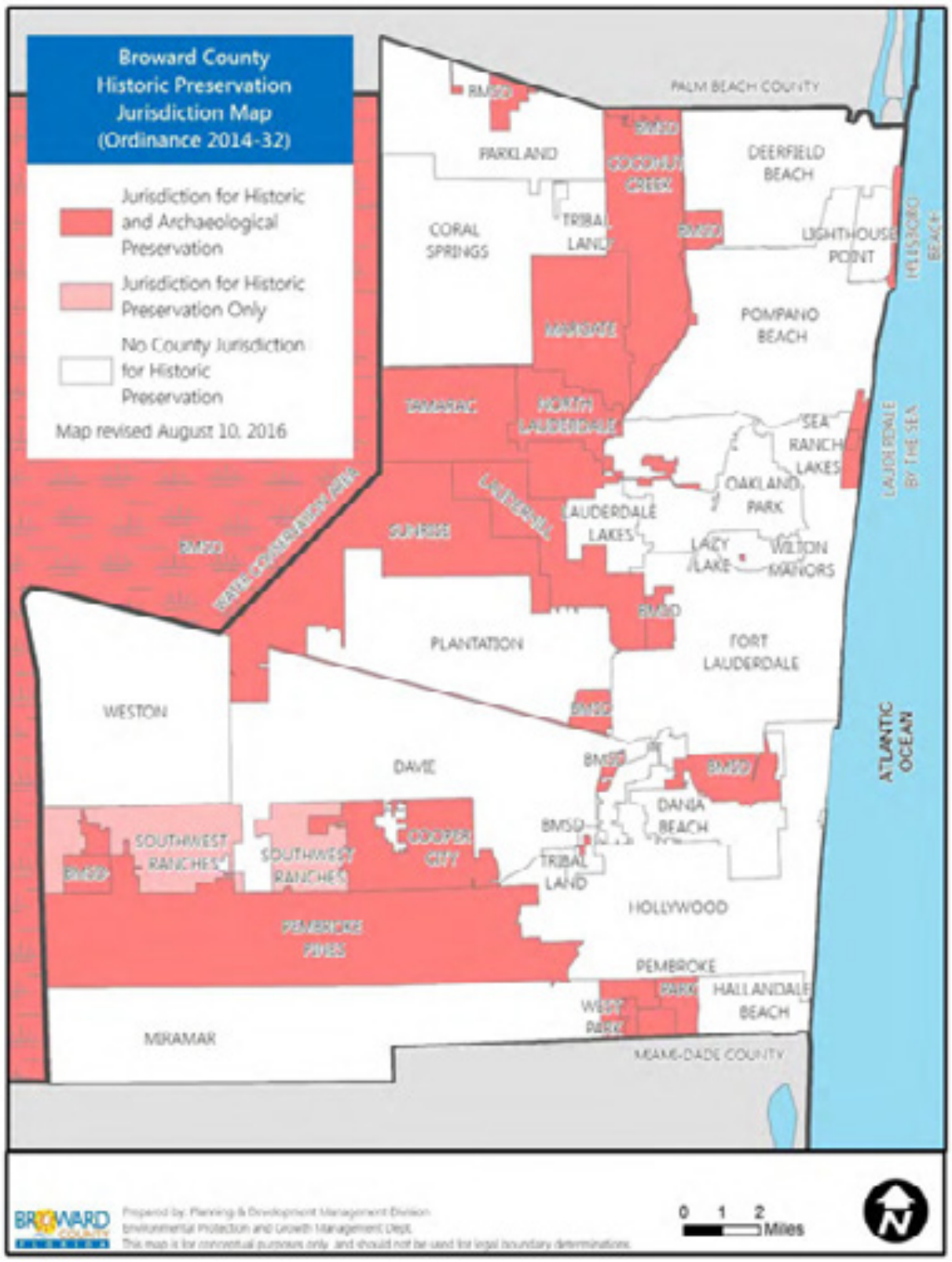
4 – City of Oakland Park (certification date: 11-23-2015)

5 – Broward County (certification date: 7-7-2016)

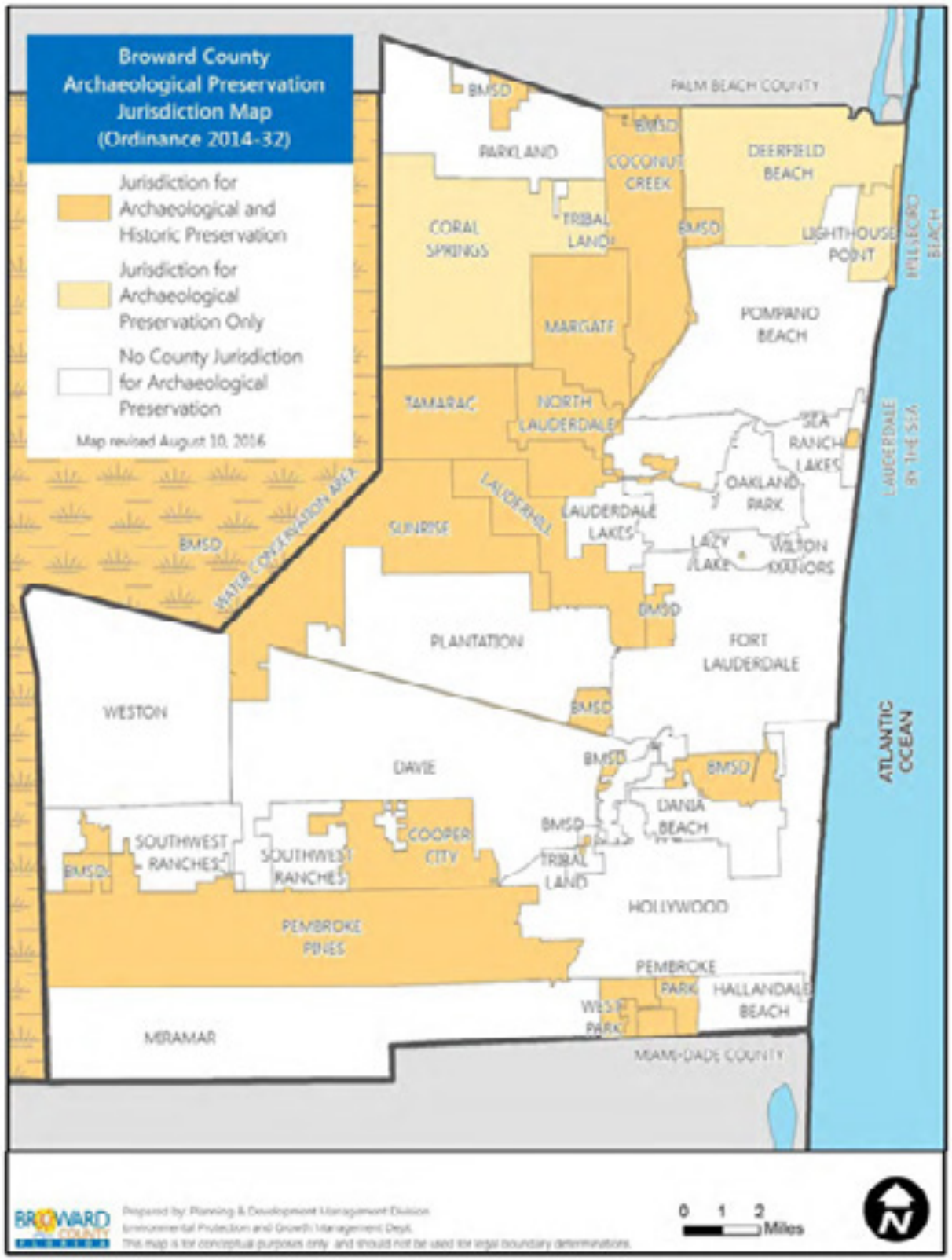
## C. Planning Horizons

The short-term planning horizon is five years or 2023. The long-term planning horizon is ten years or 2028.

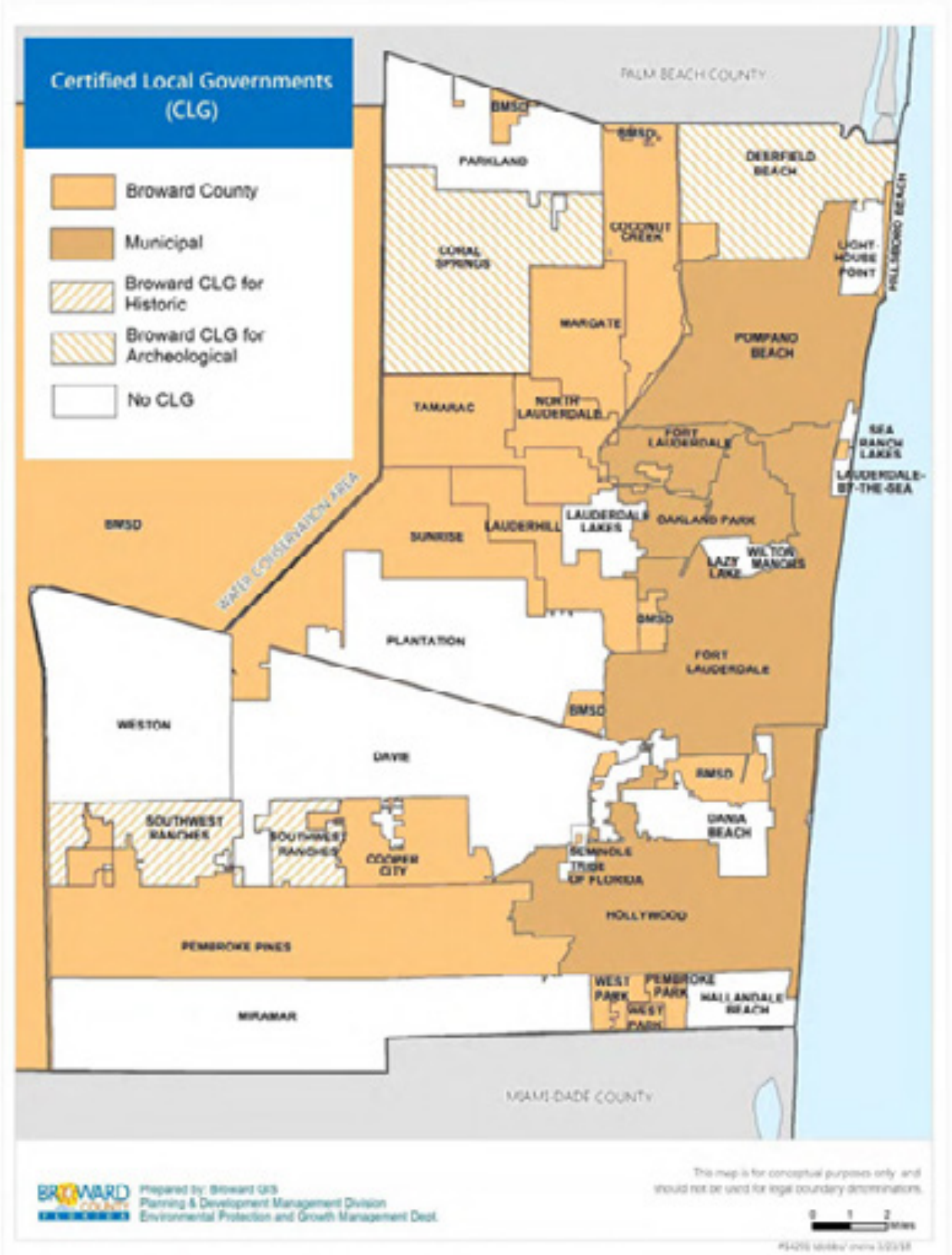
## Figure HP-3: Broward County Historic Preservation Jurisdiction



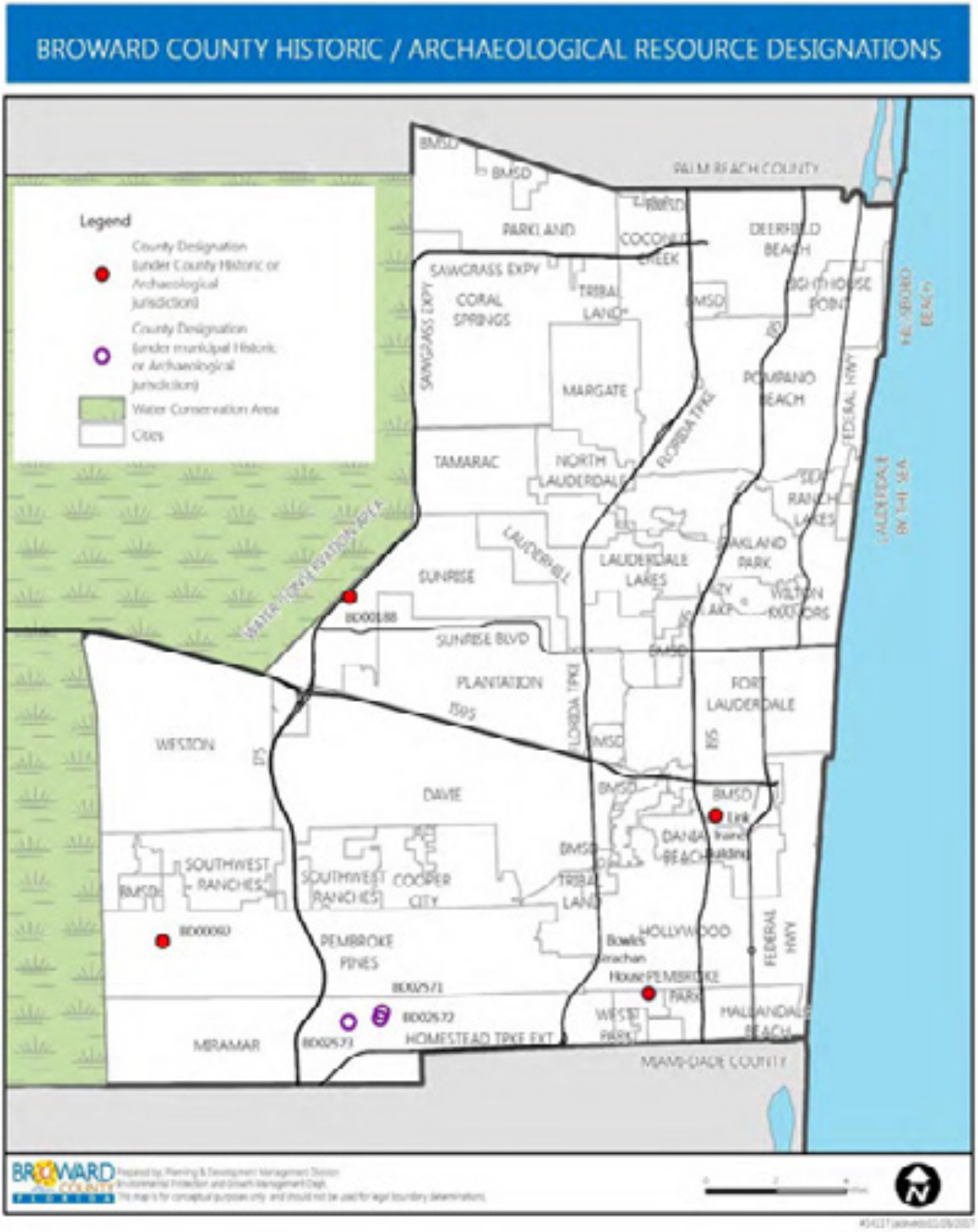
## Figure HP-4: Broward County Archaeological Preservation Jurisdiction



## Figure HP-5: Municipalities within Broward covered by CLG Historic Preservation Programs



## Figure HP-6: Broward County Historic/Archaeological Resource Designations



# DATA AND ANALYSIS REQUIREMENTS

## A. A Bit of History on Historic Preservation in Broward County

### 1. Period 1972 – 2014

The Broward County Historical Commission was established in 1972 under Article VII, Broward County Code, and served Broward County from 1972 to 2014. Under article VII the duties and powers of the Historical Commission were:

a) It shall be the duty of the commission to collect, arrange, record, preserve and maintain in its archives, museums and libraries, historical artifacts, materials and data, including, but not restricted to, books, pamphlets, maps, charts, manuscripts, family histories and genealogy, U.S. census records, papers, photographs, pictorial sketches, paintings and other objects and materials illustrative of and relating to the history and archaeology of Broward County and of Florida; to procure and preserve oral histories and narratives of the early pioneers, their exploits, perils, privations and achievements; to collect material of every description relative to the history of Indian tribes and wars, and relative to military, naval and maritime history, schools and churches, industry and public and private professions and occupations.

b) The commission may, subject to the approval of the board of county commissioners, acquire, restore, protect and preserve properties, sites, locations and places relative and pertinent to the history of Broward County and Florida.

c) The commission may, on its own initiative, on special occasions, or in conjunction with national, state, and local holidays, promote, arrange, produce, and conduct exhibits, expositions, celebrations, and educational programs concerning and touching upon the historical occasions, achievements, and pioneer days of the people, citizens, local governments of Broward County, the State of Florida, the United States of America, the colonists, and its founders.

d) The commission may, with the approval of the board of county commissioners, co-sponsor, promote, assist and jointly conduct historic site surveys, expositions, commemorations and celebrations, in conjunction and in cooperation with local, state and national societies, organizations and governmental agencies.

e) The commission may publish and distribute books, pamphlets, newsletters and other publications, concerning national, state, county and local history, archaeology, historical genealogy, government institutions and societies, and concerning the programs, work, duties and operation of the commission.

f) The commission may promote and assist in the creation, program and work of local historical, archaeological and genealogical societies.

g) The commission may, with the approval of the Board of County Commissioners, create, operate, and maintain museums for public displays of archives and artifacts for the education of the general public and citizens of Broward County, Florida.

The designation, protection, and preservation of archaeological sites and resources in Broward County were established and enforced under Article XVI "Archaeological Cultural Resource Sites".

### 2. Period 2014 to Present

In September 2014 the Broward County Board of County Commissioners enacted Ordinance No. 2014-32, revising Broward County historic preservation regulations to be consistent with federal and state requirements for a State of Florida Certified Local Government (CLG). This revision lead to the repeal of Articles VII and XVI, the adoption of Article XVII. ('Preservation of Historical Cultural Resource Sites') as the guide to a new program and board. The new ordinance replaced the former Broward County Historical Commission with a new Historic Preservation Board. Ordinance 2014-32 "shall be effective countywide and shall be effective within a municipality to the extent a municipality does not have an ordinance the preserves local historical sites and structures and that prohibits ground disturbance of archaeological historic resources."

In July of 2015, the new Historic Preservation Board was installed and held its first meeting. A year later, in July of 2016, the County was awarded Certified Local Government certification. In 2017, the first historic resource designations were recommended by the HPB and approved by the Board of County Commissioners. Also in 2017, the process of necessary code improvements by amending Ordinance 2014-32 was also initiated for discussion and recommendations.

## B. Functions of the Historic Preservation Board

The Historic Preservation Board designates or recommends for designation historic landmarks and districts, and then reviews applications to alter, add on to, demolish or move a landmark or properties within a historic district. Comprehensive plans, zoning, subdivision, and other land use laws can also be instrumental in supporting historic preservation and neighborhood conservation programs. Section 5-535 (e) of Article XVII (Preservation of Historical Cultural Resource Sites) defines the duties of the Historical Preservation Board as:

(1) Developing and updating any forms necessary for the implementation of this article, including, but not limited to, historic designation, COA, and CTD applications.

(2) Providing historical markers, plaques, and other recognition for individual historic resources, districts, archaeological sites, archaeological zones, and paleontological zones.

(3) Recommending zoning and building code amendments to the proper authorities to assist in promoting historic preservation.

(4) Developing and applying design guidelines.

(5) Initiating, reviewing, and updating historic site surveys in the County.

(6) Reviewing National Register nominations and providing comments to the appropriate entities.

(7) Reviewing and making recommendations to County staff regarding grants and financial incentives that assist in promoting historic preservation within the County that are available to property owners and to the County.

(8) Promoting the awareness of historic preservation and its community benefits.

(9) Preparing and maintaining records of the Historic Preservation Board's actions and decisions.

(10) Fulfilling all obligations and requirements associated with the CLG Program.

(11) Promoting and assisting in the creation, program, and work of local historical, archaeological, and genealogical societies.

## C. Historic Preservation Programs

### 1. National Register Program

The National Register of Historic Places is the nation's list of historic properties worthy of preservation. The program is administered by the National Park Service (NPS) and implemented by the various State Historic Preservation Offices (SHPOs). The Florida Department of State, Division of Historical Resources, Bureau of Historic Preservation is the State Historic Preservation Office for Florida.

The Survey and Registration Section of the Bureau of Historic Preservation is the office responsible with identifying and listing historic resources to the National Register.

The National Register (or NR) process consists of four major steps:

a) Determine eligibility.

b) The preparation of a National Register nomination form and documents.

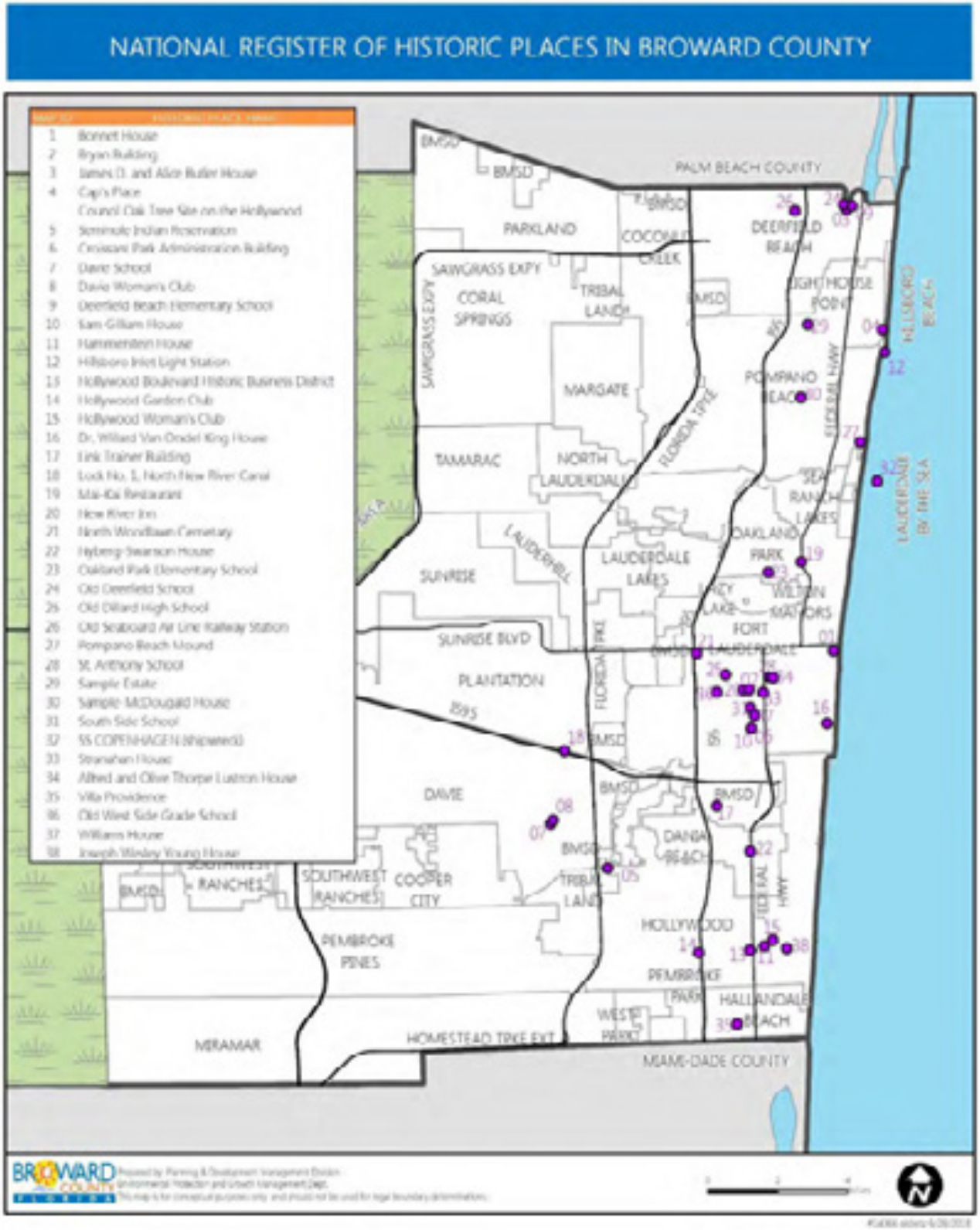
c) Presentation of the completed National Register nomination form and documents to the National Register Review Board.

d) Final submission of the nomination to the National Park Service for review and listing.

The process is usually initiated by a property owner, preservation consultant or local government entity. Survey and Registration staff may begin the process for especially significant properties, or those properties that are a priority for the Bureau of Historic Preservation. Listing on the National Register of Historic Places takes approximately 3 to 4 months or longer, depending on the complexity and size of the property being nominated.

National Register nominations within Broward County shall be identified for public hearing to provide for public participation and input. However, final authority for recommendation for National Register nominations within the County shall rest with the Historic Preservation Board. Furthermore, the County includes educational and locational information related to National Register sites within Broward through its website: www.broward.org/History/NationalRegister/Pages/default.aspx

## Figure HP-7: National Register of Historic Places in Broward County



## Table HP-1: List of National Register Sites in Broward County

| Site Name | Date Listed | Location | City | Description |
|---|---|---|---|---|
| Bonnet House | 1984 | 900 Birch Rd. | Ft Lauderdale | Residence converted to museum |
| Bryan Building | 1997 | 220-230 Brickell Ave. | Ft Lauderdale | Commercial Building |
| Butler House | 1995 | 380 E. Hillsboro Blvd. | Deerfield Beach | Residence |
| Cap's Place | 1990 | 2980 NE 31 Ave. | Lighthouse Point | Commercial Building |
| Council Oak | 2012 | US 441 & Stirling Rd. | Hollywood | Landscape Feature |
| Croissant Park Administration Bldg. | 2001 | 1421 South Andrews Avenue | Ft Lauderdale | Commercial |
| Davie School | 1988 | 6650 Griffin Road | Davie | Institutional |
| Davie Woman's Club | 2016 | 6551 SW 45th Street | Davie | Institutional |
| Deerfield Beach Elem. School | 1990 | 651 NE 1st Street | Deerfield Beach | Institutional |
| Sam Gilliam House | 2001 | 11 SW 15th Street | Ft Lauderdale | Residence |
| Hammerstein House | 2005 | 1520 Polk Street | Hollywood | Residence (museum) |
| Hillsboro Inlet Light Station | 1974 | 907 Hillsboro Mile | Hillsboro Beach | Institutional |
| Hollywood Blvd Historic Business District | 1999 | Hollywood Blvd from 21st Avenue to Young Circle | Hollywood | Commercial |
| Hollywood Garden Club | 2005 | 2940 Hollywood Boulevard | Hollywood | Institutional |
| Hollywood Woman's Club | 1995 | 501 North 14th Avenue | Hollywood | Institutional |
| Dr. Willard Van Orsdel King House | 2006 | 1336 Seabreeze Boulevard | Ft Lauderdale | Residence |
| Link Trainer Bldg. | 1998 | 4000 West Perimeter Road | BMSD | Institutional (museum) |
| Lock No. 1, North New River Canal (Sewell Lock) | 1978 | 6521 State Road 84 | BMSD | Engineering Feature (park) |
| Mai Kai Restaurant | 2014 | 3599 North Federal Highway | Oakland Park | Commercial |
| New River Inn | 1972 | 229 SW 2nd Avenue | Ft Lauderdale | Hotel (museum) |
| North Woodlawn Cemetery | 2017 | 1936 NW 9th Street | Ft Lauderdale | Cemetery |
| Nyberg-Swanson House | 1999 | 102 West Dania Beach Boulevard | Dania Beach | Residence (offices) |
| Oakland Park Elementary School | 1988 | 939 NE 33rd Street | Oakland Park | Institutional |
| Old Deerfield School | 1999 | 232 NE 2nd Street | Deerfield Beach | Institutional |
| Old Dillard High School | 1991 | 1001 NW 4th Street | Ft Lauderdale | Institutional (museum) |
| Old Seaboard Air Line Railway Station | 1990 | 1300 West Hillsboro Boulevard | Deerfield Beach | Train Station |
| Pompano Mound | 2014 | 1232 SE 13th Street | Pompano Beach | Archaeological feature (park) |
| St. Anthony School | 1997 | 820 NE 3rd Street | Ft Lauderdale | Institutional |
| Sample Estate | 1984 | 3161 North Dixie Highway | Pompano Beach | |
| Sample-McDougald House | 2004 | 450 NE 10th Street | Pompano Beach | Residence (museum) |
| South Side School | 2006 | 701 South Andrews Avenue | Ft Lauderdale | Institutional |

| | | | | |
|---|---|---|---|---|
| SS Copenhagen | 2001 | Atlantic Ocean (Drop off reef south of Hillsboro Inlet and east of LBTS) | Lauderdale-by-the-Sea | Offshore shipwreck |
| Stranahan House | 1973 | 335 SE 6th Avenue | Ft Lauderdale | House (museum) |
| Alfred & Olive Thorpe Lustron House | 2007 | 1001 NE 2nd Street | Ft Lauderdale | Residence (prefabricated enameled steel) |
| Villa Providence (Curci House) | 2013 | 324 SW 2nd Avenue | Hallandale Beach | Residence (museum) |
| West Side School | 2012 | 301Harmond Avenue | Ft Lauderdale | Institutional |
| Williams House | 2005 | 119 Rose Drive | Ft Lauderdale | Residence |
| Joseph Wesley Young House | 1989 | 1055 Hollywood Boulevard | Hollywood | Residence |

## 2. State Historic Preservation and the Florida Master Site File

Since 1967, when Florida's historic preservation program formally began with the passage of the Florida Archives and History Act (Chapter 267, Florida Statutes), the Florida Department of State has been the home to the state government's historic preservation programs. The Department of State's Office of Cultural, Historical and Information Programs (OCHIP) is responsible for promoting the historical, archaeological, museum, arts, and folk culture resources in Florida. Within OCHIP, the Director of the Division of Historical Resources (DHR) serves as Florida's State Historic Preservation Officer (SHPO). The SHPO acts as the liaison with the national historic preservation program conducted by the National Park Service. The DHR is headquartered in Tallahassee, the state capital. There are two bureaus within the Division of Historical Resources:

1. Bureau of Historic Preservation
2. Bureau of Archaeological Research

The Compliance Review Section staff evaluates and comments on the impact of federal, state and (some) local projects on historical and archaeological resources in compliance with federal and state preservation laws.

The Florida Master Site File (FMSF) maintains a federally mandated inventory of Florida's historic resources. The Site File contains approximately 200,000 entries. The FMSF provides a centralized records location for all of Florida's historic and archaeological site information. The Site File was begun with records collected from universities and museums. Today, its inventory includes computerized and paper records, including survey results and publications of historical and archaeological sites, recorded though out the state. The Division of Historic Resources estimates that approximately 7,000 new sites are added each year. At the time of research and writing of this document (Spring, 2018) the breakdown of Broward County FMSF records were:

| | |
|---|---|
| Broward historical (standing) structures: | 4808 |
| Broward archaeological sites | 309 |
| Broward Resource groups (i.e., districts, linear resources such as roads, canals, etc.) | 81 |
| Broward Historic Bridges | 58 |
| Broward Historic Cemeteries | 9 |
| *Total Broward County resources listed in FMSF (date: 5/8/2018) | 5265 |

The foundation of Broward County's historic and archaeological sites inventory is an on-going body of work that seeks to identify and document our local resources. Broward's inventory also can assist by identifying the best sites that represent our communities for preservation.

## 3. Certified Local Government (CLG) Program

In 1980, the National Historic Preservation Act was amended to include a new program, the Certified Local Government Program. The main purpose of the program is to encourage direct local government participation in Federal and State historic preservation programs. The National Park Service requires that 10% of the annual Federal apportionment of funds to each state be awarded to Certified Local Governments. Local governments wishing to participate in this federal program must demonstrate a commitment to historic preservation by fulfilling five criteria, which are:

- The local government must develop and enact a local historic preservation ordinance that provides for the identification and protection of historical resources and identifies criteria for designation and evaluation of alterations to historic properties, including demolitions.

- The local government must establish an adequate and professional historic preservation review commission based upon the ordinance's authorization.

- The local government must initiate an active and ongoing survey or inventory of its historic resources.

- The local government must provide for adequate public participation in its preservation activities.

- Each CLG must participate in State Historic Preservation Office and Federal programs in an effort to establish a strong local-state-federal partnership.

Recognizing the importance of support and participation in historic preservation policy

and programs at the community level, Florida's CLGs throughout the state benefit from being part of a community of CLGs with the aid of state consultation, encouragement and support. Broward County's Historic Preservation program was designated a Certified Local Government on July 7, 2016 by the U.S Department of the Interior and the Florida Department of State's Division of Historical Resources. Designation as a Florida CLG affirms the County's commitment to historic preservation and solidifies the partnership with the state's Bureau of Historic Preservation and National Park Service.

## 4. Local Preservation

Local preservation is accomplished in a variety of ways and can be conducted by a host of entities including local governments, agencies, institutions (i.e., museums, churches, schools, etc.), foundations, non-profit groups, investors, homeowner or neighborhood groups, and private individuals. Preservation is often accomplished at the grass roots level without fanfare, intervention or obligation by individuals and businesses who believe it makes economic sense to take an older structure and re-use or adapt it. Preservation is accomplished every time a local old gas station is turned into a restaurant or other form of business; an former house of worship is turned into a performing arts center, theater or movie house; an old residence is turned into an office or specialty store and an old warehouse is turned into a nightclub, bar or residential lofts. There are numerous examples of this happening in our own communities and the County at large.

Broward County's preservation program, under the support of the Department of Environmental Protection and Growth Management - Planning and Development Management Division, is relatively new. Many cities maintain their own preservation programs, ordinances and boards which help serve their own community's needs. Broward currently serves 14 municipalities and the BMSD for both historic and archaeological preservation; 3 municipalities for archaeological preservation only; and, 1 municipality for historic preservation only. Broward's program is centered on serving the municipalities it is charged to provide service to. A cornerstone of Broward's work is to maintain its program in compliance with CLG requirements and therefore, abide by federal and state standards. Another equally important cornerstone is to identify and recognize each area's historical and archaeological assets and offer protection for significant sites through designation and historic preservation permitting review.

## Table HP-2: Historically Designated Properties by Broward County

| Site Name | Year Built | Address | Designation | Notes |
|---|---|---|---|---|
| FMSF No. 8BD2571 | Archaic | Township: 51S; Range: 4OE; Section: 26 | 1994 | Within City of Miramar. As of 2014 under municipal archaeological jurisdiction. |
| FMSF No. 8BD2572 | Archaic | Township: 51S; Range: 40E; Section: 26 | 1994 | Within City of Miramar. As of 2014 under municipal archaeological jurisdiction. |
| FMSF No. 8BD2573 | Archaic | Township: 51S; Range: 40E; Section: 27 | 1994 | Within City of Miramar. As of 2014 under municipal archaeological jurisdiction. |
| Bowles Strachan House | 1930 | 4651 SW 19th Street, West Park | 2012 | |
| FMSF No.8BD188 (Goodman Site) | Glades I, II & III | Township: 49S; Range: 40E; Sec.: 26 | 2017 | |
| Link Trainer Building (Ft Lauderdale USNAS Building No.8 | 1942 | 4000 West Perimeter Road, Ft Lauderdale | 2017 | |
| FMSF No. 8BD92 (Buzzards' Roost) | Late Archaic; Glades III | Township: 51S; Range: 39E; Section: 11 | 2017 | Approved by HPB in July 2017. County Commission final action: December 2017. |

## D. Partners in Preservation

The preservation of Broward's historical, archaeological, architectural and cultural resources can only be achieved through cooperation between federal, state and local governments and with the outreach, participation and support of organizations, societies and private individuals. Equally important is the education and self-identification of county residents with their area's local history. Both the state and county have a historical narrative and unique historical and archaeological resources that many residents and visitors may not be aware of. The purpose of preservation is not only to preserve what's important but to also acknowledge and educate on past accomplishments. Preservation cannot be accomplished in isolation. Preservation is a shared enterprise that requires cross-institutional support, working together and the sharing of information between many groups and entities.

The following is a partial list of partners in local preservation:

| | |
|---|---|
| AIA Florida Chapter | AIA Fort Lauderdale |
| Broward County Historic Preservation Board | NASFTL Museum |
| Broward County Libraries Division | Florida Trust for Historic Preservation |
| Broward County Cultural Division | History Miami Museum |
| Broward County Parks and Recreation Division | Palm Beach County History Museum |
| Broward Trust for Historic Preservation | Florida Atlantic University |
| Fort Lauderdale Historical Society and Museum | Florida International University |
| African American Research Library and Cultural Center | Broward Community College |
| Stonewall National Museum & Archives | Hillsboro Lighthouse Preservation Society |
| Old Davie School Museum | Flamingo Gardens – Historic Wray Home |
| Bonnet House Museum & Gardens | Seminole Tribe of Florida – Hollywood |
| Historic Stranahan House Museum | Municipal Historical Societies (various) |
| Florida Division of Historical Resources | National Park Service |
| Florida Certified Local Governments | National Trust for Historic Preservation |
| Genealogical Society of Broward County | Old Dillard Museum |
| South Florida Railway Museum | Florida Division of Historical Resources |
| Florida Public Archaeology Network | Broward Archaeological Society |
| Florida Memory | Museum of Florida History |
| Fort Lauderdale Fire and Safety Museum | Fort Lauderdale Antique Car Museum |
| Dade Heritage Trust | Miami-Dade Office of Historic Preservation |
| Palm Beach County Historic Preservation | West Palm Beach Historic Preservation |
| Broward CLG municipalities | |

# IMPLEMENTATION

## A. Statutory Authority of the Historic Preservation Component

The State of Florida legislature approved the Omnibus Growth Management Act (Chapter 163, F.S.) in 1985. This statute provides for a process of integrated and mandatory planning and plan implementation and a series of substantive requirements. Under the Growth Management Act, the state set goals for a wide variety of planning components including education, health, hazardous and nonhazardous materials and waste, downtown revitalization, public facilities, cultural and historic resources, transportation, and coastal management. The Growth Management Act provides for both mandatory and optional plan elements. Under Chapter 163.3177(7)(i), Florida Statutes, historical and scenic preservation is an optional plan element. If a local government chooses to include historic preservation in its comprehensive plan, the statute provides that the element set out "plans and programs for those structures or lands in the area having historical, archaeological, architectural, scenic, or similar significance."

Requirements specific to historic preservation are outlined in Chapter 163.3177 for adoption by some mandatory elements of the comprehensive plan and may be incorporated into the vision of the optional historic preservation element.

- Section (6)(a)3.f, Florida Statutes, requires that the Future Land Use Element of a local government's comprehensive plan include criteria to be used to ensure the protection of natural and historic resources.

- Section (6)(f)1.e, Florida Statutes, requires that the Housing Element provide identification of historically significant housing for purposes of conservation and rehabilitation.

- Section (6)(g)9, Florida Statutes, requires that the Coastal Management Element include criteria to preserve historic and archaeological resources, which include the sensitive adaptive use of these resources.

At the County level, regulatory historic preservation is codified, implemented and conducted through the County's historic preservation ordinance (i.e., Ordinance No. 2014-32) which was adopted on September 23, 2014. The County's ordinance provides for participation as a Florida Certified Local Government, a professional Historic Preservation Board, Preservation Officer, criteria for the designation of historical and archaeological resources, procedures for reviewing work that may affect designated resources, review of nominations for proposed National Registers sites, public involvement in historic preservation, educational outreach through special workshops, conferences and events, and economic incentives for preservation. The County's Land Development Code also provides for preservation review and comments for development projects.

Non-regulatory historic preservation (such as the acceptance, preservation, curation and interpretation of artifacts, documents, papers and publications) is conducted by Broward's Libraries Division through the Broward County Historical Archives and the Historical Library.

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BROWARD COUNTY
FLORIDA

# Housing Element Support Document

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Affordable Housing – Housing for which monthly rents or monthly mortgage payments, including taxes and insurance, do not exceed 30 percent of an amount representing the percentage (very low = 50%; low = 80%; moderate = 120%) of the median income limits adjusted for family size for the households.

Adult Congregate Living Facility – Any facility which provides housing, food service, and one or more personal services for four or more adults for a period exceeding 24 hours.

Assisted person or household – A person or household receiving benefits through Federal funds, either alone or in conjunction with the investment of other public or private funds.

Census Designated Place (CDP) – Delineated for each decennial census as the statistical counterparts of incorporated places. CDPs are delineated to provide data for settled concentrations of population that are identifiable by name but are not legally incorporated under the laws of the state in which they are located.

Community Development Block Grant Urban Entitlement County – Includes the Broward Municipal Services District (i.e., Unincorporated Area of Broward County) and municipalities except for Davie, Fort Lauderdale, Hollywood, Lauderhill, Margate, Pembroke Pines, Pompano Beach and Sunrise.

Complete kitchen facilities – An installed sink with piped water, a range or cookstove, and a mechanical refrigerator. Quarters with only portable cooking equipment are not considered as having a range or cookstove.

Complete plumbing facilities – Hot and cold piped water, a flush toilet, and a bathtub or shower inside the housing unit, for the exclusive use of that unit.

Contract rent – The monthly rent agreed to, or contracted for, regardless of any furnishings, utilities, or services that may be included.

Dwelling unit – A house, apartment, or condominium unit, trailer, group of rooms, or a single room, occupied as a separate living quarters or, if vacant, intended for occupancy as a separate living quarters. Separate living quarters are those in which the occupants live and eat separately from any other persons in the building and which have direct access from the outside of the building or through a common hall. This includes rental

units contained in a multi-unit structure or complex which are licensed by the State Department of Business Regulation, Division of Hotels and Restaurants, as "apartments", "rental condominiums" and "retirement housing".

Foster care facility – A facility which houses foster residents and provides a family living environment for the residents, including such supervision and care as may be necessary to meet the physical, emotional and social needs of the residents and serving either children or adult foster residents.

Green Certification Programs – Applies criteria and standards to the design and construction of buildings that conserve and protect the environment, increase profitability through energy efficiency and create healthier places to live, work, and play.

Greenhouse Gas Emissions - The Earth's surface absorbs the Sun's energy and radiates this energy as heat. Greenhouse gases in the atmosphere absorb this radiated heat and in turn emit in all directions, warming the atmosphere and causing global warning. One major green house gas is carbon dioxide. Combustion of all fuels containing carbon (gasoline, natural gas, coal, diesel, wood, and propane) yield carbon dioxide which in turn absorbs and emits heat in the atmosphere causing global warning.

Gross rent – The contract rent plus the estimated average monthly cost of utilities and fuels if these are paid for by the renter.

Group home – A facility which provides a living environment for unrelated residents who operate as the functional equivalent of a family, including such supervision and care as may be necessary to meet the physical, emotional and social needs of the residents. Adult congregate Living Facilities comparable in size to group homes are included in this definition. It shall not include rooming or boarding homes, clubs, fraternities, sororities, monasteries or convents, hotels, residential treatment facilities, nursing homes, or emergency shelters.

Heating equipment – A steam or hot water system; central warm air furnace; electric heat pump; other built-in electric units which are permanently installed in the floors, walls, ceilings, or baseboards, and are a part of the electrical installation of the building; other means which include a floor, wall, or pipeless furnace; room heaters with flue or vent that burn gas, oil, or kerosene; nonportable room heaters without flue or vent that burn gas, oil, or kerosene; and fireplaces, stoves, or portable room heaters of any kind.

Historic resources – All areas, districts or sites containing properties listed on the Florida Master Site File, the National Register of Historic Places, or designated by a local government as historically, architecturally, or archaeologically significant.

Homeless family – A family that includes at least one parent or guardian and one child under the age of 18, a homeless pregnant woman, or a homeless person in the process of securing legal custody of a person under the age of 18.

Homeless individual – An unaccompanied youth (17 years or younger) or an adult (18 years or older) without children.

Homeless youth – An unaccompanied person 17 year of age or younger who is living in situations described by terms "sheltered" or "unsheltered".

Hurricane shelter – A structure designated by local officials as a place of safe refuge during a storm or hurricane.

Housing type – A building structure that includes single-family, multifamily, mobile home or trailer park.

Low income person or household – One or more natural persons or a household, not including students, whose total annual household income does not exceed 80 percent of the median annual adjusted gross income for households within the metropolitan statistical area (MSA).

Manufactured home – A mobile home fabricated on or after June 15, 1976, in an off-site manufacturing facility for installation or assembly at the building site, with each section bearing a seal certifying that it is built in compliance with the Federal Manufactured Home Construction and Safety Standard Act.

Mixed-Use Development – The practice of allowing more than one type of use in a development area. In land use and zoning terms, this can mean some combination of residential, commercial, industrial, office, institutional, or other uses.

Mobile home – A structure transportable in one or more sections, which is 8 body feet or more in width and which is built on an integral chassis and designed to be used as a dwelling when connected to the required utilities and includes the plumbing, heating, air-conditioning and electrical systems contained therein.

Moderate income person or household – One or more natural persons or a household, the total annual adjusted gross household income of which is less than 120 percent of the median annual adjusted gross income for households within the metropolitan statistical areas (MSA).

Monthly owner costs – The sum of payments for mortgages, deeds of trust, or similar debts on the property; real estate taxes; fire and hazard insurance on the property; utilities; and fuels.

NatureScape Broward – A strategy of landscaping that encourages the use of native plants to create Florida friendly green spaces that conserve water, protect water quality, and create wildlife habitat. Native species are uniquely adapted to south Florida and require little watering and are naturally resistant.

Overcrowded – Occupancy by more than 1.01 persons per room.

Relocation housing – Those dwellings which are made available to families displaced by public programs, provided that such dwellings are decent, safe and sanitary and within the financial means of the families or individuals displaced.

Resident population – Inhabitants counted in the same manner utilized by the U.S. Census, in the category of total population. Resident population does not include seasonal population.

Residential uses – Activities within land areas used predominantly for housing.

Seasonal Units – Those units used for part-time inhabitants who utilize, or may be expected to utilize, public facilities or services, but are not residents. Seasonal population shall include tourists, migrant farmworkers, and other short-term and long-term visitors.

Sense of Place – The term sense of place is defined in different ways by different people. Generally, it is a feeling or perception of the characteristics of a place that make it special or unique, feeling that foster a sense of authentic human attachment and belonging.

Smart Growth – Planning principles and issues that address the quality of life will be maintained for this and future generations of Broward County inhabitants.

Special residential facilities – A residential facility providing treatment, care, rehabilitation, or education. There are three categories of special residential facilities.

Category 1 is a housing facility which is licensed by the state of Florida for no more than eight (8) individuals who require treatment, care, rehabilitation, or education. The facility is usually referred to as a group home. Category 2 is defined as a housing facility which is licensed by the State of Florida for nine (9) to sixteen (16) nonelderly individuals who require treatment, care, rehabilitation or education. Category 3 is any housing facility licensed by the State of Florida for more than sixteen (16) nonelderly individuals who require treatment, care, rehabilitation or education. Including any not-for-profit housing facility for unrelated elderly individuals.

Substandard units – Housing units lacking complete plumbing facilities.

Substantial rehabilitation – The repair or restoration of a dwelling unit where the value of such repair or restoration exceeds 40 percent of the value of the dwelling.

Tenure – A housing unit that is either "owner-occupied" or "renter-occupied." A unit is "owner-occupied" if the owner or co-owner lives in the unit, even if it is mortgaged or not fully paid for. All other occupied units are classified as "renter-occupied," including units rented for cash rent and those occupied without payment of cash rent.

United States Green Building Council Leadership in Energy and Environmental Design (LEED) – Rating system for green building design requiring a minimum of twenty-six points for a minimum LEED certification. Points are received for meeting different design criteria and standards. Categories considered are: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design process.

Value – The respondent's estimate of how much the property (house and lot) would sell for if it were for sale.

Very low-income person or household – One or more natural persons or a household, not including students, the total annual adjusted gross household income of which does not exceed 50 percent of the median annual adjusted gross income for households within the MSA.

Workforce-Income Person – One or more natural persons or a family, not including students, that has a total annual anticipated income for the household that does not exceed 140 percent of the median annual income adjusted for family size for households within the county. While occupying a rental unit, a Workforce-Income

Person's annual anticipated gross income may increase to an amount not to exceed 140 percent of the applicable median income adjusted for family size.

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Housing

## INTRODUCTION

### A. General

The purpose of the Housing Element (HE) is to provide guidance on appropriate plans and policies to meet identified or projected deficits in the housing supply for moderate income, low income, and very low-income households, group homes, foster care facilities, and households with special housing needs. These plans and policies address government activities and provide direction and assistance to the efforts of the private sector. The HE Support Document provide the data and analysis used as the basis for the goal, objectives and policies included in the HE.

The supply of housing is controlled by many outside factors. The private sector and the market place are primarily responsible for the maintenance and development of the housing stock.

### B. Service Area

The HE service area varies depending on the program and agency under consideration. Based on the authorization of the State's local planning acts and the Broward County Charter, the Board designated the Broward County Planning Council as the local planning agency responsible for preparation of the future land use element for Broward County, as defined in the Charter. The Administrative Document authorizes Broward County, Planning and Development Management Division, to administer the County's comprehensive planning program.

The regulatory service area is generally confined to the Broward Municipal Services District (BMSD), formerly the Unincorporated Area; however, for some housing programs, municipalities may be included. The BMSD includes the following areas:

- Neighborhoods - Broadview Park, Central County (Roosevelt Gardens, Washington Park, Franklin Park, and Boulevard Gardens) and North County/Hillsboro Pines and Hillsboro Ranches.
- Regional facilities - Fort Lauderdale-Hollywood International Airport and landfill areas.
- Residential enclaves - including unincorporated parcels near the cities of Parkland and Sunrise.
- Other enclaves adjacent to the Seminole Tribal lands near Hollywood and Davie.
- Rights of Way - Florida's Turnpike interchanges at Cypress Creek Road and Sample Road, as well as the Pompano Service Complex, among others.

The planning service area is the BMSD and all 31 municipalities within Broward County.

## C. Planning Horizon

The planning period for this HE shall be 2023 for the short-term planning horizon and ~~2030~~ 2045 for the long-term planning horizon, in accordance with Florida Statute 163.3177(5)(a).

In addition to meeting the requirements of section 163.3177(6)(f), Florida Statutes, it is recommended that the Broward County Board of County Commission (Board) consider the following "best practices" when planning for the affordable housing needs:

- Identify the land requirements for the total estimated housing need, through the long-term planning period.
- Complete inventories of housing for underserved and very low-income populations, including rental developments using government subsidies, licensed group homes, and mobile home parks.
- Compare local housing characteristics with county and regional housing characteristics, analyze the area housing market and identify opportunities for affordable housing construction and/or redevelopment.
- Monitor housing construction activity.
- Analyze the housing need which can be met by the private, public and not-for-profit sectors, and the potential for collaboration among these groups.

- The HE policies recommend:
  - The creation and/or preservation of affordable housing for households with special housing needs, elder housing, and housing for the homeless;
  - Locating affordable housing near public transportation that provides access to employment centers and shopping;
  - The use of public and private funding sources for the construction and maintenance of affordable housing;
  - Energy efficient housing design and construction;
  - Creating a jobs-to-housing balance;
  - Encouraging economic development through housing construction, housing preservation, and supporting infrastructure; and
  - Integrating affordable housing, mixed-use development, and multi-modal transportation.

### D. Data Requirements

Data presented in the Housing Element Support Document is obtained from a variety of sources, including, but not limited to, the US Census; American Community Survey (ACS) 5-year averages; the Broward County Planning Council; The Shimberg Center for Affordable Housing (University of Florida); and Florida Housing Data Clearinghouse.

## II. DATA AND ANALYSIS

### A. Housing Characteristics: BMSD

Housing characteristics refer to the type, tenure, age, rent, value, monthly cost of owner-occupied units, rent to income ratio and cost to income ratio.

#### 1. Housing Type in the Broward Municipal Services District (BMSD)

Table H-1 shows the number and percentage of single-family, multiple-family, and mobile homes in ten year increments from 2007 to 2016. Single-family housing continues to be the predominant housing type in the BMSD, representing over 65.8 percent of the housing stock in 2016. Multiple family housing represents 29.3 percent of the housing stock, the majority of which are 3-4 unit apartments. Mobile homes

represent less than one percent of the BMSD housing stock; however, the number increased by 28 units between 2011 and 2016, as mobile homes are considered a more affordable housing option to some residents. The mobile home development in the BMSD, which represents 114 mobile homes, is limited to the Meadowbrook Mobile Home Community in the Broadview Park Census Designated Place (CDP). See Appendix H-D for a list of all licensed mobile home parks in Broward County.

## Table H-1: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Housing Type, 2011 & 2016

| Housing Type | Estimated Number of Units | | | Percentage of Total Units | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Single Family | 3,073 | 3,156 | 83 | 64.1% | 65.8% | 1.7% |
| Multifamily - Total | 1,628 | 1,407 | -221 | 34.0% | 29.3% | -4.6% |
| 2 units | 797 | 585 | -212 | 16.6% | 12.2% | -4.4% |
| 3 or 4 units | 503 | 675 | 172 | 10.5% | 14.1% | 3.6% |
| 5 or more units | 172 | 75 | -97 | 3.6% | 1.6% | -2.0% |
| Mobile Homes | 90 | 232 | 142 | 1.9% | 4.8% | 3.0% |
| Total | 4,791 | 4,795 | 4 | - | - | - |

Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

The table in Appendix H-B shows BMSD population, household, and dwelling unit estimates for years 2010, 2015, and projections every five years through 2045. All estimates and projections are sourced from the Broward County and Municipal Population Forecast and Allocation Model (PFAM) 2017. This model estimates that between 2020 and 2025, the BMSD neighborhoods will experience a population increase of about 11 percent. It also estimates that this population will grow by 30 percent between 2020 and 2045.

However, the number of persons per household in the BMSD will decrease from 2.96 in 2000 to 2.79 in 2045, a change of -6%. Population forecasts by age group for years 2016 through 2045, shown in Appendix H-C, indicate that the population of millennials (currently ages 20-39 years) represents a third of BMSD residents. The elderly population, those 65 years and older, constitutes about 11 percent of the total BMSD.

A decrease in the construction of new single family units between 2007 and 2016, as shown in Table H-32, could be the result of younger adults' preference for smaller living spaces (or micro-units) and the number of senior adults living without children. However, the building permit data did reflect 40 County-owned single family lots which were constructed in 2017 and/or are currently planned for development as affordable housing units.

## 2. Housing Tenure and Vacancy in the BMSD

Housing tenure refers to the occupancy of a unit, either owner-occupied or renter-occupied. Table H-2 displays the number and percentage of housing tenure for 2011 and 2016. In 2011, there were 4,791 total housing units, of which 85.9 percent are occupied and 14.1 percent are vacant. In 2016, there were 4,795 units, however the vacancy rate decreased to 8.9 percent. Owner-occupied housing represents 53 percent of the occupied housing units while renter-occupied housing represents 47 percent of the occupied housing units. However, renting has been on the rise, and between 2011 and 2016, the number of owner-occupied units decreased slightly and were replaced at the same rate by renter-occupied units.

## Table H-2: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Housing Tenure and Vacancy, 2011 & 2016

| Housing Tenure | Estimated Number of Units | | | Percentage of Total Units | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Owner-Occupied | 2,272 | 2,314 | 42 | *55.2% | *52.9% | -2.3% |
| Renter-Occupied | 1,843 | 2,057 | 214 | *44.8% | *47.1% | 2.3% |
| Total Occupied Units | 4,115 | 4,371 | 256 | 85.9% | 91.2% | 5.3% |
| Vacant units | 676 | 424 | -252 | 14.1% | 8.8% | -5.3% |
| Total units | 4,791 | 4,795 | 4 | - | - | - |

*Percent calculated as percentage of Total Occupied Units
Source: ACS five-year estimates, 2007-2011 & 2012-2016, Table DP04

Data generated from the updated 2016 Meridian Appraisal Group, Inc. Housing Supply & Demand Analysis Model, (i.e.., "the Housing Model," using data inputs from ACS 5-Year Estimates, 2012-2016: Tables DP04 and S2503, and 2016 Median Household Income of $60,900), shows that in 2016, the greatest number of owner units was in Broadview Park which also had the most occupied units of all six CDPs. The percentage of owner-occupied units was highest in the Hillsboro Pines CDP, located in North County, at 77 percent; however, this neighborhood also had a median household income of $77,361 and an owner-occupied median household income of $81,731, which were the highest in the BMSD.

The majority of BMSD renter-occupied households are located within the four Central County neighborhoods – Boulevard Gardens, Franklin Park, Roosevelt Gardens and Washington Park – and represent over 57 percent of all renter occupied units in the BMSD. The Franklin Park CDP had the lowest median household income and the highest percentage of renter-occupied housing (88 percent) within the BMSD; however, the median household income for renter-occupied units in Franklin Park was less than the median income for the entire neighborhood.

## 3. Housing Age - BMSD

Table H-3 illustrates the age of the housing stock in the BMSD in 2011 and 2016. According to the 2016 ACS, a total of 28.5 percent of the dwelling units were built after 1970, with a significant decrease in construction activity beginning in 2010. The most housing construction activity within the BMSD took place between 1950 and 1999, when 67.3 percent of the housing stock was constructed. Historically, older units have served as an important source of market rate affordable housing through a process known as filtering. However, this process relies on a balanced supply of units of varying ages, and the lack of new construction in the BMSD could prevent older units from filtering down. These numbers do not reflect an in-fill affordable housing project within the BMSD which includes the construction of new single family homes on 40 County-owned lots. A public-private partnership between the County and 10 local non-profits resulted in the conveyance of the parcels within the Boulevard Gardens, Franklin Park, Roosevelt Gardens and Washington Park neighborhoods. A portion of the homes were in various stages of construction by December 2017, and all 40 units should be completed in 2018.

### Table H-3 Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Year Structure Built, 2011 & 2016

| Year Structure Built | Estimated Number of Units | | | Percentage of Total Units | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Built 2010 to 2016* | - | 3 | - | - | 0.1% | - |
| Built 2000 to 2009 | 265 | 317 | 52 | 5.5% | 6.6% | 1.1% |
| Built 1990 to 1999 | 124 | 138 | 14 | 2.6% | 2.9% | 0.3% |
| Built 1980 to 1989 | 485 | 131 | -354 | 10.1% | 2.7% | -7.4% |
| Built 1970 to 1979 | 948 | 777 | -171 | 19.8% | 16.2% | -3.6% |
| Built 1960 to 1999 | 1,236 | 1,660 | 424 | 25.8% | 34.6% | 8.8% |
| Built 1950 to 1959 | 1,541 | 1,569 | 28 | 32.2% | 32.7% | 0.6% |
| Built 1940 – 1949 | 179 | 191 | 12 | 3.7% | 4.0% | 0.2% |
| Built 1939 or earlier | 13 | 9 | -4 | 0.3% | 0.2% | -0.1% |
| Total housing units | 4,791 | 4,795 | 4 | - | - | - |

*Estimate does not include new Franklin Park Estate homes constructed in late 2016/17

Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 4. Housing Value in the BMSD

Table H-4 shows the number and percent of the owner-occupied housing by housing value in 2016. The housing value category with the most homes was $150,000 to $199,999, with approximately 624 homes representing 27 percent of the housing inventory. The next largest category of housing value is the $100,000 to $149,999 with 565 units consisting of over 24 percent of the housing stock. Housing units which are worth $300,000 or more constitute approximately 4.5 percent of all housing.

### Table H-4: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Housing Value, 2011 & 2016

| Housing Value (owner occupied) | 2011 Estimated Total Number of Units | Percentage of Total | 2016 Estimated Total Number of Units | Percentage of Total |
|---|---|---|---|---|
| Less than $50,000 | 156 | 6.9% | 182 | 7.9% |
| $50,000 to $99,999 | 400 | 17.6% | 549 | 23.7% |
| $100,000 to $149,999 | 596 | 26.2% | 565 | 24.4% |
| $150,000 to $199,999 | 278 | 12.2% | 624 | 27.0% |
| $200,000 to $299,999 | 576 | 25.4% | 289 | 12.5% |
| $300,000 to $499,999 | 192 | 8.5% | 70 | 3.0% |
| $500.000 to $999,000 | 74 | 3.3% | 35 | 1.5% |
| Total (owner occupied) | 2272 | - | 2,314 | - |

Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

According to data generated by the 2016 Housing Model, the Franklin Park CDP had the lowest owner-occupied housing value at $86,300 compared to the Hillsboro Pines

CDP which was $415,600. The median household income for owner-occupied units in Hillsboro Pines was higher than the median household income for the entire Hillsboro Pines CDP. In Franklin Park, the median household income for renter occupied units was less than the CDP median household income.

## 5. Monthly Housing Rent in the BMSD

Table H-5 presents the amount of gross money paid for rental housing by category. There are 2,057 occupied rental housing units in the BMSD, with 76 percent of these units paying monthly rent amounts between $500 and $1,499. The largest housing rent category in 2016 is the $500 to $999 range, encompassing 823 units or 40 percent of the entire rental housing stock. The second largest monthly housing rent category is the $1,000 to $1,499 range with 738 units, or 35.9 percent of all occupied rental housing.

### Table H-5: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Monthly Housing Rent, 2011 & 2016

| Occupied Units Paying Rent | 2011 Estimated Number of Units | Percentage of Total Units | 2016 Estimated Number of Units | Percentage of Total Units |
|---|---|---|---|---|
| Less than $500 | 44 | 2.4% | 46 | 2.2% |
| $500 to $999 | 686 | 37.2% | 823 | 40.0% |
| $1,000 to $1,499 | 789 | 42.8% | 738 | 35.9% |
| $1,500 to $1,999 | N/A* | - | 311 | 15.1% |
| $2,000 to $2,499 | N/A* | - | 49 | 2.4% |
| $2,500 or more | N/A* | - | 0 | 0.0% |
| No rent paid | 133 | 7.2% | 90 | 4.4% |
| Total Occupied Units (Paying Rent & No Rent Paid) | 1843 | - | 2,057 | - |

*191 units are estimated at $1,500 or more, or approximately 10.4% of total occupied rental units for 2011. The majority of these units are likely within the $1,500-$1,999 range.
Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 6. Owner-Occupied Monthly Costs (With a Mortgage) in the BMSD

Table H-6 shows owner-occupied monthly housing costs in the BMSD for 1,600 homes with a mortgage in 2016. Approximately 43.2 percent of all owner-occupied housing had a monthly cost from $1,000 to $1,499, including a mortgage. The two next largest ranges are $1,500 to $1,999 and $500 to $999, or 30.2 percent and 14.4 percent, respectively.

were

Table H-6: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Owner-Occupied Monthly Costs (With a Mortgage), 2011 & 2016

| Owner-Occupied Monthly Cost | 2011 Estimated Number of Units | Percentage of Total Units | 2016 Estimated Number of Units | Percentage of Total Units |
|---|---|---|---|---|
| Less than $500 | 17 | 1.0% | 21 | 1.3% |
| $500 to $999 | 200 | 11.7% | 230 | 14.4% |
| $1,000 to $1,499 | 635 | 37.2% | 691 | 43.2% |
| $1,500 to $1,999 | 430 | 25.2% | 483 | 30.2% |
| $2,000 to $2,499 | N/A* | - | 112 | 7.0% |
| $2,500 to $2,999 | N/A* | - | 49 | 3.1% |
| $3,000 or more | N/A* | - | 14 | 0.9% |
| Total owner-occupied units monthly cost with a mortgage | 1706 | - | 1,600 | - |

*424 units are estimated at $2,000 or more, or approximately 24.9% of total owner-occupied units with a mortgage for 2011.

Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 7. Owner-Occupied Monthly Costs (Without a Mortgage) in the BMSD

Table H-7 presents the monthly costs of owner-occupied housing which is not mortgaged. The data reflects the monthly costs, which exclude a mortgage, of 714 homes which fall into this category. Over 50 percent of households without a mortgage pay up to $399 in monthly costs. The second highest percentage of owner-occupied households without a mortgage falls within the $400 to $599 category, while 3.1 percent pay $800 or more per month.

### Table H-7: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Owner-Occupied Monthly Costs (Without a Mortgage), 2011 & 2016

| Owner-Occupied Monthly Cost | 2011 Estimate of Total Units | Percentage of Total Units | 2016 Estimate of Total Units | Percentage of Total Units |
|---|---|---|---|---|
| Less than $250 | N/A* | - | 164 | 23.0% |
| $250 to $399 | N/A* | - | 249 | 34.9% |
| $400 to $599 | N/A** | - | 168 | 23.5% |
| $600 to $799 | N/A** | - | 111 | 15.5% |
| $800 or more | N/A** | - | 22 | 3.1% |
| Total owner-occupied units, monthly cost without a mortgage | 566 | - | 714 | - |

*271 units are estimated at less than $400, or approximately 47.9% of total owner-occupied units without a mortgage for 2011.

**295 units are estimated at $400 or more, or approximately 52.1% of total owner-occupied units without a mortgage for 2011.

Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 8. Monthly Owner Costs as Percentage of Household Income in the BMSD

Table H-8A displays the percentage of monthly income that residents of all owner-occupied units in the BMSD spent on housing in 2011 and 2016. The percentage of households spending 30 percent or more on housing decreased from 56.9 percent in 2011 to 31.1 percent in 2016, while the percentage spending less than 29.9% increased by 23.8 percent. The percentages are used as the standards to gauge the relative amount housing should cost in relation to other costs of living.

### Table H-8A: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Owner Costs as Percentage of Household Income, 2011 & 2016

| Owner Cost as Percentage of Household Income | Number of Households | | | Percentage of Total Households | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Less than 29.9 percent | 980 | 1,550 | 570 | 43.1% | 67.0% | 23.8% |
| 30.0 to 49.9 percent | 1,292** | 362 | N/A** | 56.9%** | 15.6% | N/A |
| 50.0 percent or more | N/A | 359 | N/A | N/A | 15.5% | N/A |
| Not computed | 0 | 43 | 43 | 0.0% | 1.9% | 1.9% |
| Total | 2,272 | 2,314 | 42 | – | – | – |

*All calculations include owner-occupied units with and without a mortgage

**2011 figure includes all owner-occupied housing at or above 30% cost as percentage of household income

Source: U.S. ACS, 2007-2011, 2012-2016 (B25074) 5-year averages

## 9. Monthly Renter-Occupied Costs as Percentage of Household Income in the BMSD

Monthly rent as a percentage of household income is the percentage of household income computed as a ratio of monthly gross rent to monthly household income (total household income divided by 12). The ratio is computed separately for each unit and is rounded to the nearest tenth. Units for which no rent is paid and units occupied by households that reported no income or a net loss comprise the category, "Not computed."

Table H-8B displays the number and percentage of monthly income residents of renter-occupied units spend on housing in 2011 and 2016. The percentages are standards used to gauge the relative amount housing should cost in relation to other costs of living. In 2011, 67.6 percent of all renters spent more than 30 percent on housing. This number increased in 2016, when 21 percent of renters spent 30 to 49.9 percent on housing and 45.1 percent spent more than 50 percent of their household income on housing costs. These numbers indicate that the majority of renters in Broward County are either cost burdened or severely cost burdened regarding housing expenses.

### Table H-8B: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), Monthly Gross Rent as Percentage of Household Income, 2011 & 2016

| Gross Rent as Percentage of Household Income | Number of Households | | | Percentage of Total Households | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Less than 29.9 percent | 465 | 580 | 115 | 25.2% | 28.2% | 3.0% |
| 30.0 to 49.9 percent | 1,245* | 432 | N/A* | 67.6%* | 21.0% | N/A |
| 50.0 percent or more | N/A | 927 | N/A | N/A | 45.1% | N/A |
| Not computed | 133 | 118 | -15 | 7.2% | 5.7% | -1.5% |
| Total | 1,843 | 2,057 | 214 | - | - | - |

*2011 figure includes all rental housing at or above 30% gross rent as percentage of household income.
Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table B25074 for years 2012-2016, Table DP04 for years 2007-2011.

## 10. Monthly Owner Costs to Income Ratio for Owner-Occupied Units in the BMSD

Table H-9 displays the owner cost to income ratio for owner-occupied housing within the BMSD. About 21 percent of owner-occupied households in the BMSD spend 30 percent or more of their income on housing. For lower wage earners that figure is much higher: 56.9 percent of households who earn less than $20,000 spend more than 30 percent more of their income on housing. For households who earn $35,000 to $49,999, over half (55 percent) of BMSD households spend that much on housing. Over 31 percent of households in the BMSD who earn less than $50,000 are severely cost-burdened.

### Table H-9: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), 12-Month Owner-Occupied Costs as Percentage of Household Income, 2012-2016

| Cost to Income Ratio | Less than $10,000 | | $10,000 to $19,999 | | $20,000 to $34,999 | | $35,000 to $49,999 | | $50,000 to $74,999 | | $75,000 to $99,999 | | $100,000 to $149,000 | | $150,000 or more | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % |
| less than 20 percent | 23 | 16% | 47 | 20% | 157 | 38% | 91 | 27% | 150 | 27% | 193 | 69% | 204 | 74% | 81 | 100% | 946 | 41% |
| 20.0 to 29.9 percent | 0 | 0% | 51 | 21% | 110 | 26% | 59 | 18% | 242 | 44% | 78 | 28% | 64 | 23% | 0 | 0% | 604 | 26% |
| 30.0 to 39.9 percent | 0 | 0% | 27 | 11% | 42 | 10% | 53 | 16% | 98 | 18% | 9 | 3% | 0 | 0% | 0 | 0% | 229 | 10% |
| 40.0 to 49.9 percent | 7 | 5% | 8 | 3% | 6 | 1% | 53 | 16% | 52 | 9% | 0 | 0% | 7 | 3% | 0 | 0% | 133 | 6% |
| 50.0 percent or more | 68 | 48% | 107 | 45% | 101 | 24% | 77 | 23% | 6 | 1% | 0 | 0% | 0 | 0% | 0 | 0% | 359 | 16% |
| not computed | 43 | 30% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 43 | 2% |
| Total | 141 | - | 240 | - | 416 | - | 333 | - | 548 | - | 280 | - | 275 | - | 81 | - | 2314 | - |

Data Source: ACS 5-Year Estimates, 2012-2016; Table B25095

## 11. Monthly Rent to Income Ratio for Renter-Occupied Housing Units in the BMSD

Table H-10 shows the gross rent to income ratio of renter-occupied households by income category. There are 2,057 renter occupied housing units in the BMSD. This total includes 435 households with incomes of less than $20,000 per year and-1,162 with incomes of $20,000 to $49,999. Most of the households in these income brackets spend more than 30% of their income on rent; 81.5 percent and 79.9 percent, respectively. In contrast, about 8 percent of households within the $50,000 to $74,999 income bracket are spending 30% percent or more of their income on rent. Nearly all – 98 percent – households within the $10,000-$19,000 income bracket spend fifty percent or more on rental housing costs.

### Table H-10: Selected Housing Characteristics in the Broward Municipal Services District (BMSD), 12-Month Gross Rent as Percentage of Household Income, 2012-2016

| Cost to Income Ratio | Less than $10,000 | | $10,000 to $19,999 | | $20,000 to $34,000 | | $35,000 to $49,999 | | $50,000 to $74,999 | | $75,000 to $99,999 | | $100,000 or more | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % |
| less than 20 percent | 0 | 0% | 0 | 0% | 34 | 5% | 8 | 2% | 105 | 34% | 101 | 92% | 14 | 33% | 262 | 13% |
| 20.0 to 29.9 percent | 0 | 0% | 0 | 0% | 16 | 2% | 144 | 31% | 149 | 49% | 9 | 8% | 0 | 0% | 318 | 15% |
| 30.0 to 39.9 percent | 0 | 0% | 7 | 2% | 136 | 19% | 115 | 25% | 24 | 8% | 0 | 0% | 0 | 0% | 282 | 14% |
| 40.0 to 49.9 percent | 5 | 3% | 0 | 0% | 119 | 17% | 26 | 6% | 0 | 0% | 0 | 0% | 0 | 0% | 150 | 7% |
| 50.0 percent or more | 118 | 78% | 277 | 98% | 399 | 57% | 133 | 29% | 0 | 0% | 0 | 0% | 0 | 0% | 927 | 45% |
| not computed | 28 | 19% | 0 | 0% | 0 | 0% | 32 | 7% | 29 | 9% | 0 | 0% | 29 | 67% | 118 | 6% |
| Total | 151 | - | 284 | - | 704 | - | 458 | - | 307 | - | 110 | - | 43 | - | 2057 | - |

Data Source: ACS 5-Year Estimates, 2012-2016; Table B25074

## B. Cost Burdened Households

Cost-burdened households pay more than 30 percent of income for rent or mortgage costs. Severely cost-burdened households spend more than 50 percent of income for rent or mortgage costs. Using household information extrapolated from Florida Housing Data Clearinghouse, Table H-11 below delineates the amount of income paid for housing by tenure for 2011-2016. The data suggests that 213,058 households in Broward County – about 42.8 percent – paid more than 30 percent of their income for housing. In addition, 1,327 households in the BMSD – about 44.4 percent – paid more than 30 percent of their income for housing.

### Table H-11: Selected Housing Characteristics, Amount of Income Paid for Housing, Household by Cost Burden, 2011-2016

| A. Owner-Occupied Households (HH), 2011-2016 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NO COST BURDEN | | COST BURDENED | | SEVERLY COST BURDENED | | | |
| | Paid 0% - 30% | | Paid 30% - 50% | | Paid 50% or more | | Total Owners | |
| | Number of HH* | Percentage of Total | Number of HH* | Percentage of Total | Number of HH* | Percentage of Total | Number of HH* | Percentage of Total |
| Broward County | 284,224 | 57.2% | 104,451 | 21.0% | 108,607 | 21.8% | 497,282 | 100% |
| BMSD | 1,664 | 55.6% | 613 | 20.5% | 714 | 23.9% | 2,991 | 100% |
| | | | | | | | | |
| B. Renter-Occupied Households, 2010-2014 | | | | | | | | |
| | Paid 0% - 30% | | Paid 30% - 50% | | Paid 50% or more | | Total Renters | |
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Broward County | 99,004 | 40.8% | 63,402 | 26.2% | 79,933 | 33.0% | 242,339 | 100% |
| BMSD | 918 | 42.1% | 541 | 24.8% | 721 | 33.1% | 2,180 | 100% |

Source: Shimberg Center for Affordable Housing, 2016

Appendix H-A shows the supply and demand for both owner-occupied and renter-occupied affordable housing units, based on ACS five-year estimates from 2012-2016, for the Broward Municipal Services District (BMSD) and each of its six CDPs. The data for owner-occupied units reveals a surplus of very low and low income units; however, there is a shortage of 256 moderate income units in the BMSD. However, this trend is reversed for the renter-occupied supply of affordable housing. The greatest deficit of renter-occupied units lies within the very low income category with a total shortage of

445 units. Each of the six CDPs in the BMSD experienced a deficit in this category except for Hillsboro Pines which had neither surplus nor deficit (0). The Broadview Park CDP showed the highest deficit of 181 very-low income rental units.

## C. Housing Characteristics: Broward County

Housing characteristics refers to the type, tenure, age, rent, value, monthly cost of owner-occupied units, rent to income ratio and cost to income ratio.

### 1. Housing Type

Table H-12 displays an estimate and percent of Broward County's housing inventory according to the 2007-2011 and 2012-2016 American Community Survey (ACS) 5-Year Estimates. During this time, Broward County's housing inventory increased by 7,660 units. The most significant increase occurred in the growth of duplex units at 67,946 units or in increase of .9 percent, followed by 5,616 single family units. All other housing types experienced a loss in the percentage of housing units, except for mobile homes which lost 53 units but did not result in a percentage change.

### Table H-12: Selected Housing Characteristics in Broward County, Housing Type, 2011 & 2016

| Housing Type | Estimated Number of Units | | | Percentage of Total Units | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Single Family | 332,144 | 337,760 | 5,616 | 41.0% | 41.3% | 0.3% |
| Multifamily - Total | 454,234 | 456,331 | 2,097 | 56.1% | 55.9% | -0.3% |
| Duplex | 63,615 | 67,946 | 4,331 | 14.0%* | 14.9%* | 0.9%* |
| 2 units | 23,281 | 20,849 | -2432 | 5.1%* | 4.6%* | -0.6%* |
| 3 or 4 units | 36,595 | 35,879 | -716 | 8.1%* | 7.9%* | -0.2%* |
| 5 or more units | 330,743 | 331,657 | 914 | 72.8%* | 72.7%* | -0.1%* |
| Mobile Homes/Other | 22,848 | 22,795 | -53 | 2.8% | 2.8% | 0.0% |
| Total Units | 809,226 | 816,886 | 7,660 | - | - | - |

*Percent calculated as percentage of total multifamily units.

Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 2. Housing Tenure and Vacancy in Broward County

Table H-13 displays an estimate and percent of Broward County's owner- and renter-occupied housing units according to the 2007-2011 and 2012-2016 American Community Survey (ACS) 5-Year Estimates. Housing tenure refers to the occupancy of a unit, either owner-occupied or renter occupied. In 2016, 62.8 percent of households in Broward County were owner-occupied, representing a decrease since 2011 of 41,065 units or -5.4 percent. During this same time, renter-occupied units gained this same percentage of households with an increase of 39,016 units. Broward County experienced a slight decrease of .2 percent between 2011 and 2016 in the County's housing vacancy rate.

### Table H-13: Selected Housing Characteristics in Broward County, Housing Tenure and Vacancy, 2011 & 2016

| Housing Tenure | Number of Housing Units | | | Percentage of Total | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Owner-Occupied | 453,419 | 422,354 | -31,065 | 68.2% | 62.8% | -5.4% |
| Renter-Occupied | 211,618 | 250,634 | 39,016 | 31.8% | 37.2% | 5.4% |
| Total Occupied Units | 665,037 | 672,988 | 7,951 | 82.2% | 82.4% | 0.2% |
| Vacant units | 144,189 | 143,898 | -291 | 17.8% | 17.6% | -0.2% |
| Total units | 809,226 | 816,886 | 7,660 | - | - | - |

*Percent calculated as percentage of Total Occupied Units.

Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 3. Housing Age – Broward County

Table H-14 presents the number of dwelling units in Broward County in 2016 and the construction date, shown in ten-year increments. The table shows that slightly more than half (52 percent) of Broward County's housing stock was built prior to 1979. The 1970s experienced the highest housing construction rate and accounts for 26 percent of all dwelling units. New housing construction dropped by eight percent in the 1980s and continued to decline over subsequent decades. The percentage of newer housing construction – built since 2010 – represents about one percent of total dwelling units. This subdued level of new construction could increase the demand for older housing units and incentivizes for remodeling. A lack of new construction can impact older properties, which have historically been a source of affordability, making them more expensive to potential homeowners and renters.

### Table H-14: Selected Housing Characteristics in Broward County, Year Structure Built, 2016

| Year Structure Built | Estimated Number of Housing Units | Percentage of Total Housing Units |
|---|---|---|
| Built 2010 to 2016 | 9,988 | 1% |
| Built 2000 to 2009 | 91,980 | 11% |
| Built 1990 to 1999 | 132,505 | 16% |
| Built 1980 to 1989 | 150,095 | 18% |
| Built 1970 to 1979 | 215,383 | 26% |
| Built 1960 to 1969 | 126,753 | 16% |
| Built 1950 to 1959 | 74,439 | 9% |
| Built 1940 – 1949 | 9,305 | 1% |
| Built 1939 or earlier | 6,438 | 1% |
| Total housing units | 816,886 | - |

Data Source: ACS 5-Year Estimates, 2012-2016; Table DP04

## 4. Housing Value – Broward County

Table H-15 compares Broward County's housing value in 2011 and 2016 as shown in the American Community Survey (ACS) 5-year averages. In 2016, over 30 percent of owner-occupied homes were valued at $300,000 or higher, and 10 percent of homes were valued at over $500,000. The ACS data indicates that the value of about half of Broward County's housing stock falls short of the median value of $202,300. According to US News and World Report (September 2017), the Great Recession technically began in December 2007 and ended in June 2009. However, many Americans were still dealing with the effects well into 2012 and 2013, particularly from the housing market crash of 2007. The median value of the County's housing stock decreased by $23,000 (10 percent) between 2011 and 2016.

### Table H-15: Selected Housing Characteristics in Broward County, Housing Value, 2011 & 2016

| Housing Value (owner-occupied) | 2011 Estimated Number of Units | Percentage of Total Units | 2016 Estimated Number of Units | Percentage of Total Units |
|---|---|---|---|---|
| Less than $50,000 | 27,156 | 6.0% | 35,803 | 8.5% |
| $50,000 to $99,999 | 53,484 | 11.8% | 58,947 | 14.0% |
| $100,000 to $149,999 | 54,005 | 11.9% | 55,420 | 13.1% |
| $150,000 to $199,999 | 63,673 | 14.0% | 58,932 | 14.0% |
| $200,000 to $299,999 | 101,941 | 22.5% | 83,730 | 19.8% |
| $300,000 to $499,999 | 102,127 | 22.5% | 86,386 | 20.5% |
| $500,000 to $999,000 | 41,420 | 9.1% | 34,264 | 8.1% |
| $1,000,000 or more | 9,613 | 2.1% | 8,872 | 2.1% |
| Total (owner-occupied) units | 453,419 | - | 422,354 | - |
| Median value | $225,300 | - | $202,300 | - |

Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 5. Monthly Housing Rent in Broward County

Table H-16 shows estimates of gross rent paid for renter-occupied housing units in 2016. There were 250,634 occupied rental housing units in Broward County. Forty percent of the entire rental housing stock (99,200 units) fell in the range of $1,000 to $1,499 per month. The second largest monthly housing rent category was $500 to $999 representing 25.1% (62,973 units). Almost 20% of rental units were in the $1,500 to $1999 range. All remaining rent category represents less than 15 percent of the total. The median gross rent in 2016 was $1,226 which signifies a 6 percent increase since 2011.

### Table H-16: Selected Housing Characteristics in Broward County, Monthly Housing Rent, 2011 & 2016

| Occupied Units Paying Rent | 2011 Estimated Number of Units | Percentage of Total Units | 2016 Estimated Number of Units | Percentage of Total Units |
|---|---|---|---|---|
| Less than $500 | 7,970 | 3.8% | 7,582 | 3.0% |
| $500 to $999 | 60,467 | 28.6% | 62,973 | 25.1% |
| $1,000 to $1,499 | 85,177 | 40.3% | 99,200 | 39.6% |
| $1,500 to $1,999 | 48,575* | 23.0% | 47,467 | 18.9% |
| $2,000 to $2,499 | N/A | - | 15,185 | 6.1% |
| $2,500 to $2,999 | N/A | - | 5,068 | 2.0% |
| $3,000 or more | N/A | - | 4,727 | 1.9% |
| No rent paid | 9,429 | 4.5% | 8,432 | 3.4% |
| Total units (paying rent & no rent paid) | 211,618 | - | 250,634 | - |
| Median rent | $1,162 | - | $1,226 | - |

*2011 Estimate includes all units paying rent $1,500 or more.

**Data Source:** ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 6. Monthly Owner-Occupied Costs (with a Mortgage) in Broward County

Table H-17 displays the monthly costs of owner-occupied mortgaged dwelling units within Broward County in 2011 and 2016. Between these years, the total number of owner-occupied units with a mortgage decreased by 49,964 units (16%). During that same time, the median monthly cost decreased by over $200. Nearly half (47.3%) of these households experienced a monthly owner cost ranging from $1,000 to $1,999. Only 1.2 percent of the households paid $500 or less in housing costs in 2016.

## Table H-17: Selected Housing Characteristics in Broward County, Owner-Occupied Monthly Costs (With a Mortgage), 2011 & 2016

| Owner-Occupied Monthly Cost | 2011 Estimate of Total Units | Percentage of Total Units | 2016 Estimate of Total Units | Percentage of Total Units |
|---|---|---|---|---|
| Less than $500 | 2,404 | 0.7% | 3,160 | 1.2% |
| $500 to $999 | 31,925 | 9.9% | 34,416 | 12.6% |
| $1,000 to $1,499 | 65,031 | 20.2% | 67,016 | 24.6% |
| $1,500 to $1,999 | 68,955 | 21.4% | 61,780 | 22.7% |
| $2,000 to $2,499 | N/A* | - | 42,710 | 15.7% |
| $2,500 to $2,999 | N/A* | - | 25,693 | 9.4% |
| $3,000 or more | N/A* | - | 37,470 | 13.8% |
| Total owner-occupied monthly cost with a mortgage | 322,209 | - | 272,245 | - |
| Median cost | $1,946 | - | $1,735 | - |

*153,894 units are estimated at $2,000 or more, or approximately 47.8% of total owner-occupied units with a mortgage for 2011.

Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 7. Owner-Occupied Monthly Costs (Without a Mortgage) in Broward County

Table H-18 shows owner-occupied monthly costs for homes without a mortgage in Broward County in 2011 and 2016. During this period, the total number of owner-occupied units without a mortgage decreased by 14 percent (18,899 units). During that same time, the median monthly cost decreased slightly by $5 to $577 (2016). Over half (51.5%) of these households paid between $400 to $799 monthly, and almost one-third (30.9%) paid $400 to $599 in monthly rent.

### Table H-18: Selected Housing Characteristics in Broward County, Owner-Occupied Monthly Costs (Without a Mortgage), 2011 & 2016

| Owner-Occupied Monthly Cost | 2011 Estimated Number of Units | Percentage of Total | 2016 Estimated Number of Units | Percentage of Total |
|---|---|---|---|---|
| Less than $250 | N/A* | - | 10,540 | 7.0% |
| $250 to $399 | N/A* | - | 23,484 | 15.6% |
| $400 to $599 | N/A** | - | 46,328 | 30.9% |
| $600 to $799 | N/A** | - | 30,857 | 20.6% |
| $800 to $999 | N/A** | - | 15,651 | 10.4% |
| $1000 or more | N/A** | | 23,249 | 15.5% |
| Total owner-occupied units monthly cost without a mortgage | 131,210 | - | 150,109 | - |
| Median cost | $582 | - | $577 | - |

*27,448 units are estimated at less than $400, or approximately 20.9% of total owner-occupied units without a mortgage for 2011.
**103,762 units are estimated at $400 or more, or approximately 79.1% of total owner-occupied units without a mortgage for 2011.
Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

## 8. Owner Costs as Percentage of Household Income in Broward County

Table H-19A displays owner costs as a percentage of household income for Broward County. In 2016, more than a third (36%) of owner households are considered cost-burdened since they paid over 30 percent of their income towards housing. Seventeen percent of household are cost-burdened, paying more than half, of their household income on housing costs. Between 2011 and 2016, the number owner households paying less than 30 percent of their income for monthly household expenses increased by 12 percent. However, the 2011 data aggregates all units paying 30 percent or more into a single category, so no additional breakdowns are provided (i.e., 50 percent or more). Although it appears that the number of cost-burdened owner households is decreasing, the actual number of total owner units decreased between 2012 and 2016 as more Broward households are renting.

### Table H-19A: Selected Housing Characteristics in Broward County, Owner Costs as Percentage of Household Income, 2011 & 2016

| Owner Cost as Percentage of Household Income* | Number of Owner-Occupied Units | | | Percentage of Total Units | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Less than 29.9 percent | 233,587 | 261,558 | 27,971 | 51.5% | 61.9% | 12% |
| 30.0 to 49.9 percent | 214,223** | 83,709 | N/A** | 47.2%** | 19.8% | N/A |
| 50.0 percent or more | N/A | 70,890 | N/A | N/A | 16.8% | N/A |
| Not computed | 5,609 | 6,197 | 588 | 1.2% | 1.5% | 0.2% |
| Total owner units | 453,419 | 422,354 | -31,065 | - | - | -7% |

*All calculations include owner-occupied units with and without a mortgage.
**2011 figure includes all owner-occupied housing at or above 30% cost as percentage of household income.
Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table B25095 for years 2012-2016, Table DP04 for years 2007-2011

## 9. Monthly Renter Costs as a Percentage of Household Income in Broward County

Table H-19B displays monthly renter costs as a percentage of household income for Broward County. Between 2011 and 2016 number of owners who were not cost burdened (paying less than 29.9 percent of their income for monthly household expenses) slightly decreased by 1.3 percent but remained at a little over one-third of total owners. During this period, the cost burdened renter households (paying more than 30 percent of their income for housing costs) increased by 21,000 units (14.2%). At the same time, Broward County's monthly rent costs increased by six percent to $1,226 (see Table H-16). In 2016, 40 percent of the rental stock fell within the housing rent range of $1,000 to $1,499 (99,200 units).

### Table H-19B: Selected Housing Characteristics in Broward County, Gross Rent as Percentage of Household Income, 2011 & 2016

| Gross Rent as Percentage of Household Income | Number of Renter-Occupied Units | | | Percentage of Total Units | | |
|---|---|---|---|---|---|---|
| | 2011 | 2016 | Change | 2011 | 2016 | Change |
| Less than 29.9 percent | 74,859 | 91,972 | 17,113 | 35.4% | 36.7% | 1.3% |
| 30.0 to 49.9 percent | 123603* | 68,220 | N/A* | 58.4%* | 27.2% | N/A |
| 50.0 percent or more | N/A | 75902 | N/A | N/A | 30.3% | N/A |
| Not computed | 13,156 | 14,540 | 1,384 | 6.2% | 5.8% | -0.4% |
| Total | 211,618 | 250,634 | 39,016 | - | - | - |

*2011 figure includes all rental housing at or above 30% gross rent as percentage of household income.

Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table B25074 for years 2012-2016, Table DP04 for years 2007-2011

## 10. Monthly Owner Costs to Income Ratio for Owner-Occupied Units in Broward County

Table H-20 presents the monthly owner costs to income ratio for owner occupied housing units by income category. In 2016, about 77 percent of the 56,674 owner occupied households in Broward County with incomes of less than $20,000 per year were paying 30 percent or more of their yearly income on housing costs and 58 percent were paying more than 50 percent. Of those households with incomes ranging from $20,000 to $34,999 about 61 percent paid 30 percent or more of annual household income for rental costs and 33 percent of this income range paid 50 percent or more for housing. In contrast, owner-occupied households with an annual income of $50,000 or more were less cost burdened with 19 percent paying 30 percent or more on housing and 4 percent paying 50 percent or more.

### Table H-20: Selected Housing Characteristics in Broward County, 12-Month Owner-Occupied Costs as Percentage of Household Income, 2012-2016

| Cost to Income Ratio | Less than $10,000 | | $10,000 to $19,999 | | $20,000 to $34,999 | | $35,000 to $49,999 | | $50,000 to $74,999 | | $75,000 to $99,999 | | $100,000 to $149,000 | | $150,000 or more | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % |
| less than 20 percent | 117 | 1% | 2,357 | 7% | 10,164 | 19% | 15,730 | 30% | 28,308 | 37% | 24,175 | 44% | 38,370 | 57% | 49,218 | 80% | 168,439 | 40% |
| 20.0 to 29.9 percent | 309 | 2% | 4,252 | 12% | 11,126 | 20% | 10,125 | 19% | 18,909 | 25% | 17,677 | 32% | 20,835 | 31% | 9,886 | 16% | 93,119 | 22% |
| 30.0 to 39.9 percent | 249 | 1% | 5,848 | 16% | 8,415 | 15% | 9,182 | 18% | 14,737 | 19% | 8,044 | 15% | 5,368 | 8% | 1,699 | 2% | 53,542 | 13% |
| 40.0 to 49.9 percent | 517 | 2% | 4,083 | 11% | 7,183 | 13% | 6,347 | 12% | 7,174 | 10% | 2,675 | 5% | 1,774 | 3% | 414 | 1% | 30,167 | 7% |
| 50.0 percent or more | 13,327 | 64% | 19,418 | 54% | 17,771 | 33% | 10,802 | 21% | 6,495 | 9% | 2,027 | 4% | 831 | 1% | 219 | 1% | 70,890 | 17% |
| not computed | 6,197 | 30% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 6,197 | 1% |
| Total | 20,716 | - | 35,958 | - | 54,659 | - | 52,186 | - | 75,623 | - | 54,598 | - | 67,178 | - | 61,436 | - | 422,354 | - |

Source: ACS 5-Year Estimates, 2012-2016; Table B25095

## 11. Rent to Income Ratio for Renter-Occupied Housing Units in Broward County

Table H-21 presents the rent to income ratio for renter occupied housing units by income category. In 2016, about 48 percent of the 59,356 households with incomes of less than $20,000 per year were paying 30 percent or more of their yearly income on housing costs and 77 percent were paying more than 50 percent. A significant number of households with incomes ranging from $20,000 to $34,999 (91 percent) paid 30 percent or more of annual household income for rental costs and 47 percent of this income range paid 50 percent or more for housing. On the flip side, households with an annual income of $50,000 or more were less cost burdened with 20 percent paying 30 percent or more on housing and 8 percent paying 50 percent or more.

### Table H-21: Selected Housing Characteristics in Broward County, Rent to Income Ratio for Renter-Occupied Housing Units, 2012-2016

| Cost to Income Ratio | Less than $10,000 | | $10,000 to $19,999 | | $20,000 to $34,999 | | $35,000 to $49,999 | | $50,000 to $74,999 | | $75,000 to $99,999 | | $100,000 or more | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % | Est. | % |
| less than 20 percent | 19 | 1 | 389 | 1 | 637 | 1 | 803 | 2 | 6,924 | 15 | 8,116 | 35 | 18,485 | 69 | 35,373 | 14 |
| 20.0 to 29.9 percent | 647 | 3 | 1,056 | 3 | 2,198 | 4 | 12,453 | 28 | 22,131 | 48 | 11,677 | 50 | 6,437 | 24 | 54,401 | 22 |
| 30.0 to 39.9 percent | 743 | 3 | 1,271 | 4 | 9,628 | 19 | 15,181 | 35 | 11,117 | 24 | 2,294 | 10 | 1,026 | 3 | 41,260 | 17 |
| 40.0 to 49.9 percent | 299 | 1 | 1,465 | 4 | 12,856 | 25 | 8,248 | 19 | 3,215 | 8 | 581 | 2 | 296 | 1 | 26,960 | 11 |
| 50.0 percent or more | 15,810 | 62 | 28,378 | 83 | 24,265 | 47 | 5,870 | 13 | 1,384 | 3 | 138 | 1 | 57 | 1 | 75,902 | 30 |
| not computed | 7,790 | 30 | 1,489 | 5 | 1,776 | 4 | 1,196 | 3 | 1,114 | 2 | 532 | 2 | 643 | 2 | 14,540 | 6 |
| **Total** | 25,308 | - | 34,048 | - | 51,360 | - | 43,751 | - | 45,885 | - | 23,228 | - | 26,944 | - | 248,436 | - |

Source: 2012-2016 ACS 5-year averages; B25074

# D. Housing Characteristics Comparison

This section compares the Broward Municipal Services District (BMSD) housing stock characteristics with the housing stock characteristics for all of Broward County.

## 1. Housing Type

Table H-22 exhibits Broward County housing types side by side with those in the BMSD. The BMSD contains 3,156 single family homes which make up the majority of all housing at 65.8 percent. In contrast, single family units in Broward County represent only 41.3 percent of its housing stock. The largest amount of multifamily housing in the BMSD has 2-4 units which represents 26 percent of the total multifamily housing stock. In Broward County, multifamily housing makes up 55.9 percent of the County's housing stock with the majority (72.7 percent) having 5 or more units. The number of mobile homes is significantly different in the BMSD versus the County with 232 and 795 units, respectively; however, mobile homes comprise less than 5 percent of the total housing stock in both the BMSD and Broward County.

### Table H-22: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Housing Type, 2012-2016

| Housing Type | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimated Units | Percentage of Total | Estimated Units | Percentage of Total |
| Single Family | 337,760 | 41.3% | 3,156 | 65.8% |
| Multifamily - Total | 456,331 | 55.9% | 1,407 | 29.3% |
| duplex | 67,946 | 14.9%* | 72 | 5.1%* |
| 2 units | 20,849 | 4.6%* | 585 | 41.6%* |
| 3 or 4 units | 35,879 | 7.9%* | 675 | 48.0%* |
| 5 or more units | 331,657 | 72.7%* | 75 | 5.3%* |
| Mobile Homes/Other | 22,795 | 2.8% | 232 | 4.8% |
| Total units | 816,886 | - | 4,795 | - |

*Percent calculated as percentage of total multifamily units.
Data Source: ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04

The table in Appendix H-B shows population, household, and dwelling unit estimates for years 2010 and 2015, and projections through 2045. All estimates and projections

are sourced from the Broward County and Municipal Population Forecast and Allocation Model (PFAM) 2017. The table in Appendix H-C indicates that, between 2015 and 2045, the BMSD neighborhoods will experience a population increase of 7,900 or about 35 percent. However, the number of persons per household will decrease from 3.11 to 2.79. The decrease in household size also correlates with the decrease in the construction of new single family units as shown in Tables H32 and H33. This could be attributed to a growing senior population and adults without dependent children.

## 2. Housing Tenure and Vacancy

According to the 2016 ACS figures shown on Table H-23, approximately 63 percent of the existing housing units in Broward County were owner-occupied compared to 53 percent in the BMSD. In addition, Broward County has an overall housing vacancy rate of 18 percent compared to 9 percent in the BMSD.

### Table H-23: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Housing Tenure and Vacancy, 2012-2016

| Housing Tenure | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimated Units | Percentage of Total | Estimated Units | Percentage of Total |
| Owner-Occupied | 422,354 | 62.8%* | 2,314 | 52.9%* |
| Renter-Occupied | 250,634 | 37.2%* | 2,057 | 47.1%* |
| Total Occupied Units | 672,988 | 82.4% | 4,371 | 91.2% |
| Vacant units | 143,898 | 17.6% | 424 | 8.8% |
| Total units | 816,886 | - | 4,795 | - |

*Percent calculated as percentage of Total Occupied Units.

Data Source: ACS 5-Year Estimates, 2012-2016; Table DP04

## 3. Housing Age

Table H-24 represents an estimate and percentage change in the age of housing in ten-year increments for Broward County and the BMSD, as of the 2016 ACS. The greatest number of housing units in the BMSD were constructed between 1950 and 1979 which represents 89 percent of the total BMSD housing stock. In Broward County, only 51 percent of the housing units were constructed during that same time. A review of housing constructed after 1980 shows that only 13 percent were constructed in the BMSD compared to 47 percent in Broward County during this time period. These numbers show a much older housing stock in the BMSD compared to the County. A total of 320 units were constructed in the BMSD after 2000 compared to 101,968 units in Broward County.

### Table H-24: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Year Structure Built, 2012-2016

| Year Structure Built | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimated Units | Percentage of Total (%) | Estimated Units | Percentage of Total (%) |
| Built 2010 to 2016 | 9,988 | 1.2 | 3 | 0.5 |
| Built 2000 to 2009 | 91,980 | 11.3 | 317 | 6.8 |
| Built 1990 to 1999 | 132,505 | 16.2 | 138 | 2.9 |
| Built 1980 to 1989 | 150,095 | 18.4 | 131 | 2.8 |
| Built 1970 to 1979 | 215,383 | 26.4 | 777 | 16.0 |
| Built 1960 to 1969 | 126,753 | 15.5 | 1,660 | 35.4 |
| Built 1950 to 1959 | 74,439 | 9.1 | 1,569 | 33.5 |
| Built 1940 to 1949 | 9,305 | 1.1 | 74 | 1.6 |
| Built 1939 or earlier | 6,438 | 0.8 | 9 | 0.5 |
| Total units | 816,886 | 100.0 | 4,678 | 100.0 |

Source: 2012-2016 ACS 5-year averages

## 4. Housing Value

Table H-25 illustrates a comparison estimate and percentage of housing by housing value for Broward County and the BMSD. These figures indicate a higher housing value countywide compared to the BMSD. According to the 2016 ACS, the dominant housing value in the BMSD was $150,000 to $199,999 (27 percent of the units). The $300,000 to $499,999 range was most prominent in Broward County which represented 20.5 of the County's housing stock.

### Table H-25: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Housing Value, 2012-2016

| Housing Value (owner-occupied) | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimated Units | Percentage of Total | Estimated Units | Percentage of Total |
| Less than $50,000 | 35,803 | 8.5% | 182 | 7.9% |
| $50,000 to $99,999 | 58,947 | 14.0% | 549 | 23.7% |
| $100,000 to $149,999 | 55,420 | 13.1% | 565 | 24.4% |
| $150,000 to $199,999 | 58,932 | 14.0% | 624 | 27.0% |
| $200,000 to $299,999 | 83,730 | 19.8% | 289 | 12.5% |
| $300,000 to $499,999 | 86,386 | 20.5% | 70 | 3.0% |
| $500,000 to $999,000 | 34,264 | 8.1% | 35 | 1.5% |
| $1,000,000 or more | 8,872 | 2.1% | 0 | 0.0% |
| Total (owner occupied) units | 422,354 | - | 2,314 | - |
| Median value | $202,300 | - | N/A | - |

Data Source: ACS 5-Year Estimates, 2012-2016; Table DP04

## 5. Monthly Housing Rent

Table H-26 compares the monthly gross rents for specified renter-occupied housing units in Broward County and the BMSD as of 2016. In Broward County, 83.6 percent of rental units cost less than $1,499 a month, while in the BMSD, 78.1 percent of households have a monthly rent of $1,499 or less. A small number of households pay more than $2,000 per month, representing only 10 percent in Broward County and 2.4 percent in the BMSD. There was a much higher number of units who did not pay any rent in Broward County compared to the BMSD at 8,432 and 90, units, respectively.

### Table H-26: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Monthly Housing Rent, 2012-2016

| Occupied Units Paying Rent | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimated Units | Percentage of Total | Estimated Units | Percentage of Total |
| Less than $500 | 7,582 | 3.0% | 46 | 2.2% |
| $500 to $999 | 62,973 | 25.1% | 823 | 40.0% |
| $1,000 to $1,499 | 99,200 | 39.6% | 738 | 35.9% |
| $1,500 to $1,999 | 47,467 | 18.9% | 311 | 15.1% |
| $2,000 to $2,499 | 15,185 | 6.1% | 49 | 2.4% |
| $2,500 to $2,999 | 5,068 | 2.0% | 0 | 0.0% |
| $3,000 or more | 4,727 | 1.9% | 0 | 0.0% |
| No rent paid | 8,432 | 3.4% | 90 | 4.4% |
| Total units: paying rent & no rent paid | 250,634 | - | 2,057 | - |
| Median rent | $1,226 | - | N/A | - |

Data Source: U.S. ACS, 2012-2016, Selected Housing Characteristics (DP04), 5 Year Estimates

## 6. Monthly Owner-Occupied Monthly Housing Costs (With a Mortgage)

Table H-27 displays owner-occupied monthly costs for those homes which are mortgaged. The median cost for an owner-occupied mortgaged home in Broward County is $1,735. The data indicates the cost of owning a mortgaged home in Broward County is higher than in the BMSD. There were 37,470 units in Broward County paying more than $3,000 a month on housing costs versus only 14 units in the BMSD. In both Broward County and the BMSD, most units paid between $1,000 to $1,999 per month in housing costs, representing 47.3 percent and 73.4 percent, respectively.

### Table H-27: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Owner-Occupied Monthly Costs (With a Mortgage), 2012-2016

| Owner-Occupied Monthly Cost | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimated Units | Percentage of Total | Estimated Units | Percentage of Total |
| Less than $500 | 3,160 | 1.2% | 21 | 1.3% |
| $500 to $999 | 34,416 | 12.6% | 230 | 14.4% |
| $1,000 to $1,499 | 67,016 | 24.6% | 691 | 43.2% |
| $1,500 to $1,999 | 61,780 | 22.7% | 483 | 30.2% |
| $2,000 to $2,499 | 42,710 | 15.7% | 112 | 7.0% |
| $2,500 to $2,999 | 25,693 | 9.4% | 49 | 3.1% |
| $3,000 or more | 37,470 | 13.8% | 14 | 0.9% |
| Total units: owner-occupied monthly cost with a mortgage | 272,245 | - | 1,600 | - |
| Median cost | $1,735 | - | N/A | - |

Source: U.S. ACS, 2012-2016, Selected Housing Characteristics (DP04), 5 Year Estimates

## 7. Monthly Owner-Occupied Housing Costs (Without A Mortgage)

Table H-28 presents data regarding monthly owner-occupied costs for homes which are not mortgaged in Broward County and the BMSD. The number of homes which meet this criterion equal 150,109 in Broward County and 714 in the BMSD. In Broward County, the largest amount (30.9 percent) of households pay $400 or more a month in housing costs. In the BMSD, the highest number of households have a monthly housing cost of $250-$300. are within the $400 or more category.

### Table H-28: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Owner-Occupied Monthly Costs (Without a Mortgage), 2012-2016

| Owner-Occupied Monthly Cost | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimated Units | Percentage of Total | Estimated Units | Percent |
| Less than $250 | 10,540 | 7.0% | 164 | 23.0% |
| $250 to $399 | 23,484 | 15.6% | 249 | 34.9% |
| $400 to $599 | 46,328 | 30.9% | 168 | 23.5% |
| $600 to $799 | 30,857 | 20.6% | 111 | 15.5% |
| $800 to $999 | 15,651 | 10.4% | 7 | 1.0% |
| $1000 or more | 23,249 | 15.5% | 15 | 2.1% |
| Total units: owner-occupied without a mortgage | 150,109 | - | 714 | - |
| Median cost | $577 | - | N/A | - |

Source: U.S. ACS 2012-2016, Selected Housing Characteristics (DP04), 5 Year Estimates

## 8. Monthly Owner-Occupied and Renter Occupied Costs as a Percentage of Income

Tables H-29A and H-29B present the cost of housing relative to income for owner-occupied and renter occupied housing units. The standard cost for housing is given as a rent/income or cost/income ratio. A ratio higher than 30 percent indicates a need for lower-cost housing, especially for very low, low, and moderate-income families who have less disposable income to purchase other essential items such as food, clothing, and health care.

A greater percentage of households countywide – 36.6 percent – were either cost burdened or severely cost burdened, compared to 31.1 percent of households in the BMSD. However, this trend is reversed when examining the gross monthly renter costs for both areas. The percentage of those households paying monthly rent amounts exceeding 30 percent of household income is 57.5 percent in Broward County and 66.1 percent in the BMSD. This data suggests that higher cost burden is being placed on rental households in Broward County municipalities and the BMSD.

### Table H-29A: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Owner Costs as Percentage of Household Income, 2012-2016

| Owner Cost as Percentage of Household Income* | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimated Units | Percentage of Total | Estimated Units | Percentage of Total |
| Less than 29.9 percent | 261,558 | 61.9% | 1,550 | 67.0% |
| 30.0 to 49.9 percent | 83,709 | 19.8% | 362 | 15.6% |
| 50.0 percent or more | 70,890 | 16.8% | 359 | 15.5% |
| Not computed | 6,197 | 1.5% | 43 | 1.9% |
| Total units | 422,354 | - | 2,314 | - |

*All calculations include owner-occupied units with and without a mortgage.
Data Source: ACS 5-Year Estimates, 2012-2016; Table B25095

## Table H-29B: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Gross Rent as Percentage of Household Income, 2012-2016

| Gross Rent as Percentage of Household Income | # Units in Broward County | | # Units in BMSD | |
|---|---|---|---|---|
| | Estimate | Percent | Estimate | Percent |
| Less than 29.9 percent | 91,972 | 36.7% | 580 | 28.2% |
| 30.0 to 49.9 percent | 68,220 | 27.2% | 432 | 21.0% |
| 50.0 percent or more | 75,902 | 30.3% | 927 | 45.1% |
| Not computed | 14,540 | 5.8% | 118 | 5.7% |
| Total units | 250,634 | - | 2,057 | - |

Data Source: ACS 5-Year Estimates, 2012-2016; Table B25074

## 9. Condition of Housing

The structural condition of housing can generally be categorized in one of two categories: standard and substandard. Individual housing units may be considered substandard if the unit lacks complete plumbing for exclusive use of the residents, lack of complete kitchen facilities, lack of central heating, and overcrowding (1.01 persons per room). The American Community Survey provides data regarding these interior conditions of the housing stock.

Standard housing includes those units which conform to the requirements and minimum housing standards established by the "Minimum Housing Code for Broward County Florida, Chapter 5, Article IV." The minimum housing standard established in the County's code meets or exceeds the Section 8 Existing Housing Quality Standards contained in the Broward County Consolidated Strategic Plan adopted by the Board, as required to qualify for U.S. Housing and Urban Development funds.

Table H-30 displays a summary of the condition of the 816,886 total housing units in Broward County, including the BMSD. Of the 4,795 housing units within the BMSD, 552 are substandard, which is less than one percent of the total County-wide housing stock and represents about 11.5 percent of the BMSD housing stock.

## Table H-30: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Structural Condition of Housing Units, 2012-2016

| Area | Standard Condition | Substandard Condition | Total Units |
|---|---|---|---|
| # Units in BMSD | 4,243 | 552 | 4,795 |
| # Units in remainder of Broward County | 757,680 | 54,411 | 812,091 |

Source: U.S. ACS, 2012-2016, (DP04), 5 Year Estimates

The U.S. Census estimates the total number of substandard units in a geographic area by calculating both owner- and renter-occupied units that meet the following criteria: 1) lacking complete plumbing facilities; 2) lacking complete kitchen facilities; and 3) 1.01 or more persons per room (extent of housing overcrowding). The U.S. Census defines "complete plumbing facilities" to include: 1) hot and cold piped water; 2) a flush toilet; and 3) a bathtub or shower. All three facilities must be located within the housing unit.

According to the 2016 ACS 5-Year Estimates as shown below in Table H-31, a total of 6,651 units or .08 percent of Broward County's 816,886 occupied housing units are lacking complete plumbing or kitchen facilities. A total of 26,129 units/3.2 percent are classified as overcrowded. In the BMSD, 34 units or .7 percent of 4,795 occupied housing units are lacking complete plumbing or kitchen facilities. A total of 426 units or 7 percent are classified as overcrowded.

## Table H-31: Selected Housing Characteristics, Broward County and Broward Municipal Services District (BMSD), Other Indicators of Substandard Housing, 2012-2016

| Substandard Housing Characteristic | # Units in Broward County | # Units in BMSD |
|---|---|---|
| Lacking complete plumbing | 1,877 | 0 |
| Lacking complete kitchen | 4,740 | 34 |
| Over-crowded (1.01 per room) | 25,703 | 426 |
| No fuel used | 22,091 | 92 |
| Total substandard units | 54,411 | 552 |

Source: U.S. ACS, 2012-2016, Characteristics (DP04), 5 Year Estimates

## 10. Housing Construction Activity

Tables H-32 and H-33 depict the number of new dwelling units added to the BMSD housing stock and to the Broward County housing stock, respectively. Table H-33 shows that since 2007, the number of countywide multifamily units has exceeded the amount of single family units, at times more than doubling the amount of units. However, this is not the case in the BMSD, where virtually no multifamily housing construction has occurred in the past ten years.

### Table H-32: Selected Housing Characteristics, Broward Municipal Services District (BMSD), Housing Construction Activity (Building Permits Estimates), 2010-2016

| YEAR | NUMBER OF ADDITIONAL UNITS | | |
|---|---|---|---|
| | Single Family | Multi Family | Total |
| 2010 | 11 | 0 | 11 |
| 2011 | 1 | 2 | 3 |
| 2012 | 18 | 0 | 18 |
| 2013 | 5 | 0 | 5 |
| 2014 | 6 | 0 | 6 |
| 2015 | 26 | 0 | 26 |
| 2016 | 14 | 0 | 14 |
| TOTAL | 81 | 2 | 83 |

Source: US Economic Census, Building Permits, 2010-2016

## Table H-33: Selected Housing Characteristics, Broward County, Housing Construction Activity (Building Permits Estimates), 2007-2016

| Year | Number of Residential Units Constructed | | |
|---|---|---|---|
| | Single Family | Multi Family | Total |
| 2007 | 1,754 | 2,179 | 3,933 |
| 2008 | 908 | 1,256 | 2,164 |
| 2009 | 563 | 486 | 1,049 |
| 2010 | 979 | 189 | 1,168 |
| 2011 | 1,446 | 998 | 2,444 |
| 2012 | 1,023 | 2,533 | 3,556 |
| 2013 | 1,434 | 3,036 | 4,470 |
| 2014 | 1,181 | 1,281 | 2,462 |
| 2015 | 1,417 | 3,601 | 5,018 |
| 2016 | 1,455 | 2,236 | 3,691 |
| TOTAL | 12,160 | 17,795 | 29,955 |

Source: US Economic Census, Building Permits, 2007-2016

# APPENDICES

## Appendix H-A

### Housing Supply and Demand Analysis Model, BMSD Overview – Housing Need by Income Bracket and Ownership Type, 2012-2016

| BMSD Neighborhood | Owner-Occupied Units Surplus (Shortage) by Income Bracket | | | Renter-Occupied Units Surplus (Shortage) by Income Bracket | | |
|---|---|---|---|---|---|---|
| | 0%-50.0% | 50.1%-80.0% | 80.1%-120.0% | 0%-50.0% | 50.1%-80.0% | 80.1%-120.0% |
| Broadview Park | 86 | 298 | (22) | (181) | 61 | 121 |
| Boulevard Gardens | 48 | 3 | 13 | (40) | (29) | 34 |
| Franklin Park | 13 | (14) | 1 | (81) | 66 | 28 |
| Roosevelt Gardens | 83 | 52 | (72) | (109) | 8 | 100 |
| Washington Park | (7) | 43 | (28) | (34) | (4) | 10 |
| Hillsboro Pines | 6 | (20) | 11 | 0 | (22) | 3 |
| Total units: | 229 | 362 | (97) | (445) | 80 | 296 |

Data Source: Meridian Appraisal Group, Inc. Housing Supply & Demand Analysis Model, updated 2016; using data inputs from ACS 5-Year Estimates, 2012-2016: Tables DP04 and S2503; and using 2016 Median Household Income: $60,900.

# Appendix H-B

## Total Population, Household & Dwelling Unit Estimates for 2015 and Projections through 2045, Broward Municipal Services District (BMSD)

| | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|---|---|
| Population | 14,281 | 14,934 | 18,033 | 19,954 | 20,973 | 21,674 | 22,225 | 22,834 |
| Households | 4,524 | 4,804 | 6,096 | 6,860 | 7,319 | 7,643 | 7,924 | 8,191 |
| Persons per Household: | 3.16 | 3.11 | 2.96 | 2.91 | 2.87 | 2.84 | 2.80 | 2.79 |
| Dwelling Units | 5,100 | 5,341 | 6,755 | 7,490 | 7,936 | 8,248 | 8,517 | 8,766 |

**Data Source:** Broward County and Municipal Population Forecast and Allocation Model (PFAM) 2017, Accessed 3/9/2018; PFAM assigns projections from Florida's Bureau of Economic and Business Research "Detailed Population Projections by Age, Sex Race, and Hispanic Origin, for Florida and its Counties, 2020-2045, with Estimates for 2015" to Broward County's 2012 Traffic Analysis Zones and Municipalities, including Unincorporated Broward County (BMSD).

# Appendix H-C

## Population Forecast by Age, Broward Municipal Services District (BMSD), 2016-2045

| Age Group | 2016 Estimates | | Projected Years | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Population | Percentage of Population | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | Increase |
| 0-4 years | 1,079 | 7.02% | 1,265 | 1,400 | 1,471 | 1,521 | 1,559 | 1,602 | 523 |
| 5-9 | 1,201 | 7.81% | 1,408 | 1,558 | 1,638 | 1,692 | 1,736 | 1,783 | 582 |
| 10-14 | 930 | 6.05% | 1,090 | 1,207 | 1,268 | 1,311 | 1,344 | 1,381 | 451 |
| 15-19 | 1,091 | 7.09% | 1,279 | 1,415 | 1,488 | 1,537 | 1,577 | 1,620 | 529 |
| 20-24 | 955 | 6.21% | 1,120 | 1,239 | 1,302 | 1,346 | 1,380 | 1,418 | 463 |
| 25-29 | 1,256 | 8.17% | 1,473 | 1,630 | 1,713 | 1,770 | 1,815 | 1,865 | 609 |
| 30-34 | 1,017 | 6.61% | 1,192 | 1,319 | 1,387 | 1,433 | 1,470 | 1,510 | 493 |
| 35-39 | 1,420 | 9.23% | 1,665 | 1,842 | 1,936 | 2,001 | 2,052 | 2,108 | 688 |
| 40-44 | 960 | 6.24% | 1,126 | 1,246 | 1,309 | 1,353 | 1,387 | 1,425 | 465 |
| 45-49 | 1,378 | 8.96% | 1,616 | 1,788 | 1,879 | 1,942 | 1,991 | 2,046 | 668 |
| 50-54 | 851 | 5.53% | 998 | 1,104 | 1,160 | 1,199 | 1,230 | 1,263 | 412 |
| 55-59 | 892 | 5.80% | 1,046 | 1,157 | 1,216 | 1,257 | 1,289 | 1,324 | 432 |
| 60-64 | 644 | 4.19% | 755 | 836 | 878 | 908 | 931 | 956 | 312 |
| 65-69 | 589 | 3.83% | 691 | 764 | 803 | 830 | 851 | 874 | 285 |
| 70-74 | 470 | 3.06% | 551 | 610 | 641 | 662 | 679 | 698 | 228 |
| 75-79 | 355 | 2.31% | 416 | 461 | 484 | 500 | 513 | 527 | 172 |
| 80-84 | 166 | 1.08% | 195 | 215 | 226 | 234 | 240 | 246 | 80 |
| 85+ | 126 | 0.82% | 148 | 163 | 172 | 178 | 182 | 187 | 61 |
| Total: | 15,380 | - | 18,033 | 19,954 | 20,973 | 21,674 | 22,225 | 22,834 | 7,454 |

Data Source: ACS 5-Year Estimates, 2012-2016; Table B01001 for the 6 Census Designated Places (CDP's) within the Unincorporated Area (BMSD); 2016 ratios applied to PFAM 2017 projections for years 2020-2045.

[NOTE: Population forecasts by age group for years 2020 through 2045, apply the 2016 population distribution throughout the PFAM forecast period. Current population distribution is provided by ACS 5-year Estimates for years 2012-2016. Projections for each age group are based upon the total population estimate provided by PFAM 2017 for the forecast year. Since the distribution by age group has changed little since 2009, this exercise assumes that this trend will continue through 2045 for a total population increase of 7,454 people.]

# Appendix H-D

## Mobile Homes Parks in Broward County, 2017

| PARK NAME | ADDRESS | CITY | ZIP | MOBILE HOMES |
|---|---|---|---|---|
| Azalea Trailer Colony | 601 SW 27 Ave | Fort Lauderdale | 33312 | 43 |
| Bamboo Lakes Trailer Park | 2309 SW 30 Ct | Pembroke Park | 33009 | 98 |
| Bamboo Mobile Home Park | 2430 Charles Rd | Pembroke Park | 33009 | 46 |
| Bamboo Paradise Mobile Home Park | 3121 SW 24 St | Pembroke Park | 33009 | 98 |
| Breezy Hill MH & RV Park | 800 NE 48 St | Pompano Beach | 33064 | 169 |
| Carefree Cove Mobile Home Resort | 3273 NW 37 St | Fort Lauderdale | 33309 | 166 |
| Cheron Village | 13222 SW 9 Ct | Davie | 33325 | 203 |
| Coral Cay Plantation | 2914 NW 62 Ave | Margate | 33063 | 819 |
| Country Knolls MH Community | 215 NW 50 St | Pompano Beach | 33064 | 389 |
| Country Lakes MHP | 6800 NW 30 Ave | Coconut Creek | 33073 | 500 |
| Cypress Creek Mobile Home Country | 901 NE 63 Street | Fort Lauderdale | 33334 | 156 |
| Dale Village Mobile Home Park | 4901 SW 27 Ct | Pembroke Park | 33023 | 329 |
| David Zell Trailer Park | 4517 SW 54 Ct | Fort Lauderdale | 33314 | 7 |
| Deerfield Lake Manufactured Homes | 4400 NW 69 Ct | Coconut Creek | 33073 | 346 |
| Deerfield Trailer Park | 435 S Federal Hwy | Deerfield Beach | 33441 | 28 |
| Driftwood Acres Mobile Home Park | 4800 Griffin Rd | Fort Lauderdale | 33314 | 53 |
| East Pine Ridge | 4800 S Pine Island Rd | Davie | 33328 | 74 |

| PARK NAME | ADDRESS | CITY | ZIP | MOBILE HOMES |
|---|---|---|---|---|
| Eastwood Mobile Home Park | 418 SE 8 St | Hallandale Beach | 33009 | 28 |
| Ed Frisbee Trailer and RV Park | 601 N 63 Ave | Hollywood | 33024 | 28 |
| El Rancho 7 | 5551 Johnson Rd | Coconut Creek | 33073 | 68 |
| El Rancho Mobile Home & RV Park | 601 NE 4 Ct | Hallandale Beach | 33009 | 13 |
| Emerald Isles for Mobile Homes E | 1-11 SW 10 Ave | Hallandale Beach | 33009 | 11 |
| Emerald Isles for Mobile Homes W | 11-19 SW 10 Terr | Hallandale Beach | 33009 | 11 |
| Emerald Lake Village | 5551 E Lake Dr | Fort Lauderdale | 33312 | 181 |
| Evening Star Trailer Park | 6101 Cleveland St | Hollywood | 33024 | 104 |
| Everglades Lakes Mobile Home Park | 2900 SW 52 Ave | Fort Lauderdale | 33314 | 639 |
| Golden Trio Mobile Home Park | 700 SW 8 Ave | Hallandale Beach | 33009 | 40 |
| Golf View Estates Mobile Home | 901 NW 31 Ave | Pompano Beach | 33069 | 287 |
| Grace Baptist Church of Deerfield Beach | 501 NE 48 St | Pompano Beach | 33064 | 11 |
| Green Acres Mobile Home Village | 3100 W Hallandale Beach Blvd | Pembroke Park | 33009 | 97 |
| Grice's Trailer Park | 5931 Polk St | Hollywood | 33021 | 2 |
| Grubstake Trailer Park | 4513 N Dixie Hwy 1 | Pompano Beach | 33064 | 32 |
| Gulfstream Trailer Park | 227 SE 5 St | Hallandale Beach | 33009 | 20 |
| Haven Lake Estates | 11201 SW 55 St | Miramar | 33025 | 520 |
| Havenwood Mobile Home Community | 106 Havenwood Dr | Pompano Beach | 33064 | 120 |
| Highland Village Mobile Home Park | 4900 NE 2 Ave | Pompano Beach | 33064 | 277 |

| PARK NAME | ADDRESS | CITY | ZIP | MOBILE HOMES |
|---|---|---|---|---|
| Hills Mobile Home Park | 4001 Griffin Rd | Fort Lauderdale | 33314 | 38 |
| Hitching Post Mobile Home Park | 945 S Federal Hwy | Dania Beach | 33004 | 80 |
| Holiday Mobile Estates | 31420 W Hallandale Beach Blvd | Hallandale Beach | 33009 | 127 |
| Holiday Village Mobile Home Park | 1801 S Dixie Hwy | Pompano Beach | 33060 | 206 |
| Holland Mobile Home Park | 1308 SW 21 Ln | Fort Lauderdale | 33312 | 79 |
| Hollywood MH & Travel TP | 2301 SW 59 Ave | Hollywood | 33023 | 52 |
| Home Mobile Home Park | 480 SW 8 Ave | Hallandale Beach | 33009 | 136 |
| Kings Manor Estates | 12500 SR 84 | Fort Lauderdale | 33325 | 314 |
| Kozy Kampers RV Park & Storage | 3631 W Commercial Blvd | Fort Lauderdale | 33309 | 1 |
| La Palm Trailer Park | 6128 SW 35 Ct | Miramar | 33023 | 20 |
| La Siesta Trailer Park | 3150 W Hallandale Beach Blvd | Hallandale Beach | 33009 | 37 |
| Lake Shore Mobile Home Park | 2701 S Park Rd | Pembroke Park | 33009 | 100 |
| Lauder Lakes | 3001 SW 18 Terr | Fort Lauderdale | 33315 | 107 |
| Lauderdale Mobile Home Park, LLC | 5601 N SR 7 | North Lauderdale | 33319 | 261 |
| Lauderdale Properties Inc. | 4631 SW 73 Ave | Davie | 33314 | 8 |
| Mack's Fish Camp | Everglades Land Co. 2-1 | South Florida | 33082 | 2 |
| * Meadowbrook Manufactured Home Community | 4111 SW 25 St | BMSD | 33317 | 114 |
| Mickey's Mobile Home Park | 512 NE 1 Ct | Hallandale Beach | 33009 | 3 |

| PARK NAME | ADDRESS | CITY | ZIP | MOBILE HOMES |
|---|---|---|---|---|
| Moonlight Ranch Mobile Home Park | 4651 Griffin Rd | Ft Lauderdale | 33314 | 55 |
| New England Mobile Estates | 600 S 62 Ave | Hollywood | 33023 | 145 |
| Northcoast Trailer Park/Marina | 4500 Ravenswood Rd | Fort Lauderdale | 33312 | 14 |
| Oak Ridge Mobile Home Park | 3050 W Hallandale Beach Blvd | Hallandale Beach | 33009 | 34 |
| Ocean Waterway Mobile Home Park | 1500 Old Griffin Rd | Dania Beach | 33004 | 269 |
| Orange Blossom MHP | 6651 SW 45 St | Davie | 33314 | 101 |
| Orange Brook Mobile Home Estates | 1447 S Park Rd | Hollywood | 33021 | 247 |
| Orange Park Club | 900 SW 133 Ave | Davie | 33325 | 51 |
| Palm Haven Mobile Home Park | 4791 SW 82 Ave | Davie | 33328 | 79 |
| Pan American Estates | 150 NW 68 St | Fort Lauderdale | 33309 | 239 |
| Park City West MHP | 10550 W SR 84 | Fort Lauderdale | 33324 | 363 |
| Park Lake Estates | 3184 W Hallandale Beach Blvd | Pembroke Park | 33009 | 677 |
| Park Ridge Mobile Home Park | 1600 NW 33 St | Pompano Beach | 33064 | 110 |
| Parker Lone Pine West MHP | 3030 W Hallandale Beach Blvd | Pembroke Park | 33309 | 220 |
| Parkridge East Mobile Home Park | 1400 NW 33 St | Pompano Beach | 33064 | 67 |
| Parkway Mobile Home Court LLC | 6206 Buchanan St | Hollywood | 33024 | 11 |
| Pembroke Park Lakes | 3196 W Hallandale Beach Blvd | Pembroke Park | 33009 | 234 |
| Pine Tree Mobile Home Park | 430 Hibiscus Dr | Deerfield Beach | 33442 | 316 |
| Pinecrest Mobile Home Park | 3030 Stirling Rd | Hollywood | 33021 | 67 |

| PARK NAME | ADDRESS | CITY | ZIP | MOBILE HOMES |
|---|---|---|---|---|
| Ramgoh Mobile Home Park | 4500 S SR 7 | Fort Lauderdale | 33314 | 42 |
| Rexmere Village | 11300 Rexmere Blvd | Davie | 33325 | 780 |
| Riverside Mobile Home Park | 4732 SW 46 Ln | Fort Lauderdale | 33314 | 41 |
| Royal Garden Village | 6028 Johnson St | Hollywood | 33024 | 40 |
| Royal Palm Mobile Home Park | 720 S Federal Hwy | Hallandale Beach | 33009 | 130 |
| Sanders Mobile Home Colony | 3150 SW 31 Way | Pembroke Park | 33009 | 13 |
| Sea Estates Trailer Court | 350 NE 7 St | Hallandale Beach | 33009 | 66 |
| Seville Mobile Home Park | 426 NE 5 St | Hallandale Beach | 33009 | 127 |
| Sheldon Mobile Home Court | 2333 Griffin Rd | Fort Lauderdale | 33312 | 104 |
| Snowbird Haven Mobile Home Park | 855 SW 7 St | Hallandale Beach | 33009 | 54 |
| Sunnydale MHP | 915 SW 5 St | Hallandale Beach | 33009 | 64 |
| Sunny Palm R/V Park | 5930 Buchanan St | Hollywood | 33021 | 25 |
| Sunshine Holiday RV & MH Park | 2802 W Oakland Park Blvd | Fort Lauderdale | 33311 | 272 |
| Sunshine Village MHP | 13453 SW 5 St | Davie | 33325 | 356 |
| Swaying Palms MHP | 4851 Griffin Rd | Fort Lauderdale | 33314 | 77 |
| Tallowwood Isle MHP | 3878 NW 67 St | Coconut Creek | 33073 | 280 |
| Taylor's Trailer Park | 4305 Stirling Rd | Fort Lauderdale | 33314 | 7 |
| Tidewater Estates Co-Op Inc. | 1701 NW 5 St | Deerfield Beach | 33442 | 127 |
| Village Mobile Home Park, The | 3900 W Prospect Rd | North Lauderdale | 33309 | 307 |

| PARK NAME | ADDRESS | CITY | ZIP | MOBILE HOMES |
|---|---|---|---|---|
| Weiners Mobile Park | 801 E Dania Beach Blvd | Dania Beach | 33004 | 36 |
| Western Hills Estates | 13000 SW 5 Ct | Davie | 33325 | 405 |
| Whispering Pines Addition | 3311 NW 15 Ave | Pompano Beach | 33064 | 77 |
| Wolf Lakes MHP | 4631 SW 73 Ave | Davie | 33314 | 42 |
| Mobile Homes SubTotal (not including BMSD) | | | | 14,355 |
| Mobile Homes within BMSD | | | | 114 |
| Mobile Homes in Seminole Indian Reservation | | | | **0 |
| All Mobile Homes Total | | | | 14,469 |

* Meadowbrook MHP is located within the BMSD, Broadview Park CDP

**a total of 1,500 mobile homes were lost in 2012-13 due to closing of Seminole Estates Mobile Home Park, which was the only MHP within the Seminole Reservation.

Sources: The Florida Department of Health, May 2017' ACS 5-Year Estimates, 2007-2011 & 2012-2016; Table DP04; Broward County Planning and Development Management Division, Zoning Section


MIRAMAR
Deerfield Beach
Florida
COCONUT CREEK
BUTTERFLY CAPITAL OF THE WORLD
Lauderhill
Dania Beach
mpano beach
orida's Warmest Welcome
CORAL SPRINGS
sfwmd.gov
TAMARAC
The City For Your Life
SEA RANCH LAKES
Hollywood
FLORIDA
Plantation
the grass is greener
SHERIFF'S OFFICE
BROWARD COUNTY
CITY OF SUNRISE
FLORIDA
FORT LAUDERDALE-HOLLYWOOD INTERNATIONAL AIRPORT
BROWARD COUNTY, FLORIDA
Hallandale Beach
COOPER CITY
BROWARD COUNTY
FLORIDA
MUNICIPAL SERVICES DISTRICT
MIAMI-DADE COUNTY
WEST PARK
LAUDERDALE BY·THE·SEA
CITY OF MARGATE
Together We Make It Great
PARKLAND
Florida
MICCOSUKEE
Lazy Lake Florida
Pembroke Pines
TRI RAIL
PORT EVERGLADES
BROWARD COUNTY, FLORIDA
OAKLAND PARK
FLORIDA
BROWARD
County Public Schools
Cooper City
PALM BEACH COUNTY
FLORIDA
BROWARD COUNTY
FLORIDA
Intergovernmental Coordination
Element Support Document
FLORIDA
SFRPC
South Florida Regional Planning Council
NOAA
Broward MPO
Metropolitan Planning Organization
LAUDERDALE LAKES
"We Care"

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# Intergovernmental Coordination

## INTRODUCTION

### A. General

Chapter 163.3177(6)(h)(1) requires an intergovernmental coordination element that describes the relationships with certain other plans and states principles and guidelines to be used in coordinating the adopted comprehensive plan with such plans. These include:

- School board plans
- Regional plans, including water supply plans
- Plans of local governmental entities, such as districts and municipalities, that provide services, but do not have regulatory authority over the use of land
- Adjacent municipal and county plans
- State comprehensive plan (Chapter 187, Florida Statutes)
- Strategic Regional Policy Plan for South Florida.

### B. Service Area

The Service area for the Intergovernmental Coordination Element varies depending upon the type of intergovernmental coordination required for each comprehensive plan element. The service areas can generally be described as follows:

- Broward Municipal Service District (BMSD) Future Land Use and Community Planning
  - Regulatory (Land use planning)
    - Broward Municipal Services District
    - Water Conservation Areas
  - Planning
    - Broward Municipal Services District
    - Water Conservation Areas

    - Historic Preservation Component
        - Regulatory and Planning:
            - Broward Municipal Services District
            - Local governments subject to the jurisdiction of the County's Archaeological and/or Historic Preservation review, per County Code of Ordinances. Article XVII
- Capital Improvements Element
    - Regulatory
        - Broward Municipal Services District
    - Planning
        - Broward Municipal Services District
        - Broward County (County projects)
- Climate Change Element
    - Regulatory
        - Broward Municipal Services District
    - Planning
        - Broward Municipal Services District
        - Broward County
- Coastal Management Element and the Natural Disaster Component
    - Regulatory
        - None
    - Planning
        - Beach resources (vegetation preservation and restoration, sea turtle protection, erosion prevention, and renourishment)
        - Marine resources (vegetation preservation and restoration, sea turtle protection, reef protection, fisheries management)
- Conservation Element
    - Regulatory
        - Regional air resources (South Florida Airshed)
        - Water resources
        - Natural resources
    - Planning
        - Regional air resources (South Florida Airshed)
        - Water resources
        - Natural resources
- Housing Element
    - Regulatory

        - Broward Municipal Services District minimum housing code
        - Florida Building Code
        - Housing programs
    - Planning
        - Housing programs
- Public School Facilities Element
    - Regulatory
        - Broward Municipal Services District
    - Planning
        - Broward County
- Recreation and Open Space Element
    - Regulatory
        - Broward Municipal Services District parks
        - Regional parks
    - Planning
        - Broward Municipal Services District parks
        - Regional parks
- Solid Waste Element
    - Regulatory
        - Broward Municipal Services District solid waste removal
    - Planning
        - Broward Municipal Services District solid waste removal
- Transportation Element and the Deepwater Ports Component
    - Regulatory
        - Broward Municipal Services District (Local roads, local sidewalks and bike lanes)
        - Broward County (County roads, county sidewalks, and county bike lanes).
    - Planning
        - Broward Municipal Services District (Local roads, local sidewalks and bike lanes)
        - Broward County (County roads, county sidewalks, and county bike lanes)
        - Public transit systems including Broward County Transit (BCT), Tri-Rail, and several municipal community bus programs
        - Waterways including both navigable waterways and Port Everglades which is confined to the Port Jurisdiction Area
        - Aviation including both the Fort Lauderdale/Hollywood International Airport (FLL) and the North Perry Airport
        - Recreational trails and greenways

- Water Management Element:
  - Potable Water
    - Regulatory (Treatment and Supply)
      - Broward Municipal Services District
      - Portions of certain municipalities
    - Planning
      - Broward Municipal Services District
      - Municipalities
  - Sanitary Sewer
    - Regulatory (Treatment and Disposal)
      - Broward Municipal Services District
      - Portions of certain municipalities
    - Planning
      - Broward Municipal Services District
      - Portions of certain municipalities
  - Drainage and Natural Groundwater Aquifer Recharge
    - Regulatory (Stormwater Management)
      - Broward County's four dependent drainage districts
      - Broward Municipal Services District areas not located within a drainage district
    - Planning-watershed serving Broward County

## C. Planning Horizons

The short-term planning horizon is 2023 and the long-term planning horizon is ten years or 2028.

# DATA REQUIREMENTS

The data upon which the Intergovernmental Coordination Element is based includes the processes used to develop the plan, plans of adjacent jurisdictions, coordination methods, and dispute resolution procedures.

## A. Plan Development

The BrowardNEXT comprehensive planning initiative was a partnership between the Broward County Planning Council and the Broward County Department of Environmental Protection and Growth Management. The planning process included extensive public outreach that included meetings to solicit input and identify issues related to six focus areas, with Intergovernmental Coordination being one. The Intergovernmental Coordination focus area comments (Appendix A) are categorized under each of the following topics:

- Development review process
- Addressing current and future issues
- Municipality and county plans
- Development and redevelopment
- Transportation
- Platting

Some of the issues identified within the Intergovernmental Coordination Focus Area are addressed through the adoption of the Broward Next 2017 Broward County Land Use Plan, such as aligning flexibility zones with municipal boundaries. Other issues, such as outreach to the Broward Legislative Delegation on matters related to legislative changes, are on-going.

## B. Adjacent Jurisdictions

As described above, the service area of Broward County's comprehensive plan varies among the elements. Local level comprehensive planning is the responsibility of Broward County's 21 municipal governing bodies, as well as the Broward County Board of County Commissioners for the unincorporated areas in Broward County. Broward County's unincorporated planning area is divided into two general categories:

1. Water Conservation Areas: Undevelopable areas of western Broward County commonly referred to as the Everglades.
2. Broward Municipal Services District: Developable areas east of the Water Conservation Areas that are not part of a municipality.

The table below lists adjacent jurisdictions that may be impacted by implementation of Broward County's Comprehensive Plan.

## Table IC-1
## Adjacent Jurisdictions
## Broward County

| ADJACENT MUNICIPALITIES | | |
|---|---|---|
| Coconut Creek | Cooper City | Coral Springs |
| Dania Beach | Davie | Deerfield Beach |
| Fort Lauderdale | Hallandale Beach | Hillsboro Beach |
| Hollywood | Lauderdale-by-the-Sea | Lauderdale Lakes |
| Lauderhill | Lazy Lake | Lighthouse Point |
| Margate | Miramar | North Lauderdale |
| Oakland Park | Parkland | Pembroke Park |
| Pembroke Pines | Plantation | Pompano Beach |
| Sea Ranch Lakes | Southwest Ranches | Sunrise |
| Tamarac | Unincorporated Broward County | West Park |
| Weston | Wilton Manors | |

| ADJACENT COUNTIES | | | |
|---|---|---|---|
| Collier | Hendry | Miami-Dade | Palm Beach |

| ADJACENT REGIONAL PLANNING COUNCILS | | |
|---|---|---|
| South Florida | Southwest Florida | Treasure Coast |

## C. Coordination Methods

The Broward County Charter identifies Broward County as a regional government that implements programs, policies, and a budget with a regional or countywide focus. The Charter provides for a County Land Use Plan and County Trafficways Plan and for a Broward County Planning Council that serves as the Local Planning Agency responsible for preparing and maintaining such plans. The Planning Council's responsibilities include receiving public comments and advising the Board of County Commissioners (Board) on such plans. The Board has both regulatory and planning responsibilities in its Unincorporated Areas, as well as a combination of regulatory and planning responsibilities within municipalities. The varied land use planning, infrastructure, and service delivery mechanisms within Broward County result in a crucial need for intergovernmental coordination. Broward County recognizes the importance of having methods of ongoing coordination with adjacent jurisdictions and the public, as well as resolving any disputes that may arise during plan development.

Broward County continually coordinates its comprehensive plan by working with the Broward County Planning Council, Broward County League of Cities, Broward Legislative Delegation, and various Broward County Boards and Committees.

1. Local Planning Agency. Broward County maintains a Local Planning Agency that holds meetings to receive public comment and makes recommendations to the Board of County Commissioners on proposed plans and plan amendments.
2. Broward County League of Cities. Broward County continues to work with the Broward League of Cities to address intergovernmental and legislative issues. The League organizes committees and task forces based upon priority topics. Among the topics currently being addressed by committees and task forces are workforce housing, solid waste, and legislative priorities. Every year, the Broward League of Cities develops its legislative agenda.
3. Broward Legislative Delegation. The Broward Legislative Delegation is comprised of the Florida Senate and House of Representatives members whose districts include Broward County. It was created in 1971 by the Florida Legislature to provide a structured means for Broward County's citizens, governmental entities, and community organizations to communicate with local members of the Florida Legislature. Broward County continues to communicate with the Florida Legislature through its work with the Broward Legislative Delegation.
4. Broward County Boards and Committees. The Broward County Board of County Commissioners encourages public participation in county government by appointing residents to serve on boards, committees, commissions, task forces, agencies, and authorities. Broward County Commissioners also are appointed to serve as members on some of these boards. Over 1,000 Broward residents serve on boards ranging from the Advisory Board for Individuals with Disabilities to the Water Resources Task Force. Certain boards, such as the Broward County Planning Council, are regularly used for comprehensive plan coordination purposes. Other boards may be consulted when text amendments related to their area of concern are being considered. Boards regularly used for comprehensive plan coordination purposes are indicated in the table below with an asterisk. Information about specific boards is found on the Office of Intergovernmental Affairs and Professional Standards webpage located on Broward County's website.

# Table IC-2
## Boards with Members Appointed by the Board of County Commissioners

| | | |
|---|---|---|
| Advisory Board for Individuals with Disabilities | Animal Care Advisory Committee* | Bicycling and Pedestrian Advisory Committee |
| Board of Rules and Appeals | Broward County Housing Authority | *Broward County Planning Council |
| Broward Cultural Council | Broward League of Cities | *Broward Metropolitan Planning Organization |
| Broward Regional Emergency Medical Services Council | Broward Regional Health Planning Council | CareerSource Broward |
| *Central County Community Advisory Board | Central Examining Board of Electricians | Central Examining Board of Engineered Construction Trades |
| Central Examining Board of General Construction Trades | Central Examining Board of Liquefied Petroleum Gas Contractors | Central Examining Board of Mechanical Contractors |
| Central Examining Board of Plumbers | Charter Review Commission | Children's Services Board |
| Children's Services Council of Broward County | Climate Change Task Force | Cocomar Water Control District Advisory Board |
| Commission on the Status of Women | Community Action Agency Advisory Board | Community Redevelopment Agency |
| Consumer Protection Board | Courthouse Task Force Advisory Committee | Diversity Advisory Council |
| Early Learning Coalition, Inc. | Educational Facilities Authority | Fire Rescue Council |
| Florida Association of Counties | Florida Atlantic Research and Development Authority | Greater Fort Lauderdale Alliance |
| Health and Sanitary Control Board | Health Facilities Authority | Hillsboro Inlet District |
| *Historic Preservation Board | HIV Health Services Planning Council | Homeless Continuum of Care Board |
| *Housing Council | Housing Finance Authority | Human Rights Board |
| Intergovernmental Emergency Coordinating Council | Juvenile Justice Board | Legal Aid Service and Coast to Coast Legal Aid |
| Library Advisory Board | Living Wage Advisory Board | Management and Efficiency Study Committee |
| Marine Advisory Committee | Medical Marijuana Advisory Board | Parks and Recreation Advisory Board |
| Performing Arts Center Authority | Public Safety Coordinating Council Advisory Board | *School Oversight Committee |
| Small Business Development Advisory Board | *South Florida Regional Planning Council | South Florida Regional Transportation Authority |

| | | |
|---|---|---|
| Substance Abuse Advisory Board | Tourist Development Council | *Transit Advisory Committee |
| Transportation Management Association | Unsafe Structures Board | Urban Wilderness Advisory Board |
| Value Adjustment Board | Water Advisory Board | Water Control District # 2 |
| Water Control District # 3 | Water Control District #4 | |
| *Board regularly used for comprehensive plan coordination purposes | | |

### D. Dispute Resolution

The South Florida Regional Planning Council offers a dispute resolution process that was adopted pursuant to the requirements of Chapter 186.509, Florida Statutes. The Board of County Commissioners may use the process to reconcile differences in planning, growth management, and other matters among local governments, regional agencies, and private interests. The process is intended to accomplish the following:

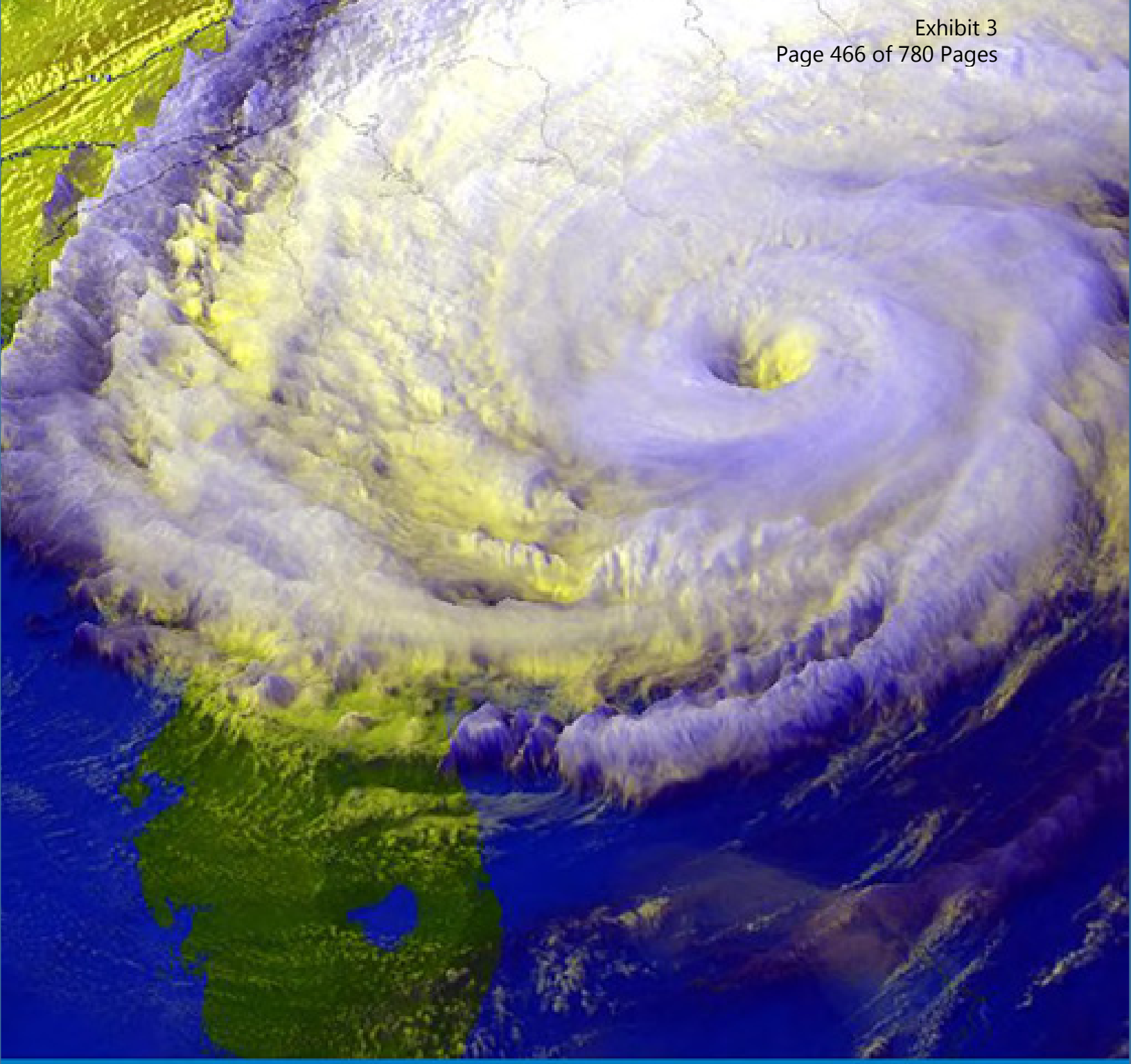
- Identify and resolve problems as early as possible;
- Utilize procedures in a low-to-high cost sequence;
- Allow flexibility;
- Provide for the appropriate involvement of affected parties;
- Provide as much process certainty as possible.

## ANALYSIS REQUIREMENTS

The comprehensive plan's effect on the development of adjacent jurisdictions is considered throughout the plan preparation, amendment, and implementation processes. There are myriad ongoing opportunities for public involvement and public outreach in the plan implementation process through Broward County Board of County Commissioners, Broward County Planning Council, and Local Planning Agency public hearing processes, as well as Broward County's various boards and committees.

## IMPLEMENTATION

Extensive public outreach was done as part of the Broward Next comprehensive planning process; however, the complexity, variability, and fluctuating nature of certain issues requires ongoing coordination. Broward County's intergovernmental coordination mechanisms are sufficient to achieve the required ongoing coordination.



BROWARD COUNTY
FLORIDA

# Natural Disaster Component Support Document

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Coastal High Hazard Areas – The evacuation zone for a Category 1 hurricane established in the regional hurricane evacuation study applicable to Broward County.

Comprehensive Emergency Management Plan (CEMP) – The CEMP addresses concepts and responsibilities of collaborated and coordinated county emergency management efforts among the many internal and external county stakeholders and ~~the~~ Broward County~~'s Emergency Management Division~~ Regional Emergency Services and Communications. Additionally, the CEMP describes strategies and mechanisms through which the local and county governments and agencies will mobilize resources and conduct activities to guide and support efforts for emergency operations.

Evacuation Order Time – The time in hours by which the evacuation order must be given to allow all evacuees to reach their destination.

a. An evacuation order shall be issued by the County Administrator twenty-one hours prior to expected hurricane landfall for Zone A and twenty-six hours prior to hurricane eye landfall for Zone B.

b. Evacuation operations should commence four hours after an evacuation order is issued by the County Administrator and shall be in effect 6.5 hours for Zone A and 12 hours for Zone B.

Evacuation Routes – Routes designated by county emergency management authorities, or the regional evacuation plan, for the movement of persons to safety, in the event of a hurricane.

Hurricane Evacuation Zones – The hurricane evacuation zones are areas requiring evacuation based upon the expected storm event, which are delineated in the Broward County Coastal Hurricane Evacuation Plan as follows:

Zone A. A storm situation that will produce a Saffir/Simpson category of 1 to 2 hurricane intensity, with a storm surge of four to seven feet above mean sea level and winds ranging from 74 to 110 miles per hour in velocity, will necessitate the evacuation of all residents, residing from the coastline to the Intracoastal Waterway as well as all county mobile homes.

Zone B. A storm situation that will produce a Saffir/Simpson category 3 to 5 in hurricane intensity, with a storm surge of seven to eleven feet above mean sea level and winds ranging from 111 to 155 miles per hour in velocity, will necessitate the evacuation from the coastline to U.S. 1/ Federal Highway and all mobile homes.

Hurricane Shelter – A structure designated by County officials as a place of safe refuge during a storm or hurricane.

Hurricane Vulnerability Zone – The areas (hurricane evacuation areas and mobile home parks) delineated by the regional or local evacuation plan as requiring evacuation.

Interagency Hazard Mitigation Report – The recommendations of a team of federal, state, regional, or local officials which address measures to reduce the potential for future flood losses and which is prepared in response to a Presidential Disaster Declaration.

Persons with Special Needs – Those persons with minor health/medical conditions that require: professional observation, assessment and maintenance; assistance with personal care and/or assistance with medications but do not require hospitalization; and/or needs medications and/or vital sign readings and is unable to do so without professional assistance

Transit Dependent – Those persons within the Risk Area who do not have access to an automobile for evacuation during a hurricane situation.

Tropical Storm Force Winds (TSFW) – The TSFW is defined as one-minute sustained winds >39 mph or 34 knots. The arrival of TSFW initiates the pre-landfall hazard time during which hazardous conditions exist prior to actual storm landfall. Evacuation timing procedures should be completed before the arrival of the TSFW (Broward County CEMP, 2015)

Vulnerable Population – Those persons at risk during an emergency or natural disaster due to a disability, frailty or health issues and who elect to shelter in place.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| CCCL | Coastal Construction Control Line |
| CME | Coastal Management Element |
| ~~EMD~~ | ~~Emergency Management Division~~ |
| FAC | Florida Administrative Code |
| FDEP | Florida Department of Environmental Protection |
| NDC | Natural Disaster Component |
| LOS | Level of Service |
| RESC | Regional Emergency Services & Communications |

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

INTRODUCTION

# Natural Disaster Component

## INTRODUCTION

### A. General

Consistent with Florida Statutes Section 163.3177(g)7, the purpose of the Natural Disaster Component (NDC), as part of the Coastal Management Element (CME), is to plan to "protect human life against the effects of natural disasters." Natural disaster planning issues have been singled out as a separate component to stress their importance in Broward County. The NDC Support Document provides the data and analysis used as the basis for the goal, objectives and policies included in the NDC.

The NDC Support Documents are divided into five parts: Part I identifies the service area, the planning horizons and defines key terms. Part II addresses the data requirements and includes inventories of hurricane evacuation planning data, post-disaster redevelopment data, and coastal high hazard areas. Part III analyzes current hurricane evacuation planning issues. Part IV addresses implementation of the Natural Disaster Component. Part V lists appendices.

### B. Service Area

The NDC service area is the hurricane evacuation zone, as defined herein, and all mobile home parks in Broward County with regard to hurricane evacuation.

### C. Planning Horizon

The short-term planning horizon is 2020, while the long-term planning horizon is 2040, in accordance with the requirements of Florida Statutes Chapter 163.3177 (5)(a), which states that "each local government comprehensive plan must include at least two planning periods, one covering at least the first 5-year period occurring after the plan's adoption and one covering at least a 10-year period. Additional planning periods for specific components, elements, land

use amendments, or projects shall be permissible and accepted as part of the planning process."

# DATA REQUIREMENTS

This Natural Disaster Component is intended to address the natural disaster issues identified in Florida Statutes Chapter 163.3178(2)(d), (e), and (f), which pertains to the Coastal Management Element.

## A. Hurricane Evacuation Planning Data

According to the National Oceanic and Atmospheric Administration (NOAA), Florida has been struck by more hurricanes than any other state in recorded history. Including Hurricane Irma in 2017, Florida has now sustained 117 direct hits by hurricanes which represents 40% of all US hurricanes. This is due to warmer water temperatures fed by the Gulf Stream and the west-northwesterly direction in which hurricanes travel. Hurricane season runs from June 1 to November 30 but planning and preparation are year-round activities.

### 1. Hurricane Vulnerability and Evacuation Zones in Broward County

The hurricane vulnerability zone includes areas requiring evacuation in the event of a 100-year storm or Category 3 storm event. The hurricane evacuation zone is that area requiring evacuation in the event of a Category 1 through 5-storm event. As the result of an elevation study conducted in the year 2000, there has been a significant reduction in the mandatory hurricane evacuation zones in Broward County. Two (2) types of evacuation zones – Zones A and B – correspond to hurricane intensity as follows:

*Zone A*. This is the area requiring evacuation in the event of a storm situation that will provide a Saffir/Simpson Category 1 and 2 hurricane intensity. This area includes all areas east of the Intracoastal Waterway, mobile home residents, residents beside tidal bodies of water and in low-lying areas.

*Zone B*. This is the area requiring evacuation in the event of a storm situation that will provide a Saffir/Simpson Category 3 through 5 hurricane intensity. This zone includes all areas east of U.S. 1/ Federal Highway, mobile home residents, residents beside tidal bodies of water and in low-lying areas.

## 2. Number of Persons Requiring Evacuation

Table ND-1 illustrates the number of persons, Countywide, requiring evacuation by hurricane intensity. According to this, about 2 percent of the County's total population is located within an evacuation zone during a Category 1 or 2 hurricane. During a hurricane with Category 3 through 5 intensities, those people requiring evacuation more than doubles to 5.4 percent of the Broward County population.

Table ND-1
Number of Persons Requiring Evacuation by Hurricane Intensity (Countywide)

| HURRICANE INTENSITY | NUMBER OF PERSONS |
|---|---|
| Category 1 and 2 | 44,775 |
| Category 3 through 5 | 99,378 |

Source: Table B01003, U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates EOC Evacuation Zones, January 18, 2018

According to the Florida Department of Health, there were 14,469 mobile home units in Broward County in 2017, including 114 mobile home units in the Broward Municipal Services District (BMSD). The name, location and number of mobile homes in each mobile home development is shown in the Housing Element Support Document's Appendix H-D. This number represents a decrease over the past ten years. The number of mobile homes should continue to decline as no new mobile home parks being established and several existing parks are being redeveloped for other uses including either permanent resident units or other non-residential uses.

## 3. Number of Persons Requiring Public Hurricane Shelter

The number of persons requiring public hurricane shelter includes not only those persons living within the hurricane vulnerability and evacuation zones, but also those persons residing in mobile homes and homeless people. Table ND-2 shows that, during a Category 1 or 2 hurricane, about 3.4% of Broward County's total population requires sheltering. This percentage increases to 6.4% of the population during a Category 3 through 5 strength hurricane.

Table ND-2
Estimated Number of Persons Requiring Public Shelters by Hurricane Intensity
(Countywide)

| HURRICANE INTENSITY | NUMBER of PERSONS |
|---|---|
| Category 1 and 2 | 64,039 |
| Category 3 through 5 | 118,642 |

Source: Table B01003, U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates EOC Evacuation Zones, January 18, 2018, Mobile Home Report, Broward County Health

## 4. Number of Hurricane Shelter Spaces Available

An inventory of hurricane shelter sites is shown in the Appendices as Table ND-B and associated map, Figure ND-1. There are currently 41 public schools in Broward County serving as some type of hurricane shelter. A total of 34 schools are used as basic hurricane shelters and five (5) schools are designated as special needs shelters. According to ~~the Emergency Management Division~~ Regional Emergency Services & Communications, the general population shelters could functionally hold on average 21,000 persons, depending on square footage per person and extra staff enabling the usage of additional space, and the special needs shelters could accommodate around 1,000 persons, for a total of about 22,000 shelter spaces to serve Broward County. Additional shelter spaces would be needed if all residents within the evacuation zone and in mobile homes required sheltering. During Hurricane Irma in 2017, the County opened pet friendly shelters which did not allow animals in the same area as people, but enabled residents to ensure the safety of their pets.

## 5. Special Needs Registry

Residents with special needs who require electricity for medical needs or have a medical condition that cannot be supported at a general population shelter may pre-register for the Broward County Special Needs Emergency Sheltering and Transportation Program. This program is a cooperative effort between Broward County ~~Emergency Management Division~~ Regional Emergency Services and Communications, Florida Department of Health in Broward, disability advocates and local health care providers. Sheltering applications are available from Broward County ~~Emergency Management~~ Regional Emergency Services and Communications and transportation is coordinated by Broward County Paratransit or the Office of Medical Examiner and Trauma Services, depending on need.

There are three levels of shelter based on medical need:

1. Mass Care Shelter, coordinated by the American Red Cross, which requires no pre-registration;
2. Special Needs Shelter, coordinated by Florida Department of Health in Broward; and
3. Higher Level of Care Shelter, requiring boarding in participating hospital.

The Florida Department of Emergency Management and Florida Department of Health in Broward estimate that about 1,100 people are registered with the Special Needs Emergency Sheltering and Transportation Program.

## 6. Vulnerable Population Registry

Residents who are at risk due to disability, frailty or other health issues, regardless of age, and who elect to shelter at-home during an emergency or natural disaster, are eligible for the Vulnerable Population Registry. A partnership between ~~the~~ Broward County ~~Emergency Management Division~~ Regional Emergency Services and Communications and the municipalities' emergency management agencies, the registry assists emergency responders in better planning for post-disaster recoveries.

## 7. Evacuation Routes

There are 23 evacuation routes in Broward County leading from and into hurricane evacuation areas. These routes and other pertinent information, such as the east-west terminus, jurisdiction and barrier island access, are displayed in Appendix ND-A. Slightly over half of these routes (52 percent) have barrier island access. Nearly all evacuation roadways – except for Copans Road, Cypress Creek Road, and Johnson Street – are at least partially under the authority of the Florida Department of Transportation (FDOT). A map of evacuation routes is available on the Broward County website on the Evacuation Routes & Zones webpage.

## 8. Transportation and Hazard Constraints on Evacuation Routes

The regular travel speeds on evacuation routes will be reduced significantly due to the high number of evacuees using private automobiles. Hazard constraints include the unpredicted early arrival of gale force winds blowing debris and sand onto evacuation routes, flooding, and the falling of objects, such as utility poles, causing road blockages, which may restrict vehicular movement out of the evacuation areas.

### 9. Evacuation Planning

All evacuations are planned so that the County's population is able to reach a safe location prior to the arrival of Tropical Storm Force Winds (TSFW), which are defined as one-minute sustained winds >39 mph or 34 knots, which have the ability to down powerlines and trees, blow out windows and signs; generate flying debris, and cause structural collapse and vehicular damage. Broward County has established planning policies which coordinate storm preparation activities and evacuation procedures to be complete prior to the arrival of TSFWs, described under the Analysis Requirements Section, subsection A.7 – Evacuation Time.

## B. Post-Disaster Redevelopment

### 1. Existing and Proposed Uses in Coastal High Hazard Areas

The allowable densities permitted within the residential categories range from.an individual single family to 50 dwelling units per acre. Areas east of the Intracoastal Waterway are not permitted allocations of Flexibility Units resulting in a residential density greater than twenty-five (25) dwelling units per gross acre for the residentially designated parcel (or portion of a non-residentially designated parcel to be developed with residential use), and/or cannot exceed one hundred percent (100%) of the maximum number of dwelling units indicated for the parcel by the local land use plan map, whichever resulting residential density is less (Broward Land Use Plan (LUP) Policy 2.2.4).

### 2. Structures with a History of Repeated Damage in Coastal Storms

A "repetitive loss property" is an insurable property where, since 1978, the National Flood Insurance Program has paid at least two (2) claims of more than $1,000 within 10 years. There are over 700 such properties in Broward County located, in every municipality except Sea Ranch Lakes. Broward County and its municipalities should strive to reduce the number of repetitive loss properties.

Pursuant to Section 161.053, Florida Statutes, the Coastal Construction Control Line (CCCL) is a jurisdictional line that defines the landward limit of the Florida Department of Environment Protection's (DEP) authority to regulate construction. The Florida Department of Environmental Protection (DEP) does allow rebuilding seaward of the CCCL; however, structures must comply with the siting and design standards of Section 161.053, F.S., and Chapter 62B-33, F.A.C.. This is administered through two State-level

programs: the Beach Erosion Control Program, which provides for the restoration and maintenance of critically eroding beaches, and the Joint Coastal Permit Program, which protects the shoreline from activities which could contribute to erosion, water pollution or habitat degradation.

Certain projects are exempt from DEP permitting requirements, such as the repair, maintenance or modification of existing structures within the confines of the existing foundation and not involving work on the foundation itself. In addition, existing structures may be relocated to a landward location or an improved foundation if it creates no additional adverse impacts to the beach and dune system.

### 3. Infrastructure in Coastal High Hazard Areas

Public funds for infrastructure improvements should not be used in coastal high-hazard areas unless such funds are necessary to provide service to the existing development and to provide adequate evacuation in the event of a natural disaster. The inventories of infrastructure, including streets, highways, sewer and drainage systems., are addressed in the Coastal Management Element Support Document, Section II G.

### 4. Beach and Dune Conditions

Since most dunes have been destroyed by coastal overdevelopment, the replenishment of the dune system is necessary to mitigate the impact of destruction by natural storms. Mitigation projects should focus on the enhancement of natural resources such as beach nourishment and revegetation beach areas to create sand dunes. The inventories of beach and dune systems have been addressed in the Coastal Management Element Support Document, Section II. F.

## C. Coastal High Hazard Areas

Broward County has identified its Coastal High-hazard Area as the land and water eastward of the Intracoastal Waterway to the Atlantic Ocean, including any coastal protection structures. The Broward County Planning Council maintains a Broward County coastal high-hazard area map (a.k.a. Floodplains, Flood Prone Areas and Coastal Storm Area Map) with information received from Regional Emergency Services and Communications the Emergency Management Division as part of the Natural Resource Map Series of BrowardNEXT (see also Broward County Comprehensive Plan Map Series: Maps WM-7 and ND-1).

# ANALYSIS REQUIREMENTS

## A. Hurricane Evacuation Analysis

The Broward Comprehensive Emergency Management Plan (CEMP) consists two components - the Basic Plan and its supporting Emergency Support Function (ESF) Standard Operating Procedures (SOPs). The CEMP was most recently adopted in 2015, in accordance with the adoption provisions of Florida Statutes Chapter 252 and Rule FAC 27P-6 of the Florida Administrative Code.

The Basic CEMP provides a comprehensive overview of Broward County~~'s Emergency Management Division~~ Regional Emergency Services & Communications (RESC), its policies and procedures. It offers a general framework for all involved agencies to follow the phases of the County's approach to emergency activities and operations. The CEMP utilizes the organizational and procedural protocols of the Incident Command System (ICS) which organizes resources for disaster response and post disaster recovery. It also fully incorporates the policies, protocols, and procedures of the National Incident Management System (NIMS).

The following evacuation planning issues included in the CEMP are analyzed in this section: hurricane vulnerability zones; number of persons requiring evacuation; number of available hurricane shelters and shelter spaces; evacuation routes; transportation and hazard constraints on the evacuation routes; and evacuation time.

### 1. Hurricane Vulnerability Zones

There are two zones for evacuation: A and B. The barrier island is located within evacuation Zone A. Because of the limited number of bridges over the Intracoastal Waterway – a total of 11 – there are few viable alternatives to change the zones or the evacuation routes. The Broward Municipal Services District (BMSD) (i.e., the unincorporated neighborhoods) are located west of Federal Highway (US 1) and therefore fall outside of the evacuation Zones A and B.

### 2. Persons Requiring Evacuation

All persons who reside on the barrier island are required to evacuate in the event of a Saffir/Simpson Category 1-2 hurricane intensity, which also falls into the Hurricane Evacuation Zone A, and the approximate number of residents subject to an evacuation order are 44,775. More than 99,378 persons are estimated to live in coastal areas and mobile homes vulnerable to storm surges and winds in a Category 3 through 5 strength hurricane.

## 3. Available Hurricane Shelters and Spaces

Broward County has a total of 41 public school sites which currently serve as emergency shelters during a hurricane or other natural disaster, five (5) of which are designated as special needs shelters. Additional shelters have been opened as needed to accommodate more residents if everyone within the evacuation zone and in mobile homes required sheltering. The County coordinates with local governments to ensure sufficient staffing of the shelters.

## 4. Vulnerable Population

Approximately ten percent of Broward County's total population are estimated to have a vulnerability and ten percent of that vulnerable population wants/needs sheltering during a natural disaster or other emergency. Broward County's Vulnerable Population Registry (VPR) allows residents to register with their city which enables emergency workers to improve recovery effort planning following a natural disaster or other emergency. The VPR does not involve sheltering or transportation services and each municipality utilizes the VPR based on their own independent recovery plans. According to ~~the~~ Broward County ~~Emergency Management Division~~ Regional Emergency Services and Communications, approximately 3,600 people are included on the Vulnerable Population Registry.

## 5. Evacuation Routes

As shown on Map ND-1 in the BrowardNEXT Map Series, there are a twelve (12) east-west evacuation routes leading from and into the hurricane evacuation area in Broward County. State Road (SR) A-1-A is a two-lane undivided highway. If these evacuation routes are not flooded and the bridges are maintained in good working order, these routes would be sufficient and the evacuation plan could be carried out in a timely manner.

## 6. Transportation and Hazard Constraints on Routes

The normal speeds on evacuation routes will be reduced significantly due to the high number of evacuees using private automobiles. The torrential rains and tropical storm force winds generated by the outer bands of a hurricane often render evacuation routes impassable long before the predicted landfall of the storm. Hazard constraints include the unpredicted early arrival of gale force winds blowing debris and sand onto evacuation routes, flooding, and the falling of objects, such as utility poles causing road

blockages, and thereby restricting vehicular movement out of the evacuation areas. Human made hazards may also exist as many residents wait until the final opportunity to make evacuate plans.

In the event of hurricane evacuation requirements, both boat and vehicle traffic will be hectic, creating transportation constraints. Power outages and high winds impacting traffic controls at intersections along with the removal of disabled vehicle removals are also sources of concerns. Municipal, county, and state law enforcement officers have been assigned to direct traffic at the coastal major intersections. The maintenance of optimum traffic flow is critical, especially along State Road A-1-A, which is the main north-south thoroughfare east of the Intracoastal Waterway primarily serving Evacuation Zone A. Due to the roadway's vulnerability to inundation by severe wave action and tidal surge, access to one or more of the nine evacuation routes may be restricted.

## 7. Evacuation Time

Broward County Regional Emergency Services and Communications (RESC) ~~The Emergency Management Division (EMD)~~ in cooperation with the Broward County Enterprise Technology Service (ETS) Division has developed a computer program, Storm Action Lead Time (SALT), to assist in natural disaster decision making processes, including evacuation times. Forecasts from the National Hurricane Center and Miami Weather Service (NWS) are entered into the application which generates operational tasks and assigns them a lead-time based on the intensity of the storm and the estimated arrival of tropical storm force winds (TSFW). These SALT-based activity schedules are tentative as they are based on the most current NHC advisory.

Broward County's Comprehensive Emergency Management Plan (CEMP) is a decision-making tool, in addition to a guide for coordinating efforts and resources in emergency situations. The following elements in the current CEMP (2015) are based on the arrival of TSFW, defined as one-minute sustained winds >39 mph or 34 knots, and have replaced previous evacuation timing procedures:

1. Clearance Time is a fixed estimate of time required to evacuate a given area and is determined by evacuation studies and risk analyses. Clearance times vary according to both storm and local conditions; however, this is the general period prior to arrival of TSFWs.

2. Evacuation Start Time is the very latest time by which an evacuation could be initiated and completed prior to the arrival of TSFWs. The time between Evacuation Start Time and arrival of TSFW must be greater or equal to the clearance time.

3. Decision Time is the amount of time available before the latest issuance of a protective action to allow adequate response time for the threatened population. Typically, Decision Time will be greater than Evacuation Start Time in order to provide time for evacuation preparations such as closing bridges, preparing evacuation routes and opening shelters.

Countywide evacuation and pre-storm prep activities will stop once TSFWs arrive. In order to decrease evacuation times during a hurricane emergency, ~~the~~ Broward County ~~Emergency Management Division~~ Regional Emergency Services and Communications also annually reviews and approves hospitals, nursing homes, ambulatory surgical centers and adult living facilities and other residential health care facility's comprehensive emergency management plans.

## B. Post-Disaster Redevelopment

The CEMP Recovery Plan specifically addresses the recovery phase of a disaster and includes specific recovery actions from the response stage through the long term recovery stage of a disaster, enabling a rapid and efficient delivery of recovery operations following a natural disaster.

### 1. Peril of Flood Legislation

In 2015, the State Legislature adopted "Peril of Flood" legislation that was added to Section 163.3178 Coastal management, F.S. Subsection (2)(f) adds the requirement for, "A redevelopment component that outlines the principles that must be used to eliminate inappropriate and unsafe development in the coastal areas when opportunities arise." The component must:

1. Include development and redevelopment principles, strategies, and engineering solutions that reduce the flood risk in coastal areas which results from high-tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea-level rise.

2. Encourage the use of best practices development and redevelopment principles, strategies, and engineering solutions that will result in the removal of coastal real

property from flood zone designations established by the Federal Emergency Management Agency.

3. Identify site development techniques and best practices that may reduce losses due to flooding and claims made under flood insurance policies issued in this state.

4. Be consistent with, or more stringent than, the flood-resistant construction requirements in the Florida Building Code and applicable flood plain management regulations set forth in 44 C.F.R. part 60.

5. Require that any construction activities seaward of the coastal construction control lines established pursuant to s. 161.053 be consistent with chapter 161.

6. Encourage local governments to participate in the National Flood Insurance Program Community Rating System administered by the Federal Emergency Management Agency to achieve flood insurance premium discounts for their residents."

These requirements are being met through multiple policies that appear in the Climate Change, Coastal Management, Intergovernmental Coordination, Natural Disaster, and Water Management Elements, in addition to the Broward Municipal Services District Land Use and Community Planning Element. A new policy has been added to the Natural Disaster Element, ND7.6, which states:

Broward County shall develop strategies and policies to address post disaster redevelopment issues, such as:

1. Expediting demolition of abandoned significantly damaged structures;
2. Requiring utility and infrastructure improvements that reduce vulnerability to storms and disasters;
3. Promoting energy efficient, heat reduction, and storm resilient features in the redevelopment of neighborhoods, including solar farms and replanting trees;
4. Improving drainage and raising structures, driveways and streets to avoid flooding damages;
5. Restricting redevelopment of properties in areas prone to repeat flood, wind or fire damage;
6. Addressing resiliency of mobile homes and other types of manufactured homes;
7. Transferring of title of abandoned properties within a reasonable time frame to promote expedited redevelopment.

## 2. Local Mitigation Strategy (LMS) and Enhanced Local Mitigation Strategy (ELMS)

Prior to the creation of the Local Mitigation Strategy (LMS) in 2012, there was no existing comprehensive, cohesive or coordinated post-disaster redevelopment and mitigation plan for Broward County and its 31 municipalities, of which 9 are coastal cities with over 150,000 residents, to reduce or eliminate exposure to hazard impacts.

In 2013, the Board of County Commissioners adopted an Enhanced LMS (ELMS) which included enhanced components beyond FEMA's and the State of Florida's planning requirements. In 2017, the County used a FEMA mitigation grant to update the ELMS plan once again. The ELMS provides a comprehensive and coordinated hazard mitigation program for Broward County and its 31 municipalities to deal with emergency response and recovery issues, long and short term planning issues and economic issues relating to mitigation.

Broward County is vulnerable to a wide range of natural and human caused hazards that threaten life and property. FEMA's current regulations and direction under the Disaster Mitigation Act of 2000) require an evaluation of all naturally occurring hazards and may also incorporate man-made hazards. A list of Broward County's most significant hazards of concern is shown below, and a risk assessment of these hazards is conducted in conjunction with each iteration of the Enhanced Local Mitigation Strategy (ELMS).

Table ND-3
Hazards Affecting Broward County

| NATURAL HAZARDS | HUMAN CAUSED HAZARDS |
|---|---|
| Extreme Heat | Pandemic/Infectious Disease |
| Severe Storm/Tornado | Mass Migration |
| Tropical Cyclone (Storms/Hurricanes) | Terrorism |
| Coastal Erosion | Hazardous Material Incident |
| Drought | |
| Flood | |
| Sea Level Rise/Climate Change | |
| Wildfire | |

Source: Broward County CEMP 2015

### 3. Emergency Generators

To assist in post-disaster recovery efforts, the State of Florida requires the installation of emergency generators for retail motor fuel dispensing facilities. In accordance with Chapter 526.143, Florida Statutes, any generators suffering storm damage must be replaced with an alternative source within 36 hours of a natural disaster occurrence. Local building inspectors conduct equipment and operations checks, prior to the issuance of certificates of occupancy (CO), and each service station must maintain equipment records capability and testing. Although generators are not currently mandated for other retail uses, Regional Emergency Services and Communications ~~the Emergency Management Division~~ has identified approximately 137 generator-ready businesses, including grocery, home improvement and wholesale warehouse stores. These businesses, listed in the Appendices as Table ND-C, may be open for business after a storm, natural disaster or other emergency resulting in a prolonged power outage.

In 2018, the Governor signed into law Rule 59A-4.1265, F.A.C. (House Bill 7099) which appears under the Minimum Standards for Nursing Homes. The Rule requires that existing Florida nursing homes satisfy the following by June 1, 2018:

- Maintain an alternative power source, such as a generator, that can air-condition an area of no less than 30 net sq. ft. per resident at a temperature of 81 degrees Fahrenheit or lower for at least 96 hours, and
- Keep 72 hours of fuel on-site.

Extensions for compliance may be granted by the Agency for Health Care Administration until January 1, 2019, for nursing homes experiencing delayed construction, product delivery and/or permitting processes.

## C. Coastal High-Hazard Areas

The County has analyzed relocation of any County owned or operated infrastructure located in coastal high-hazard areas. However, the County is only responsible for maintaining the roadway network, except for State Road A-1-A which is under the jurisdiction of the Florida Department of Transportation (FDOT). All beach related equipment would be removed in preparation for a storm.

Broward County will not utilize public funds for infrastructure expansion or improvements in coastal high-hazard areas unless such funds are necessary to provide services to the existing

development and to provide adequate evacuation in the event of an emergency. To reduce hurricane damage and decrease population densities, it is desirable to direct population concentrations away from the coastal high-hazard area.

# IMPLEMENTATION

## A. Authority

The Florida Emergency Management Act, Chapter 252, Florida Statutes, mandates the establishment and maintenance of a local emergency management agency in support of the state comprehensive emergency management plan and program. Natural disaster planning in Broward County is addressed primarily by ~~the~~ Broward County ~~Emergency Management Division~~ Regional Emergency Services and Communications enabled by Section 8.20 of the Broward County Administrative Code. In addition, all County divisions are involved in disaster planning activities in accordance with the Broward Emergency Response Team (BERT) Emergency Operation Center Manual.

## B. Sources

Broward County~~'s~~ Regional Emergency Services and Communications ~~Emergency Management Division~~ is the primary source for the data and analysis included in the NDC Support Document. Other sources include the Broward County Planning and Development Management Division, the School Board of Broward County and the Department of Health in Broward County.

# APPENDIX

## Appendix ND-A: Hurricane Evacuation Routes, 2018

| Evacuation Route | East Terminus | West Terminus | Roadway Jurisdiction | Barrier Island Access |
|---|---|---|---|---|
| Hillsboro Blvd. | A1A | I-95 | FDOT | Yes |
| SW 10th Street | US 1 | Sawgrass Expressway | FDOT / City of Deerfield Beach | No |
| Sample Road | US 1 | I-95 | FDOT | No |
| Copans Road | US 1 | I-95 | Broward County | No |
| NE 14th Street | A1A | US 1 | FDOT | Yes |
| Atlantic Blvd. | A1A | I-95 | City of Pompano Beach / FDOT | Yes |
| Cypress Creek Rd | US 1 | I-95 | Broward County | No |
| Commercial Blvd. | A1A | I-95 | FDOT | Yes |
| Oakland Park Blvd. | A1A | I-95 | FDOT | Yes |
| Sunrise Blvd. | A1A | I-95 | FDOT | Yes |
| Broward Blvd. | US 1 | I-95 | FDOT | No |
| Las Olas Blvd. | A1A | US 1 | FDOT / City of Fort Lauderdale | Yes |
| Davie Blvd | US 1 | I-95 | FDOT | No |
| SE 17th Street | Harbor Beach Pkwy | US 1 | FDOT | Yes |
| SR 84 | US 1 | I-95 | FDOT | No |
| Griffin Road | US 1 | I-95 | FDOT | No |
| Dania Beach Blvd. | A1A | US 1 | FDOT | Yes |
| Stirling Road | US 1 | I-95 | FDOT | No |
| Sheridan Street | A1A | I-95 | FDOT | Yes |
| Johnson Street | US 1 | I-95 | City of Hollywood | No |
| Hollywood Blvd. | A1A | I-95 | FDOT / City of Hollywood | Yes |
| Pembroke Road | US 1 | I-95 | FDOT | No |
| Hallandale Beach. Blvd. | A1A | I-95 | FDOT | Yes |

Source: Planning and Development Management Division, 2018

## Appendix ND-B: Emergency Shelters in Broward County, 2017

| SCHOOL NAME | ADDRESS |
|---|---|
| 1. Arthur Ashe Adult Center | 1701 NW 23rd Avenue, Ft. Lauderdale 33311 |
| 2. Beachside Montessori Village | 2230 Lincoln Street, Hollywood, FL 33020 |
| 3. Challenger Elementary | 5703 NW 94th Avenue, Tamarac 33321 |
| 4. Coconut Palm Elementary | 13601 Monarch Lakes Blvd., Miramar 33027 |
| 5. Coral Cove Elementary | 5100 SW 148th Avenue, Miramar 33027 |
| 6. Coral Glades High | 2700 Sportsplex Drive., Coral Springs 33065 |
| 7. Dolphin Bay Elementary | 16450 Miramar Parkway, Miramar, FL 33027 |
| 8. Everglades Elementary | 2900 Bonaventure Blvd., Weston 33331 |
| 9. Everglades High | 17100 SW 48th Court, Miramar 33027 |
| 10. Falcon Cove Middle | 4251 Bonaventure Blvd., Weston 33332 |
| 11. Fox Trail Elementary | 1250 Nob Hill Road, Davie 33324 |
| 12. Gator Run Elementary | 1101 Arvida Parkway, Weston 33327 |
| 13. Gulfstream K-8 (South Campus) | 900 SW 8th Street, Hallandale 33009 |
| 14. * Indian Ridge Middle | 1355 Nob Hill Road, Davie 33324 |
| 15. Lakeside Elementary | 900 NW 136th Avenue, Pembroke Pines 33028 |
| 16. Liberty Elementary | 2450 Banks Road, Margate 33063 |
| 17. Lyons Creek Middle | 4333 Sol Press Blvd., Coconut Creek 33073 |

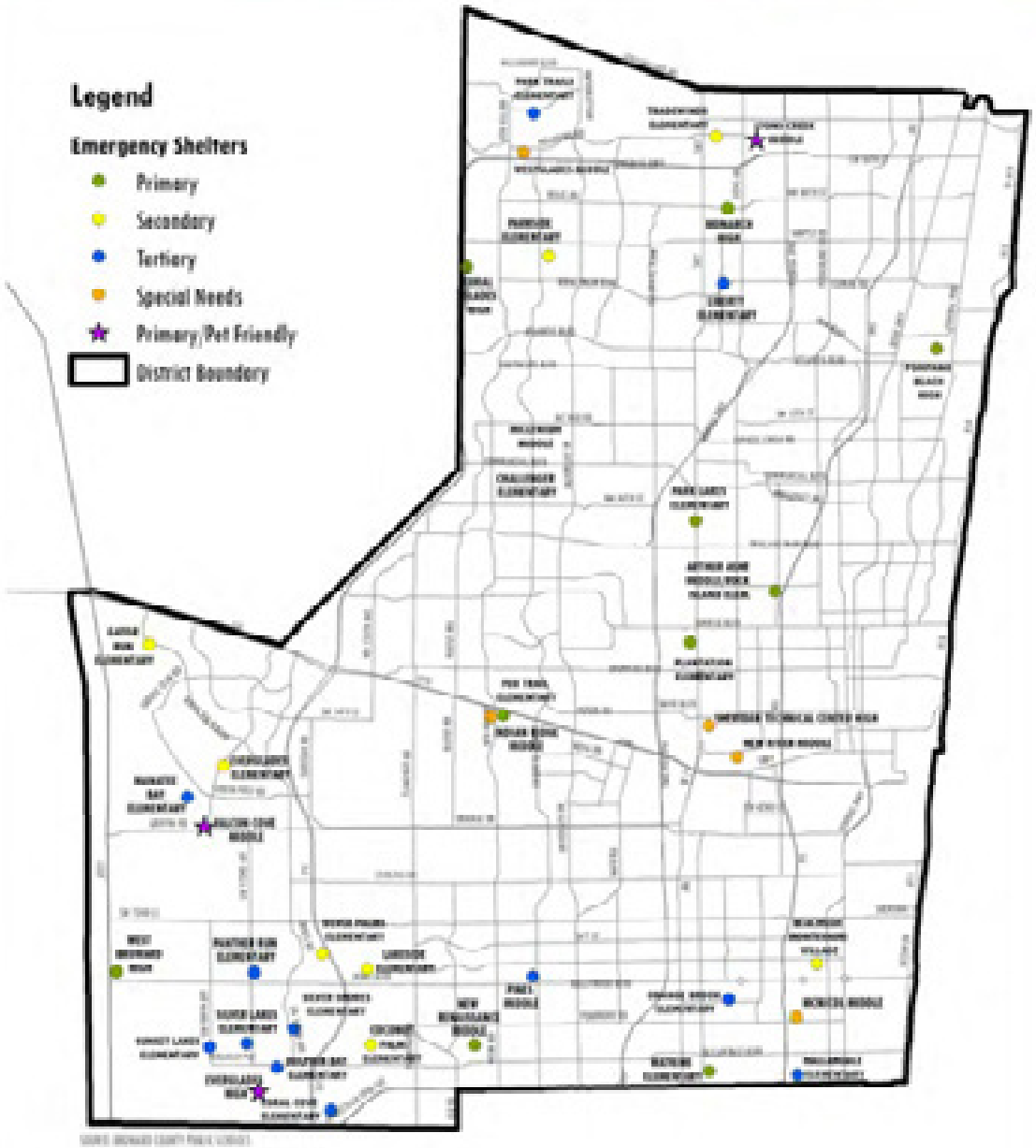
| SCHOOL NAME | ADDRESS |
|---|---|
| 18. Manatee Bay Elementary | 19200 SW 36th Street, Weston 33332 |
| 19. * McNicol Middle | 1602 South 27th Avenue, Hollywood 33020 |
| 20. Millennium Middle | 5803 NW 94 Avenue, Tamarac 33321 |
| 21. Monarch High | 5050 Wiles Road, Coconut Creek 33073 |
| 22. New Renaissance Middle | 10701 Miramar Blvd., Miramar 33027 |
| 23. * New River Middle | 3100 Riverland Road, Ft. Lauderdale 33312 |
| 24. Orange Brook Elementary | 715 S. 46 Avenue, Hollywood 33021 |
| 25. Panther Run Elementary | 801 NW 172nd Avenue, Pembroke Pines 33029 |
| 26. Park Lakes Elementary | 3925 N. State Road 7, Lauderdale Lakes 33319 |
| 27. Park Trails Elementary | 10700 Trails End, Parkland 33076 |
| 28. Parkside Elementary | 10257 NW 29th Street, Coral Springs 33065 |
| 29. Pines Middle | 200 N. Douglas Road, Pembroke Pines 33024 |
| 30. Plantation Elementary | 651 NW 42nd Avenue, Plantation 33317 |
| 31. Pompano Beach High | 600 NE 13th Avenue, Pompano Beach 33060 |
| 32. Rock Island Elementary | 2350 NW 19th Street, Ft. Lauderdale 33311 |
| 33. * Sheridan Technical High | 3775 SW 16th Street, Ft. Lauderdale 33312 |
| 34. Silver Lakes Elementary | 2300 SW 173rd Avenue, Miramar 33029 |
| 35. Silver Palms Elementary | 1209 NW 155th Avenue, Pembroke Pines 33028 |

| SCHOOL NAME | ADDRESS |
|---|---|
| 36. Silver Shores Elementary | 1701 SW 160th Avenue, Miramar 33027 |
| 37. Sunset Lakes Elementary | 18400 SW 25th Street, Miramar 33029 |
| 38. Tradewinds Elementary | 5400 Johnson Road, Coconut Creek 33073 |
| 39. Watkins Elementary | 3520 SW 52nd Avenue, Pembroke Park 33023 |
| 40. West Broward High | 500 NW 209 Avenue, Pembroke Pines 33029 |
| 41. * Westglades Middle | 11000 Holmberg Road, Parkland, FL 33076 |

* designated Special Needs Shelter
Source: Broward County ~~Emergency Management Division,~~ Regional Emergency Services and Communications, May 2018

# EMERGENCY SHELTERS

FIG. ND-1



## Appendix ND-C: Generator-Ready Businesses in Broward County, August 2017

| NAME | BUSINESS TYPE | LOCATION |
|---|---|---|
| Home Depot | Home Improvement | 4450 N SR 7, Coconut Creek |
| Publix | Grocery | 5365 Lyons Rd, Coconut Creek |
| Publix | Grocery | 6570 N SR7, Coconut Creek |
| Publix | Grocery | 4760 W Hillsboro Blvd, Coconut Creek |
| Publix | Grocery | 4849 Coconut Crk Pkwy, Coconut Creek |
| Publix | Grocery | 5656 S Flamingo Rd, Cooper City |
| Publix | Grocery | 10018 Griffin Rd, Cooper City |
| Publix | Grocery | 9359 Sheridan St, Cooper City |
| Home Depot | Home Improvement | 750 N University Dr, Coral Springs |
| Lowe's | Home Improvement | 3651 Turtle Creek Dr, Coral Springs |
| Publix | Grocery | 11600 W Sample Rd, Coral Springs |
| Publix | Grocery | 6270 W Sample Rd, Coral Springs |
| Publix | Grocery | 2201 N University Dr, Coral Springs |
| Publix | Grocery | 8160 Wiles Rd, Coral Springs |
| Publix | Grocery | 5950 Coral Ridge Dr, Coral Springs |
| Publix | Grocery | 1400 Coral Ridge Dr, Coral Springs |
| Publix | Grocery | 1305 University Dr, Coral Springs |
| Publix | Grocery | 10701 Wiles Rd, Coral Springs |
| SuperTarget | Retail | 4400 N SR 7, Coral Springs |
| Target | Retail | 9600 Westview Dr, Coral Springs |
| Publix | Grocery | 402 E Dania Beach Blvd, Dania Beach |
| Publix | Grocery | 3102 Griffin Rd, Dania Beach |
| Costco | Warehouse Club | 1890 S University Dr, Davie |
| Home Depot | Home Improvement | 5801 S University Dr, Davie |
| Home Depot | Home Improvement | 2300 S University Dr, Davie |

| NAME | BUSINESS TYPE | LOCATION |
|---|---|---|
| Home Depot | Home Improvement | 15885 Rick Case Honda Way, Davie |
| Publix | Grocery | 8842 W SR 84, Davie |
| Publix | Grocery | 6525 Nova Dr, Davie |
| Publix | Grocery | 5997 Stirling Rd, Davie |
| Publix | Grocery | 4901 Volunteer Rd, Davie |
| Publix | Grocery | 13700 SR 84, Davie |
| Publix | Grocery | 4901 SW 148th Ave, Davie |
| Publix | Grocery | 4701 S University Dr, Davie |
| SuperTarget | Retail | 5800 S University Dr, Davie |
| Whole Foods | Grocery | 1903 S University Dr, Davie |
| Home Depot | Home Improvement | 60 SW 12 Ave, Deerfield Beach |
| Publix | Grocery | 3740 W Hillsboro Blvd, Deerfield Beach |
| Publix | Grocery | 1337 S Military Trl, Deerfield Beach |
| Publix | Grocery | 150 S Federal Hwy, Deerfield Beach |
| SuperTarget | Retail | 3599 W Hillsboro Blvd, Deerfield Beach |
| Target | Retail | 1200 S Federal Hwy, Deerfield Beach |
| BJs Wholesale Club | Warehouse Club | 5100 NW 9 Ave, Ft. Lauderdale |
| Home Depot | Home Improvement | 1000 NE 4 Ave, Ft. Lauderdale |
| Publix | Grocery | 3500 Davie Blvd, Ft. Lauderdale |
| Publix | Grocery | 2501 E Sunrise Blvd, Ft. Lauderdale |
| Publix | Grocery | 1415 E Sunrise Blvd, Ft. Lauderdale |
| Publix | Grocery | 1950 Cordova Rd, Ft. Lauderdale |
| Publix | Grocery | 3400 N Federal Hwy, Ft. Lauderdale |
| Publix | Grocery | 601 S Andrews Ave, Ft. Lauderdale |
| Target | Retail | 3200 N Federal Hwy, Ft. Lauderdale |
| Whole Foods | Grocery | 2000 N Federal Hwy, Ft. Lauderdale |
| Publix | Grocery | 1400 E Hallandale Bch Blvd, Hallandale Beach |

| NAME | BUSINESS TYPE | LOCATION |
|---|---|---|
| Winn Dixie | Grocery | 1515 E Hallandale Bch Blvd, Hallandale Beach |
| BJs Wholesale Club | Warehouse Club | 4000 Oakwood Blvd, Hollywood |
| Home Depot | Home Improvement | 1951 S SR 7, Hollywood |
| Home Depot | Home Improvement | 3401 Oakwood Blvd, Hollywood |
| Penn Dutch | Grocery | 3950 N 28 Terr, Hollywood |
| Publix | Grocery | 3251 Hollywood Blvd, Hollywood |
| Publix | Grocery | 1700 Sheridan St, Hollywood |
| Publix | Grocery | 6901 Taft St, Hollywood |
| Sedano's | Grocery | 2319 N 60 Ave, Hollywood |
| Target | Retail | 300 Hollywood Mall, Hollywood |
| Winn Dixie | Grocery | 6775 Taft St, Hollywood |
| Publix | Grocery | 5855 W Oakland Park Blvd, Lauderhill |
| SuperTarget | Retail | 7730 W Commercial Blvd, Lauderhill |
| Publix | Grocery | 2450 N Federal Hwy, Lighthouse Point |
| Publix | Grocery | 3700 N Federal Hwy, Lighthouse Point |
| Penn Dutch | Grocery | 3201 N SR 7, Margate |
| Publix | Grocery | 7230 W Atlantic Blvd, Margate |
| Winn Dixie | Grocery | 5600 W Sample Rd, Margate |
| Home Depot | Home Improvement | 3183 SW 160 Avenue, Miramar |
| Publix | Grocery | 9951 Miramar Pkwy, Miramar |
| Publix | Grocery | 11000 Pembroke Rd, Miramar |
| Publix | Grocery | 18409 Miramar Pkwy, Miramar |
| Publix | Grocery | 14375 Miramar Pkwy, Miramar |
| Publix | Grocery | 6890 Miramar Pkwy, Miramar |
| SuperTarget | Grocery | 16901 Miramar Pkwy, Miramar |
| Home Depot | Home Improvement | 1195 S SR 7, North Lauderdale |
| Publix | Grocery | 1297 S SR 7, North Lauderdale |
| Publix | Grocery | 8140 W McNab Rd, North Lauderdale |

| NAME | BUSINESS TYPE | LOCATION |
|---|---|---|
| Sedano's | Grocery | 7208 Southgate Blvd, North Lauderdale |
| Home Depot | Home Improvement | 1701 W Oakland Park Blvd, Oakland Park |
| Lowe's | Home Improvement | 1001 W Oakland Park Blvd, Oakland Park |
| Publix | Grocery | 1003 E Commercial Blvd, Oakland Park |
| Safeway | Grocery | 950 E Commercial Blvd, Oakland Park |
| BJ's Wholesale Club | Warehouse Club | 5901 W Hillsboro Blvd, Parkland |
| Publix | Grocery | 8095 N University Dr, Parkland |
| BJ's Wholesale Club | Warehouse Club | 13700 Pines Blvd, Pembroke Pines |
| Costco | Warehouse Club | 15915 Pines Blvd, Pembroke Pines |
| Home Depot | Home Improvement | 11001 Pines Blvd, Pembroke Pines |
| Lowe's | Home Improvement | 130 N University Dr, Pembroke Pines |
| Publix | Grocery | 600 N University Dr, Pembroke Pines |
| Publix | Grocery | 19441 Sheridan St, Pembroke Pines |
| Publix | Grocery | 18341 Pines Blvd, Pembroke Pines |
| Publix | Grocery | 170 S Flamingo Rd, Pembroke Pines |
| Publix | Grocery | 15729 Pines Blvd, Pembroke Pines |
| Publix | Grocery | 1657 N Hiatus Rd, Pembroke Pines |
| Sedano's | Grocery | 10333 Pines Blvd, Pembroke Pines |
| Sedano's | Grocery | 17171 Pines Blvd, Pembroke Pines |
| Target | Retail | 11253 Pines Blvd, Pembroke Pines |
| Whole Foods | Grocery | 14956 Pines Blvd, Pembroke Pines |
| Fresh Market, The | Grocery | 12171 W Sunrise Blvd, Plantation |
| Publix | Grocery | 225 S Flamingo Rd, Plantation |
| Publix | Grocery | 1181 S University Dr, Plantation |
| Publix | Grocery | 10065 Cleary Blvd, Plantation |

| NAME | BUSINESS TYPE | LOCATION |
|---|---|---|
| Publix | Grocery | 8101 W Sunrise Blvd, Plantation |
| Publix | Grocery | 6921 W Broward Blvd, Plantation |
| Target | Retail | 8201 Federated West Roadway, Plantation |
| Costco | Warehouse Club | 1800 W Sample Rd, Pompano Beach |
| Home Depot | Home Improvement | 1151 NW Copans Rd, Pompano Beach |
| Lowe's | Home Improvement | 1851 N Federal Hwy, Pompano Beach |
| Publix | Grocery | 1405 S Federal Hwy, Pompano Beach |
| Publix | Grocery | 411 S Cypress Rd, Pompano Beach |
| Publix | Grocery | 1140 SW 36 Ave, Pompano Beach |
| Publix | Grocery | 2511 E Atlantic Blvd, Pompano Beach |
| Winn Dixie | Grocery | 3435 N Federal Hwy, Pompano Beach |
| Publix | Grocery | 4703 N Ocean Dr, Sea Ranch Lakes |
| Lowe's | Home Improvement | 6600 Dykes Rd, Southwest Ranches |
| Publix | Grocery | 15801 Sheridan St, Southwest Ranches |
| Home Depot | Home Improvement | 12525 W Sunrise Blvd, Sunrise |
| Home Depot | Home Improvement | 2901 N University Dr, Sunrise |
| Lowe's | Home Improvement | 8050 W Oakland Park Blvd, Sunrise |
| Publix | Grocery | 9300 W Commercial Blvd, Sunrise |
| Publix | Grocery | 10155 W Oakland Park Blvd, Sunrise |
| Publix | Grocery | 12500 W Sunrise Blvd, Sunrise, FL |
| SuperTarget | Retail | 12801 W Sunrise Blvd, Sunrise |
| Publix | Grocery | 881 N University Dr, Tamarac |
| Publix | Grocery | 4121 W Commercial Blvd, Tamarac |
| Publix | Grocery | 8245 NW 88 Ave, Tamarac |
| Winn Dixie | Grocery | 7015 N University Dr, Tamarac |
| Publix | Grocery | 294 Indian Trace, Weston |
| Publix | Grocery | 1170 Weston Rd, Weston |
| Publix | Grocery | 4567 Weston Rd, Weston |
| Publix | Grocery | 1601 Promenade Blvd, Weston |

| NAME | BUSINESS TYPE | LOCATION |
|---|---|---|
| Publix | Grocery | 2465 Glades Cir, Weston |
| Publix | Grocery | 2633 N Dixie Hwy, Wilton Manors |
| Publix | Grocery | 100 W Oakland Park Blvd, Wilton Manors |

Source: Broward County Emergency Management Division, August 9, 2017


BROWARD COUNTY
FLORIDA

# Public School Facilities Element Support Document

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BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Public School Facilities Element

## INTRODUCTION

### A. General

The Florida Legislature strengthened the ties between school planning and general land use and comprehensive planning with the adoption of Senate Bill 360 in 2005, but reversed course and repealed many provisions, including mandatory school concurrency in 2011 with the passage of the Community Planning Act (House Bill 7207). The Community Planning Act shifts much more regulatory discretion to local governments to plan their communities and reduces state oversight in comprehensive planning areas. Under new/revised provisions adopted with Florida Statutes (SF) Chapter 2011-139:

1. Requirement for a Public School Facilities Element is deleted.
2. State-mandated school concurrency is optional.
3. Data and analysis and mapping requirements relaxed.

*Public School Facilities Element Requirements*

FS Chapter 2011-139 provides that local governments have the option to repeal or continue implementing public school concurrency. Local governments who choose to continue implementing it, can do so under provisions set forth in s. 163.3177(1), 163.31777 and 163.3180(6)(a). Broward County will continue to implement the provisions according to state statute and the Interlocal Agreement for Public School Facilities Planning (ILA).

The Public School Facilities Element goals, objectives, and policies address the following areas:

1. Procedure of annual update process;
2. Procedure for school site selection;
3. Procedure for school permitting;
4. Provision of infrastructure necessary to support proposed schools;
5. Provision for collocation of other public facilities in proximity to public schools;
6. Provision for location of schools proximate to residential areas and to complement patterns of development;
7. Measures to ensure compatibility of school sites and surrounding land uses; and
8. Coordination with adjacent local governments and the school district on emergency preparedness issues.

The data and analysis portion of the Public School Facilities Element addresses:

1. How Level-of-Service (LOS) standards will be achieved and maintained;
2. The Interlocal Agreement (ILA) adopted pursuant to s. 163.31777 and the 5-year school District Educational Facilities Program (DEFP), including LOS maps, adopted pursuant to s. 1013-35, Florida Statutes;
3. The educational plant survey prepared pursuant to s. 1013.31 and an existing educational map or map series;
4. Projected future population and associated demographics, including development patterns year by year for the upcoming 5-year and long-term planning periods; and
5. Information on existing development and development anticipated for the next 5 years and the long-term planning period;
6. An analysis of problems and opportunities for existing schools and schools anticipated in the future;
7. An analysis of opportunities to collocate future schools with other public facilities such as parks, libraries, and community centers as per the ILA;
8. Inventory of public schools that serve as emergency shelters; and
9. Funding sources for capital improvements.

## B. Service Area

The planning service area is countywide and includes both charter schools and public schools in all 31 municipalities and the BMSD. Serving students in 234 schools, centers and technical colleges, and 93 charter schools, Broward County has the sixth ($6^{th}$) largest school district in the nation and second ($2^{nd}$) largest in Florida. Broward County.

## C. Planning Horizon

The planning horizons for the Public School Facilities Element are five years (2021-22) and ten years (2027), in compliance with FS Chapter 163.3177(5)(a).

# DATA REQUIREMENTS

## A. Collaborative Planning Process and Intergovernmental Coordination

Beginning in 2006, School Board staff began working collaboratively with the County and municipalities through the School Board's Staff Working Group and Oversight Committee to form consensus on the amendments to the Interlocal Agreement and the preparation of a model Public School Facilities Element. The committee continues to meet on a regular basis in order to implement state and Interlocal Agreement requirements to coordinate and collaborate on updates to the financially feasible District Educational Facilities Plan (DEFP), Concurrency Service Areas (CSAs) and amendments to the Comprehensive Plans of the County and non-exempt municipalities (those whose schools are operating at less than 100 percent of capacity and whose projected five-year student growth rate is under 10 percent) for the implementation of public school concurrency.

## B. Concurrency Management System (CMS)

The concurrency management system for Broward County is an intergovernmental effort that is grounded in the provisions of the Broward County Charter, which provide for county-wide planning processes implemented through the County's Land Development Code. The public school facility Concurrency Management System operates according to the state mandated requirements (Section 163.31777 F.S. and 163.3180 F.S.) for the implementation of school concurrency and the adopted ILA. These require Broward County, the School Board and non-exempt municipalities to ensure that the adopted LOS Standard to be achieved and maintained for each school type and CSA.

Unlike existing concurrency services (roads, sanitary sewer, solid waste, drainage, potable water, recreation and mass transit) which are the responsibility of local governments, the School Board, by constitutional mandate, has the responsibility of providing educational facilities to meet the needs of current and future students as represented in the School Board's adopted Five Year DEFP. The local governments, therefore, do not have control of the funding sources or the allocation of funds for new or renovated schools which would add student capacity. Concurrency Management Systems are implemented by the local governments through their Land Development Regulations

The Broward County Land Development Code contains the County's Concurrency Management System. The Code requires plat approval of all parcels of land prior to receiving a Development Order. Plat approval applies to land within the municipal boundaries as well as

that in the unincorporated areas. Per Section 8.2 of the Interlocal Agreement the point of review for Public School Concurrency is plat or site plan (or functional equivalent).

When a development application is reviewed for school concurrency, it must be determined if the development is exempted or vested (as per Section 8.11 of the Interlocal Agreement) or has been issued a School Capacity Availability Determination Letter (SCAD) by the School Board indicating that adequate school capacity exists. If so, it can be accepted by the County for further processing.

If the development application is not exempted or vested, it is subject to school concurrency and the applicant must submit a Public School Impact Application (PSIA) to the applicable local government for review by the School Board according to the provisions and processes outlined in Section 8.13 of the Interlocal Agreement.

## C. Level of Service Standard Methodology

The LOS standard is based upon the capacity of the school facility, which is the number of pupils to be served by the facility. The level of service is expressed as the percentage (ratio) of student enrollment to the student capacity of the school. The level of service is standard and is expressed in terms of Florida Inventory of School Houses (FISH) capacity. FISH capacity is determined by Florida Department of Education guidelines and represents a measure of the physical capacity of the facility itself. FISH capacity includes satisfactory student stations in classrooms. Based on the ~~second amendment to the~~ Third Amended and Restated Interlocal Agreement for Public School Facility Planning, which became effective in May 2018 ~~September 2010~~, the level of service standard was ~~uniformly~~ set for schools of the same type as follows: ~~as 100% of gross capacity (with relocatable classrooms) for each CSA until the end of the 2018/19 school year; and commencing at the 2019/20 school year, the LOS for each CSA shall be 110% of the permanent FISH capacity.~~

1. School Type A is a bounded elementary, middle or high school that has the equivalent of at least 10% of its permanent FISH capacity available onsite in relocatables. The LOS for School Type A shall be 100% gross capacity (including relocatables).

2. School Type B is a bounded elementary, middle or high school that has less than the equivalent of 10% of its permanent FISH capacity available onsite in relocatables. The LOS for School Type B shall be 110% permanent FISH capacity.

The relationship of enrollment to capacity, for individual schools and for concurrency service areas, is derived directly from the five-year schedule of capital improvements that incorporates the Five-Year District Educational Facilities Work Program adopted annually by the School Board. The school capacity and level of service analysis is assigned in a capacity/enrollment and level of service table. This table provides a year-by-year projection of capacity, enrollment, levels of service (LOS) and available capacity, illustrating surpluses and deficiencies, based on the financially feasible capital program adopted by the school district.

Student enrollment is projected annually based on the specific function of the educational facility and the characteristics of the school attendance area, historical trends, and the current and projected pace of development.

Other factors such as students attending schools outside their assigned attendance areas due to reassignments, magnet programs, charter schools and other educational choices are factored into the methodology for enrollment projections and for allocating school capacity.

Student enrollment projections are geographically based using local development trend data and the District's historic student enrollment data. School-by-school enrollment projections by concurrency service areas are applied. General locations of future public schools to be constructed within the District over five years are applied to concurrency service areas relative to the location serving the anticipated capacity deficit. In addition, as stated in School Board Policy 5000, the School Board will maximize the use of existing space throughout the District, not to exceed capacity equal to or greater than 100% of gross FISH capacity, through boundary changes in order to meet school concurrency. As a temporary solution, the implementation of alternative enrollment options as identified by the Superintendent will be the sole discretion of the School Board to ease overcrowding until permanent capacity becomes available through the building of additional facilities on site, boundary change, or new schools.

School enrollments exceeding the ~~available~~ adopted level of service capacity, ~~resulting in a level of service greater than 100% of gross FISH capacity in the first fiscal year (or 110% permanent FISH capacity beginning the 2019/20 academic planning year),~~ achieve the level of service standard by the fifth year due to planned capital improvements not yet available until the final year or by utilizing options in School Board Policy 5000 to meet the level of service.

## D. Problems and Opportunities for Existing and Future Schools

### 1. Land Availability

Some schools that experienced rapid growth have had to utilize areas of their sites to place classroom additions and relocatables. As a result, much of the available green space, playfields, playgrounds, and parking areas have been used to locate building programs. The demand for water retention areas and additional parking has also reduced the useable area for educational programs.

Strategies to design for and construct on smaller sites were incorporated in the Guidelines for Urban Conscripts, adopted by the School Board in February 2009 via Resolution #09-66. The resolution encourages designing a more compact building footprint, sharing parking and playfields, as well as exploring the use of parking garages versus surface parking.

### 2. Construction Costs and Revenue Sources

The primary ~~main~~ source of revenue for the ~~capital plan~~ District's capital outlay is the tax on local property. Property tax revenues increased by ~~8.2 %~~ 6.1% between ~~2016~~ 2017 and ~~2017~~ 2018.

On November 4, 2014, Broward County Voters approved an $800 million General Obligation Bond. The district has committed to investing the funding to enhance students' learning environments by focusing on improvements in Safety, Music and Art, Athletics, Renovation, and Technology (SMART Program). When the general obligation bond is combined with other capital outlay funds, the SMART Program is currently $1,009.6 ~~$987~~ Million.

To keep the School Board and the public fully informed of how the District is using sound policies and practices that meet the essential needs of students and that warrant public confidence in District operations, each year the District prepares and the School Board adopts a ~~five-year~~ Five Year DEFP. The Adopted DEFP is incorporated in the District's adopted budget annually as required by Section 1013.35, Florida Statutes. The current ~~five-year~~ Five Year DEFP was adopted on ~~September 6, 2017~~ September 5, 2018 and will be updated again in September ~~2018~~ 2019. The Adopted DEFP includes the SMART program and lays out a ~~$2.68~~ $2.8 billion long-term financial plan.

The Adopted DEFP highlights SMART Program construction projects across the District. These projects are being implemented through contracts the District has entered ~~into~~

with outside firms to provide Owner's Representative and Cost/Program Controls management services. Using these firms, the District is enhancing efficiency by keeping current with the latest developments in construction management systems and practices. In addition, the firms ~~are establishing~~ have established a central coordinated repository of data by implementing, maintaining, and upgrading management information systems appropriated to facilitate the efficient and effective use of information throughout the District's capital projects.

## 3. Enrollment Projections

Enrollment is not uniform throughout the District as local communities go through their aging cycles at different rates. The District is still experiencing growth in certain areas of the county that has stressed the educational facility capacities in those areas. This imbalance created by regionalized growth, combined with a decline in enrollment in other areas, has left the District with a surplus in permanent capacity of 21,602 seats, and therefore, due to state plant survey restrictions, unable to add capacity in overcrowded schools. Planning based on sound enrollment projections has proven to be a crucial component especially in times of financial challenges.

Broward County Public School's (BCPS) primary projection tool is a geographically-based Cohort Survival model, which projects future students by grade. The Cohort Survival model is considered very reliable and is utilized by the Florida Department of Education in their student projections and the U.S. Census Bureau for their reports. The model uses an "aging" concept that moves a group, or cohort, of students into the future and increases or decreases their numbers according to past experience through history.

The Cohort Survival methodology relies on historical enrollment and birth data to capture the effects of in and out-migration, housing changes, and natural trends in population. In essence, the model derives a growth factor or ratio for student survival matriculation to the next grade based upon previous survival numbers to the same grade of students in each Traffic Analysis Zone (TAZ), the basic geographic area for the model. In most cases, TAZ areas represent neighborhoods. There are 953 TAZ areas in Broward County. TAZ areas are further divided into smaller geographic areas to account for schools that matriculate to more than one school at each grade level, (e.g. an elementary school that feeds into 2 different middle schools). The combination of elementary, middle and high school attendance zones and TAZ areas create a unique identifiable area called a Study Area IDentification or SAID. SAIDs capture the grade

cohorts more accurately by including feeder patterns. For example, if elementary school A matriculates to 2 different middle schools B and C and one high school D, there would be 2 different SAIDs for elementary school A—one SAID to represent matriculation from elementary A to middle school B to high school D and another SAID to represent matriculation from elementary A to middle school C to high school D.

Once the model has been run for the small geographic units or SAIDs, the projections are then summarized by TAZ. In some instances, individual TAZ areas are corrected to reflect changes in growth which are not picked up in the projection model's histories. A few examples where corrections are required include areas where:

1. new construction is anticipated to exceed the pace of historical construction for an area,
2. an area is reaching build-out and all new construction will cease or slow down,
3. an unprecedented slow-down in the economic market, or
4. a boundary change has artificially increased/decreased the area.

### a. Birth Data

The historical number of births is a good indicator of future kindergarten class size. Birth data is acquired from the Florida Department of Health Vital Records by U. S. Census tract. Several steps are taken to interpolate future kindergarten enrollment based on births, as not all children born will enter kindergarten. To project kindergarten enrollment, births by census tract have to be estimated for a five year period i.e., births from 2011 will potentially enter kindergarten in 2016-17. Data is then increased or decreased based on past kindergarten populations by census tract. Once the number of births is adjusted, the percentage of students that are in each census tract is broken down to the SAID level. Since the census tract may intersect more than one SAID, a unique identifier is created between the census tracts and SAIDs. The percentage of actual attending kindergarten students for the past two years is calculated for each unique SAID/census tract. This percentage is used to extrapolate the number of kindergarten from the total number of kindergarten aged students within a given unique SAID/census tract. The SAIDs are then summarized to obtain the estimated number of kindergarten students by SAID for five years.

### b. Residential Development Data

Each year Broward County municipal planning staff provides current and forecasted certificates of occupancy to assist county and BCPS demographic staff in estimating population changes. Residential growth is also shared and monitored through the Facility Planning and Real Estate Department. BCPS requests city and county planning staff to estimate future certificates of occupancy over the next five years.

### c. Other Data

Other information is analyzed to determine if the Cohort Survival rates may need to be adjusted to align with a shorter or longer historical time horizon. These data may include:

1. Existing home sales (source: Florida Association of Realtors)
2. Population Projections (source: U.S. Census, Broward County, Bureau of Economic and Business Research, and Florida Department of Education).

### d. Attrition Rate of Attending Students

BCPS includes four years of attending enrollment to calculate the rate of attrition or rate of students matriculating to the next level within their SAID by grade. Attending enrollment is the total number of students within the attendance zone that are attending their geographically assigned school. Determining the attrition rate by SAID, keeps the feeder patterns intact as the grades matriculate to each specific school. For example:

$$\frac{\text{(\# of 2007-2008 attending 2nd graders) by SAID}}{\text{(\# of 2006-2007 attending 1st graders) by SAID}} = \text{SAID 2nd grade attrition rate 2007-2008}$$

$$\frac{\text{(\# of 2008-2009 attending 2nd graders) by SAID}}{\text{(\# of 2007-2008 attending 1st graders) by SAID}} = \text{SAID 2nd grade attrition rate 2008-2009}$$

$$\frac{\text{(\# of 2009-2010 attending 2nd graders) by SAID}}{\text{(\# of 2008-2009 attending 1st graders) by SAID}} = \text{SAID 2nd grade attrition rate 2009-2010}$$

Once the attrition rate is calculated for each grade, grades one through twelve, over the past three years, it is then averaged and used as a factor to obtain next year's projections for that grade. For example:

$$\left(\begin{array}{c}\text{Average SAID 2nd grade}\\ \text{attrition rate from 2007-2010}\end{array}\right) \times \left(\begin{array}{c}\text{\#of 2009-10 attending}\\ \text{2nd graders by SAID}\end{array}\right) = \text{projected 2010-11 2nd graders by SAID}$$

To calculate subsequent years of projections by grade, the model uses the projected rate of attrition based on the projected enrollment of the previous year to calculate the next projection year. For example:

$$\left(\begin{array}{c}\text{Average SAID 2nd grade}\\ \text{projected attrition rate}\\ \text{from 2008-2011}\end{array}\right) \times \left(\begin{array}{c}\text{\# of projected 2010-11}\\ \text{attending 2nd graders}\\ \text{by SAID}\end{array}\right) = \text{projected 2011-12 2nd graders by SAID}$$

Projections by SAID for each grade are then reviewed school-by-school. Attrition rates can cause projections to be exceedingly high or low in which case they will have to be adjusted so as not to cause an exponential effect in outer projection years. The following are possible corrections to rates:

Out-of-Boundary Students (OOB): Out-of-boundary (OOB) students are students attending a school from outside their attendance area (i.e. approved reassignments).

BCPS assumes that OOB students at each grade level at each school will be the same as the existing year and will have a survival rate of 100% as they matriculate through the grade levels. For example, Middle School A currently has the following OOB students: 35-6th grade, 38-7th grade, and 42-8th grade. For all projected years, Middle School A will have 35-6th grade, 38-7th grade, and 42-8th grade OOB students.

However, adjustments can be made to OOB students if enrollments naturally decline based on the calculated cohort survival rate yet economic or other conditions may suggest enrollment should increase or if schools are eligible to receive assignment transfers. Since assignment data is determined after the release of the projections and is subject to change, the OOB students typically remain constant in the model based on the current year's data.

The school-by-school Cohort Survival model projections, by grade, are compared and tested for reasonableness with other models such as the Florida Department of Education (FDOE) projections and the Broward County Planning

and Redevelopment Division school-aged population projections. Accordingly, adjustments may be made to the Cohort Survival model based on the following factors:

1. changes in the rate or type of new housing development within Broward county
2. changes in economic conditions (e.g. the creation of jobs usually means families are moving in whereas a recession usually means families are moving out)
3. immigration
4. natural phenomena (e.g. hurricanes)

There are also decisions made within BCPS, which may have a dramatic effect upon projections. These include:

1. future placement of English Language Learners (ELL) clusters
2. future placement of Exceptional Student Education (ESE) clusters
3. opening and closing of magnet programs (first year projections are difficult because of the lack of a "track record")
4. student choice reassignments
5. other approved reassignments
6. opening and closing of charter schools throughout the year

## 4. State Plant Survey

Florida Statue 1031.31 requires that every five years each county must submit a plant survey to aid in formulating plans for housing the educational program and student population as well as ancillary plants that provide services for the district. The Educational Plant Survey is a long-range facility planning tool that determines the future housing and facility needs of the district to provide an appropriate educational program and services for each student based on the district's mission statement and strategic plan. The survey is developed using Department of Education five-year projections. All projects in the Adopted District Educational Facilities Plan using state authorized funds must be in the district's state plant survey. Because of declining enrollment and increased space availability this requirement will eliminate building new capacity additions as a viable option to resolve level of service compliance. However, through the passage of the General Obligation Bond, which includes $800 million for capital

projects, the District will provide replacement permanent capacity to certain facilities that rely on aging relocatable classrooms to house their student population.

The updated five-year student enrollment projections provide a basis for determining capital needs. Table PSF-1 below, summarizes the actual enrollment, by level, for the ~~2017-18~~ 2018-19 and the projected enrollment for ~~2022-23~~ 2023-24 school years. The enrollment projections are compared to the benchmark day figures for the current (~~2017-18~~ 2018-19) school year. As indicated in the table, ~~an increase~~ a decrease of ~~412~~ 967 students occurred between ~~2016-17 and 2017-18~~ 2017-18 and 2018-19.

## Table PSF-1: Summary of Enrollment Projections

| School Type | 2017/18 Benchmark Day Enrollment | 2018/19 Benchmark Day Enrollment | 2018/19 Increase/(Decrease) Over 2017/18 Benchmark Day Enrollment | 2023/24 Projected Benchmark Day Enrollment | 2023/24 Increase/(Decrease) Over 2018/19 Benchmark Day Enrollment |
|---|---|---|---|---|---|
| Pre-Kindergarten | 5,939 | 6,158 | 219 | 6,158 | 0 |
| Elementary (K-5) | 96,374 | 94,864 | -1,510 | 95,487 | 623 |
| Middle | 48,335 | 48,804 | 469 | 48,821 | 17 |
| High | 70,686 | 70,358 | -328 | 70,974 | 616 |
| Centers | 5,090 | 4,447 | -643 | 4,447 | 0 |
| Charters | 45,093 | 45,919 | 826 | 47,521 | 1,602 |
| Total | 271,517 | 270,550 | -967 | 273,409 | 2,859 |

**Source:** School Board of Broward County 2018

The District is projected to increase by ~~2,045~~ 2,859 total pre-kindergarten through twelfth grade students, including those in centers and charter schools, by the ~~2022-23~~ 2023-24 school year. Enrollment in charter schools is ~~45,093~~ 45,919 this year, with an undetermined number of additional charter schools anticipated in the next year. If the charter school trend continues, then these projected students will impact the capital needs of other public schools in the District. Recent trends in District and charter school enrollment, as well as current birth data indicate that elementary (pre-kindergarten through grade 5) enrollment in District-owned facilities will increase over the next five years by ~~537~~ 623 students. ~~High~~ Middle school enrollment in District-owned facilities is projected to show ~~a decrease~~ an increase of ~~89~~ 17 students while ~~elementary~~ high school enrollment will increase by ~~145~~ 616 students ~~and high school enrollment will increase by 481 students~~. By the end of the five-year period, Broward County School District's projected enrollment will total ~~273,562~~ 273,409 students.

## 5. Class Size Reduction

~~Amendment 9 to the State Constitution, approved by Florida voters in November 2002, requires that the State Legislature provide funding for sufficient classrooms so that class sizes can be reduced to certain constitutional class size maximums. Sections 1003.03 and 1013.735 of Amendment 9 relate to the implementation of Amendment 9 and are collectively referred to herein as the "Class Size Legislation." Beginning with the 2010-~~

~~11 school year, the maximum number of students in each core class is: 18 students for Grades PK-3; 22 students for Grades 4-8; and 25 students for Grades 9-12. Compliance with Amendment 9 is determined at the classroom level.~~

In November 2002, Florida's voters approved an amendment to the Florida Constitution that set limits on the number of students in core classes in the State's public schools. In 2003, the Florida Legislature enacted Chapter 2003-391, Laws of Florida, which implemented the amendment by requiring the number of students in each core classroom to be reduced by at least two students per year beginning in the 2003-04 school year, with full compliance measured at the classroom level by the 2010-11 school year. The class size maximums established in section 1003.03, Florida Statutes (F.S.), are described in Table PSF-2 below.

Table PSF-2: Class Size Maximums

| Grade Group | Class Size Maximum |
|---|---|
| PK-3 | 18 |
| 4-8 | 22 |
| 9-12 | 25 |

### a. ~~Class Size Reduction Non-Compliance Consequences~~ Compliance

As of the 2010-11 school year, class size compliance is measured at classroom level, by room and period, for all core courses. Core-curricula courses that are included in the class size calculations are defined by the Florida Department of Education (FLDOE) by grade group per section 1003.01(14), F.S. The term is limited in meaning and used for the sole purpose of designating classes that are subject to the maximum class size requirements established in s. 1, Art. IX of the State Constitution. This term does not include virtual education or blended learning courses offered under ss. 1002.321(4)(e), 1002.33(7)(a)2.b., 1002.37, 1002.45, and 1003.499, F.S.

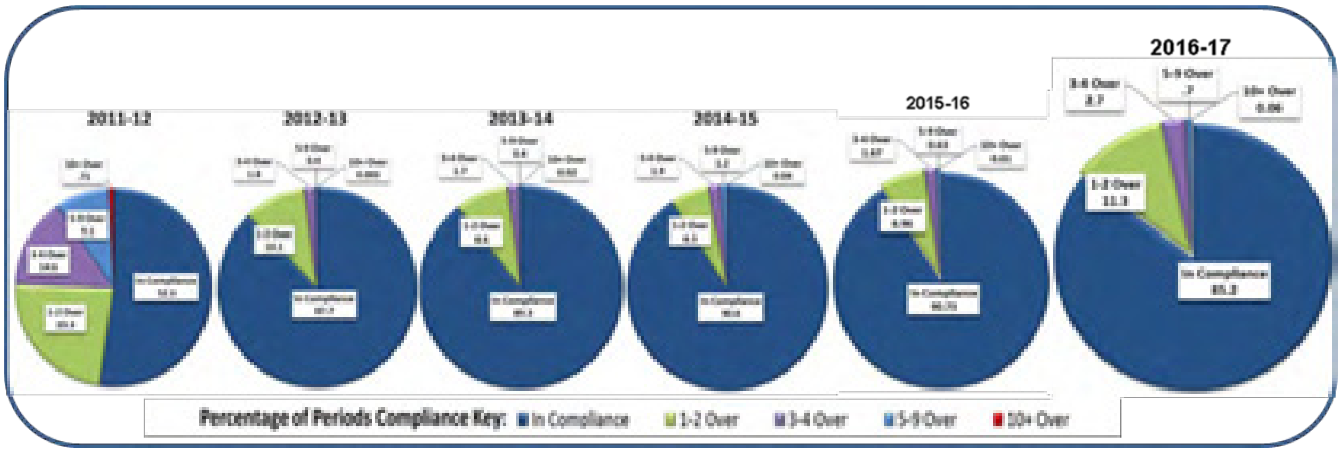
In 2010, Florida Legislature clarified that charter schools must comply with maximum class size requirements, except that the calculation for compliance pursuant to section 1003.03, F.S. shall be at the school level average by grade group, instead of at the classroom level. In 2013, Florida Legislature revised section 1002.31(9), F.S., requiring district-operated schools of choice to comply with section 1003.03, F.S., relating to maximum class size, with the calculation for compliance at the school level average by grade group, in the same manner as charter schools.

For the 2011-12 school year, when class size implementation began at the classroom level, Broward County Public Schools (BCPS) was meeting class size in 52.3% of the total core periods. The following year, in 2012-13, overall District class size compliance increased to 87.7% and continued to increase in 2013-14 to 89.3%. In 2014-15, all of the District's non-charter schools were able to meet 100% class size compliance requirements, at the classroom level for traditional schools and at the school level average by grade group for Schools of Choice. In 2017-18, for the fourth consecutive year, BCPS has continued to meet 100% class size compliance requirements at all of the District's non-charter schools. Final class size data for the 2018-19 school year will be released by the FLDOE at year's end.

~~The Class Size Legislation continues to require each School Board to consider implementing various policies and methods to meet these constitutional class sizes, including encouraging dual enrollment courses, encouraging the Florida Virtual School, maximizing instructional staff, reducing construction costs, using joint-use facilities, implementing alternative class scheduling, redrawing attendance zones, implementing evening and multiple sessions, and implementing year-round and non-traditional calendars.~~

~~During 2012-13, classes at non-charter went from 52.3% in compliance during 2011-12, to 87.7% in compliance during 2012-13. In 2013-14, Broward continued to apply State implementation options and increased period-by-period compliance to 89.3%. Additionally, the state legislature provided that District 'Schools of Choice' would be held to the same, schoolwide average by grade grouping compliance standards as Charter schools. In 2014, per Florida State Statute, the calculation for the District's penalty was increased to 100% of the base student allocation versus the original 50%. In 2014-15, Districtwide period-by-period compliance increased to 90.6% at non-charter schools. At this same time, for the first time in 4 years, the District non-charter schools were not included in the FDOE CSR Compliance penalty calculations. In 2015-16, District compliance for non-charter and traditional schools improved 0.1 percentage point over 2014-15 levels to 90.7%. In 2016-17, the overall District period-by-period compliance decreased to 85.2%; however, the District continued to meet schoolwide average compliance by grade grouping at all Schools of Choice and 100% period-by-period compliance at all traditional schools. This was the third consecutive year that the District's non-charter schools did not incur a Class Size Reduction Compliance penalty. Final data for 2017-18 compliance will be available at year's end.~~

Figure PSF-1: Class Size Compliance Periods




Source: School Board of Broward County 2017

Accountability provisions put into place during the 2011 Legislative session provided the following:

1. Compliance determination continues to be based on the October student enrollment survey;
2. A reduction calculation to class size funding for non-compliant districts, which can be adjusted for good cause;
3. A reallocation bonus of up to five percent of the base student allocation for compliant districts, not to exceed 25 percent of the reduced funds;
4. An add-back of the remaining 75 percent of the reduced funds, if districts submit a plan to meet the requirements by October of the subsequent year; and
5. Authorization of virtual instruction programs as an option to meet class size requirements.

During the 2011-12 school year, the FDOE implemented a one-time rule in which a District could not be fined for more than half the State's total fine. Under the 2011 bill and continuing, a timeframe was specified for satisfying and maintaining class size maximums, with specific exceptions of an extreme emergency beyond the district's control and when a student enrolls after the October survey period. Based on a district school board's determination that not assigning the student would be impractical, educationally unsound, or disruptive to student learning, a student could be assigned to an existing class that temporarily exceeds the class size maximums. However, the additional number of students, who can be assigned to a teacher above the maximum, may not exceed three students in Grades PK-3; and five students above the maximum in Grades 4-12. This temporary exception is also contingent upon a district school board

~~developing, and filing a plan with the FDOE by February 1st, that provides that a school will be in full compliance with the maximum class size requirements by the following year's October student membership survey.~~

### b. Accountability

Accountability provisions included in the amendment and revised during the 2011 legislative session provide the following:

1. Compliance with the class size amendment is determined from student course records submitted to the Florida Department of Education (FLDOE) from the October student membership survey;
2. For each district out of compliance with class size requirements, the FLDOE will calculate a penalty reduction in the district's class size allocation;
3. Districts that have fully met class size requirements will receive a reallocation bonus of up to five percent of the base student allocation multiplied by the total district FTE students, not to exceed 25 percent of the reduced funds;
4. Each district that has not complied with class size requirements must submit a class size compliance plan, certified by the district school board, by February 1st that describes the specific actions the district will take to fully comply with class size requirements by October of the following school year; and
5. Section 1003.03(4)(c), F.S., authorizes the commissioner to recommend an alternate reduction amount if there is evidence that class size requirements were not met despite appropriate efforts to do so or because of an extreme emergency.

The 2011 legislature session also amended section 1003.03(2)(b), F.S., providing class size flexibility for students that enroll after the October student membership survey. If a district school board determines that it is impractical, educationally unsound or disruptive to student learning, students may be temporarily assigned to a class that exceeds the maximum. In kindergarten through grade 3, up to three students may be assigned to a teacher above the maximum. In grades 4 through 12, up to five students may be assigned to a teacher above the maximum. The district school board must develop a plan that provides that the school will be in full compliance by the next October student survey.

## 6. Options for Reducing Capacity

Broward County's School Board has considered options to optimize the usage of educational facilities within the District. Each year the District undergoes an extensive boundary process and considers the effectiveness of programs that are being utilized

as an alternative to adding capacity.

*Boundary Process*

Each year the District undergoes a boundary process that considers the demographic changes in student populations, available and future facility capacity, programming components, as well as the diversity at each school. As part of the annual boundary process the District relies on input from the communities and stakeholders. Through the boundary process, every effort is made to maintain equal educational opportunities.

*Multi-track Scheduling*

Broward County Schools has utilized multi-track schedules for an elementary school successfully. In that school, this multi-track schedule accommodated up to 120% of the school's FISH capacity in the 2005-06 school year. The community was content with the multi-track scheduling and has shown increases in student achievement, attendance and less discipline situations. The District can utilize this method in the future to increase the utilization of schools.

*Grade Level Organization*

Various grade level configurations are examined to reduce or add capacity. Presently we have two primary schools with grade levels of PreK-3, five PreK -8 school, and ~~two~~ three 9-12 schools.

*Block Scheduling*

Broward County Schools have been in the forefront of implementing and evaluating block scheduling. Broward County Schools utilize block schedules at several schools.

*High School Options*

Dual enrollment gives high school juniors and seniors the opportunity to take college level courses and receive credits towards high school graduation. If a student qualifies for this it can free up capacity while benefiting student achievement. The early admissions and 18 credit diploma option allows for high school students to apply for early graduation, which will also relieve enrollment at our high schools.

*Other Alternatives*

Broward County Schools has also been using creative alternative methods to assist in distributing the student population by allowing parents and students the choice of school assignment. Some examples are:

1. Broward Virtual School: Broward Virtual School (BVS) offers full-time enrollment to students in grades K-12 through an online educational delivery system. Students in grades 6-12 may enroll part-time as well. BVS offers equitable access to high quality, individualized education, through the Internet and other distance learning technologies. The virtual environment provides flexibility of time and location, and promotes development of the skills, the attitudes, and the self-discipline necessary to achieve success in the 21st century. Broward Virtual School offers students the opportunity to earn a standard high school diploma entirely online.

2. Magnet Schools: The District offers magnet programs in several locations largely in schools where space is available. These programs offer a thematic educational program; which entices students/parents to choose a school and fill available seats. They have been a popular choice alternative option.

3. Charter Schools: Second only to Miami-Dade County, the District has led the state in the number of students attending charter schools. During the 1999-00 school year 3,873 students attended charter schools. Since that time charter school enrollment has increased an additional ~~41,220~~ 42,046 students, enrolling a total of ~~45,093~~ 45,919 students during the ~~2017-18~~ 2018-19 school year.

## Table PSF-3: Charter Schools Serving Elementary, Middle and High School Students

| Charters Serving Elementary School Students | Charters Serving Middle School Students | Charters Serving High School Students |
|---|---|---|
| Alpha International Academy | Avant Garde Academy | Academic Solutions Academy - A |
| Atlantic Montessori Charter School | Avant Garde K-8 Broward | Academic Solutions Academy High School |
| Atlantic Montessori Charter School West Campus | Ben Gamla Charter | Andrews High School |
| Avant Garde K-8 Broward | Ben Gamla Charter North Campus | Ascend Career Academy |
| Ben Gamla Charter | Ben Gamla Charter South Broward | Avant Garde Academy |
| Ben Gamla Charter North Campus | Bridge Prep Academy Broward County | Broward Math and Science Schools |
| Ben Gamla Charter South Broward | Broward Math and Science Schools | Championship Academy of Distinction at Davie High School |
| Bridge Prep Academy Broward County | Central Charter School | City of Pembroke Pines High |
| Bridge Prep Academy of Hollywood Hills | Championship Academy of Distinction at Davie | Coral Springs Charter School |
| Broward Math and Science Schools | Championship Academy of Distinction Middle School | Eagles' Nest Charter Academy |
| Central Charter School | Championship Academy of Distinction of West Broward | Franklin Academy - Pembroke Pines High School |

| | | |
|---|---|---|
| Championship Academy of Distinction at Davie | City of Pembroke Pines High | International School of Broward |
| Championship Academy of Distinction at Hollywood | City of Pembroke Pines Middle | Somerset Academy Charter High School Miramar Campus |
| Championship Academy of Distinction of West Broward | City of Pembroke Pines Middle - West | Somerset Academy High |
| Charter School of Excellence | Coral Springs Charter School | Somerset Conservatory |
| Charter School of Excellence @ Davie | Eagles' Nest Charter Academy | Somerset Key High Charter School |
| City of Pembroke Pines Elementary | Eagles' Nest Middle | Somerset Preparatory Charter High at North Lauderdale |
| City of Pembroke Pines Elementary - East | Everest Charter School | SunEd High of North Broward |
| City of Pembroke Pines Elementary - West | Franklin Academy - Pembroke Pines High School | SunEd High School |
| Eagles' Nest Charter Academy | Franklin Academy - Sunrise | Sunrise High School |
| Everest Charter School | Franklin Academy Cooper City | The Ben Gamla Preparatory Charter High School |
| Excelsior Charter of Broward | Franklin Academy F | |
| Franklin Academy - Sunrise | Franklin Academy Pembroke Pines | |
| Franklin Academy Cooper City | Greentree Preparatory Charter School | |
| Franklin Academy F | Hollywood Academy of Arts & Science Middle | |
| Franklin Academy Pembroke Pines | Imagine Charter School at Broward | |
| Greentree Preparatory Charter School | Imagine Charter School at Weston | |
| Hollywood Academy of Arts & Science | Imagine Schools - Plantation Campus | |
| Imagine Charter School at Broward | International School of Broward | |
| Imagine Charter School at Weston | North Broward Academy of Excellence Middle | |
| Imagine Elementary School at North Lauderdale | Paragon Academy of Technology | |
| Imagine Schools - Plantation Campus | Renaissance Charter Middle School at Pines | |
| Innovation Charter School | Renaissance Charter School at Cooper City | |
| Kidz Choice Charter | Renaissance Charter School at Pines | |
| New Life Charter Academy | Renaissance Charter School at University | |
| North Broward Academy of Excellence Elementary | Renaissance Charter School of Coral Springs | |
| Panacea Prep Charter School | Renaissance Charter School of Plantation | |

| | | |
|---|---|---|
| Renaissance Charter Middle School at Pines | RISE Academy School of Science and Technology | |
| Renaissance Charter School at Cooper City | Somerset Academy Key Middle School | |
| Renaissance Charter School at Pines | Somerset Academy Middle | |
| Renaissance Charter School at University | Somerset Academy Miramar Middle | |
| Renaissance Charter School of Coral Springs | Somerset Academy Riverside Middle Charter School | |
| Renaissance Charter School of Plantation | Somerset East Preparatory Academy | |
| RISE Academy School of Science and Technology | Somerset Pines Academy | |
| Somerset Academy Davie | Somerset Preparatory Academy Charter at North Lauderdale | |
| Somerset Academy Elementary | Somerset Preparatory Charter Middle | |
| Somerset Academy Elementary South Campus | Somerset Village Academy Middle | |
| Somerset Academy Miramar | The Ben Gamla Preparatory Charter High School | |
| Somerset Academy Pompano | West Broward Academy | |
| Somerset Academy Riverside Charter School | | |
| Somerset East Preparatory Academy | | |
| Somerset Miramar South | | |
| Somerset Neighborhood | | |
| Somerset Pines Academy | | |
| Somerset Preparatory Academy Charter at North Lauderdale | | |
| Somerset Village Academy | | |
| South Broward Montessori Charter School | | |
| Sunshine Elementary | | |
| West Broward Academy | | |

**Source:** School Board of Broward County 2018

## E. Analysis of Infrastructure Needs for Existing and Proposed School Facilities

Broward County currently has ~~324~~ 322 public school facilities, including elementary, middle, high, charter and special schools. Infrastructure, including roads, drainage, sanitary sewer and potable water facilities, are available to support existing and proposed school facilities.

One area which needs attention however, is pedestrian infrastructure. The County has some areas where sidewalks and unobstructed access to schools can be improved. To address this, Broward County promotes safe routes to schools (SRTS) through the Broward County MPO 2035 Long Range Transportation Plan. A goal to "ensure and where possible enhance safety and security" in transportation projects near schools is intended to reduce hazards by providing infrastructure needed for school children within a 2-mile radius of schools. In furthering this goal, the 2035 Plan proposes sidewalk infrastructure improvements in areas which are deemed hazardous and/or enhance the safety and security of pedestrians. The School District has also applied for Safe Route to School (SRTS) Grants for sidewalk construction since 2006. The list of needed sidewalk improvements contains over 150 locations in Broward County and is updated annually.

In addition, the development review and site selection process of any proposed school must consider infrastructure needs. These procedures and processes are outlined in Sections V and VI of the Third Amended ILA. The School Board also requires that all major expansion, remodeling and/or replacements projects (exceeding $1,000,000) undergo a Master Planning process. This process involves public input and evaluates infrastructure issues such as site circulation, parking, retention areas and public utility locations.

# DATA & ANALYSIS

## A. Population and Housing Conditions

### 1. Population Growth in Broward County

Broward County has experienced significant population growth since 1970. As Table 3 below illustrates, in 1970 Broward County had a population of 620,100 and the 2010 Census population count was 1,748,066, a growth of 182%. Though the County is approaching "build-out", expectations are that growth will continue. The future pace of growth will be less than in past decades, both in terms of percentage and in absolute growth as Broward makes the transition from large tracts of "Greenfield" development to "redevelopment." However, with the addition of lands in the northwest "Wedge" near Parkland, over two thousand acres of agricultural lands were transferred into Broward County from Palm Beach County's boundary.

At the same time the population demographics will continue to change. A larger percentage of population growth will occur from international migration. Generally, migrants are younger and less likely to have a family. The "Median Age" and "% 65 or over" columns, from Table 3 below, are indicators of this change in the short term. Broward's median age increased as it became home to larger numbers of retirees during the 1970's and early 1980's. The population ages 65 or greater peaked in the early 1980's at 22%; but, an increase in international migration to Broward brought that percentage down to 14% in 2010, approaching its lowest level since 1960, before the influx of retirees. Looking to the future, demographic trends are expected to shift once more. This shift is most likely to result from the "baby boomer" generation achieving retirement age, accompanied by a trend towards smaller families. Broward County can expect an increase in the percentage population ages 65 and older, combined with a slow reduction in the percentage of population ages 18 or under. These trends are expected to continue into the long-term planning horizon by 2045, as shown in Table PSF-~~3~~4, below.

## Table PSF-4: Population Broward County 1970-2045

| Year | Total | Average Annual Change | | Median Age | % 18 or Under | % 65 or over |
|---|---|---|---|---|---|---|
| | | Percent | Population | | | |
| 1970 | 620,100 | 8.6% | 28,615 | 38.7 | 29% | 18% |
| 1980 | 1,018,257 | 6.4% | 39,816 | 38.7 | 22% | 22% |
| 1990 | 1,255,531 | 2.3% | 23,727 | 37.8 | 21% | 21% |
| 2000 | 1,623,018 | 2.9% | 36,749 | 37.8 | 24% | 16% |
| 2010 | 1,748,066 | 0.8% | 12,505 | 39.7 | 22% | 14% |
| 2015* | 1,827,367 | 0.9% | 15,860 | – | 21%** | 15% |
| 2016* | 1,854,513 | 1.0% | 17,741 | – | 21%** | 15% |
| 2020* | 1,914,498 | 1.2% | 21,553 | – | 21%** | 17% |
| 2025* | 1,989,753 | 1.0% | 19,543 | – | 21%** | 20% |
| 2030* | 2,052,432 | 0.8% | 15,752 | – | 21%** | 22% |
| 2035* | 2,111,652 | 0.6% | 13,015 | – | 20%** | 23% |
| 2040* | 2,158,080 | 0.5% | 11,121 | – | 20%** | 24% |
| 2045* | 2,200,492 | 0.5% | 10,590 | – | 20%** | 24% |

Sources for Table PSF4:

U.S. Census Bureau, Decennial Census for years 1970, 1980, 1990, 2000, 2010

University of Florida Bureau of Economic and Business Research, Detailed Population Projections by Age, Sex, Race, and Hispanic Origin, for Florida and Its Counties, 2020-2045, With Estimates for 2016 All Races

* Median Age data not available from BEBR.

** Calculation of % 18 or Under for 2015-2045 is for % 17 or Under

## 2. School Age Population

As with population growth in general, Broward's school age population has experienced considerable growth since 1970. Table PSF-45, below, illustrates how the influx of retirees through the early 1980's caused the Kindergarten through 12th Grade population to decrease by more than 5% of the total. The decline continued into 1990, but by 2000 the K-12 population's percentage of the total increased. Since 2000, the

school age population, in both K-12 and Higher Education, has slowly declined as a percentage of total population. This trend is expected to continue into the long-term planning horizon in 2045. During this time, the absolute numbers in school age population are expected to increase for both K-12 and Higher Education.

## Table PSF-5: School Age Population Broward County 1970-2045

| Year | School Age Population | | | Percent of Total Population | | |
|---|---|---|---|---|---|---|
| | K-12 | Higher Ed. | Total | K-12 | Higher Ed. | Total |
| 1970 | 133,064 | 118,673 | 251,737 | 22% | 19% | 41% |
| 1980 | 164,431 | 250,044 | 414,475 | 16% | 250% | 41% |
| 1990 | 177,638 | 317,283 | 494,921 | 14% | 25% | 39% |
| 2000 | 279,888 | 348,245 | 628,133 | 17% | 22% | 39% |
| 2010 | 288,093 | 371,647 | 659,740 | 17% | 21% | 38% |
| 2015 | 284,090 | 401,087 | 685,177 | 16% | 22% | 38% |
| 2016 | 286,454 | 405,946 | 692,400 | 15% | 22% | 37% |
| 2020 | 294,344 | 423,059 | 717,403 | 15% | 22% | 37% |
| 2025 | 305,980 | 436,134 | 742,114 | 15% | 21% | 36% |
| 2030 | 315,355 | 431,019 | 746,374 | 15% | 20% | 35% |
| 2035 | 322,598 | 431,309 | 753,907 | 15% | 20% | 35% |
| 2040 | 328,250 | 441,211 | 769,461 | 15% | 20% | 34% |
| 2045 | 331,076 | 453,278 | 784,354 | 15% | 20% | 34% |

**Source:** U.S. Census Bureau, Decennial Census for years 1970, 1980, 1990, 2000, 2010
University of Florida Bureau of Economic and Business Research, Detailed Population Projections by Age, Sex, Race, and Hispanic Origin, for Florida and Its Counties, 2020-2045, With Estimates for 2016 All Races

## 3. Housing Characteristics

While Broward's housing inventory once was dominated by the single-family detached home, that is no longer the case. The housing industry responded to the influx of retirees during the 1970's and 1980's by building large numbers of multi-family condominiums and apartments. Between 1970 and 1990, single family homes grew by nearly 87,000. During that same time period, multi-family homes grew by 264,000 units (averaging 13,000 per year).

Expansion in the southwest and northwest portions of Broward shifted new construction emphasis back to single-family homes. They increased by nearly as much during the decade of the 1990's as they did for the twenty years prior. Still, in 2016 there are 15% more multi-family units than single-family. Multi-family units represent 56% of all housing units in Broward. With the annexation of the "Wedge" into the northwest boundary of Broward County, a small increase in single-family units should be expected in the next few years, but these new units will likely be balanced out by multi-family infill and redevelopment in the eastern corridor closer to the beaches.

Reported vacancy rates are influenced primarily by the number of seasonally-occupied units and magnitude of current residential construction. The high vacancy rate in Broward County may be attributed to its role as a destination for many seasonal residents, and that these units have been counted as vacant regardless of the actual status. Both of these influences on vacancy rates are expected to decrease. The vacancy rate reached its lowest in 2000, during a time when the County was experiencing intensive construction for single family houses. At that time, the school age population also spiked, particularly in the K-12 age group. The relationship between vacancy rate and school age population is expected to loosen in the coming years as development patterns shift away from single family homes to other types of housing.

## Table PSF-6: Housing Characteristics, Broward County 1970-2016

| Year | Total Units | Single Family | % Single Family | Multi-Family | Other | Owner Occupied | Renter Occupied | % Vacant | % Owner Occupied |
|---|---|---|---|---|---|---|---|---|---|
| 1970 | 253,325 | 149,447 | 59.0% | 94,017 | 9,861 | 161,962 | 60,601 | 12.1% | 72.8% |
| 1980 | 477,468 | 202,898 | 42.5% | 258,987 | 15,583 | 299,730 | 117,787 | 12.6% | 71.8% |
| 1990 | 628,660 | 236,321 | 37.6% | 358,665 | 33,674 | 359,570 | 168,872 | 15.9% | 68.0% |
| 2000 | 741,043 | 303,357 | 40.9% | 409,756 | 27,930 | 454,750 | 199,695 | 11.7% | 69.5% |
| 2010 | 806,858 | 330,550 | 41.0% | 452,673 | 23,635 | 463,511 | 205,387 | 17.1% | 69.3% |
| 2015 | 814,454 | 336,671 | 41.3% | 455,767 | 22,016 | 425,691 | 244,593 | 17.7% | 63.5% |
| 2016 | 816,886 | 337,760 | 41.3% | 456,331 | 22,795 | 422,354 | 250,634 | 17.6% | 62.8% |

**Source:** U.S. Census Bureau, Decennial Census for years 1970, 1980, 1990, 2000, 2010; American Community Survey 5-Year Estimates for years 2015 and 2016.

## 4. Development Trends

Broward County has approached "build-out" status while still feeling the pressure of population growth. As shown on Table H-33 in the Housing Element Support Document, a total of 29,955 residential building permits were issued in Broward County in 2016. The majority (61%) were for multi-family construction permits, which have seen a steady increase since 2012. The demand for rental units includes new households and households switching from owning to renting. This growth in renter household growth reflects in part the sharp decline in the national homeownership rate after 2004. While many factors drove that decline, the massive wave of foreclosures after the housing crash was a key contributor.

## B. Current Profile of Broward County Public Schools

### 1. Summary Profile of Public Schools in Broward County

The numbers of school buildings, student stations and classrooms are reflected in Table PSF-~~6~~7. The majority of buildings and student stations are for elementary students, ~~52%~~ 55% and ~~43%~~ 44% respectively as compared to the total for the School District. High Schools have the highest level of relocatable stations ~~(9,140)~~9,883 and Elementary has the highest level of relocatable classrooms (~~406~~)414. As noted in Table PSF-~~7~~8, most of the school facility buildings were constructed in the last 20 years. Figure PSF-A in the Appendix depicts the locations of all Public Schools in Broward County.

Table PSF-7: Summary Profile of School Capacity

| School Type | Permanent Buildings | Relocatable Buildings | Permanent Stations | Relocatable Stations | Permanent Classrooms | Relocatable Classrooms | Permanent Net Sq.Ft. | Relocatable Net Sq.Ft. |
|---|---|---|---|---|---|---|---|---|
| Elementary | 1,322 | 414 | 116,004 | 7,696 | 6,551 | 414 | 15,444,070 | 358,760 |
| Middle | 389 | 323 | 57,954 | 5,938 | 2,714 | 323 | 7,145,931 | 267,421 |
| High | 486 | 418 | 74,821 | 9,883 | 3,389 | 418 | 9,624,340 | 343,099 |
| Special | 189 | 122 | 13,866 | 2,251 | 823 | 122 | 2,420,506 | 100,764 |
| Charter | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Total | 2,386 | 1,277 | 262,645 | 25,768 | 13,477 | 1,277 | 34,634,847 | 1,070,044 |

**Source:** School Board of Broward County, Florida Inventory of School Houses (FISH) data 2018.

Table PSF-8: Age of School Facility Buildings

| School Type | % of sq.ft. 1-10 years | % of sq.ft. 11-20 years | % of sq.ft. 21-30 years | % of sq.ft. 31-40 years | % of sq.ft. 41-50 years | % of sq.ft. over 50 years |
|---|---|---|---|---|---|---|
| Elementary Schools | 6% | 31% | 37% | 7% | 14% | 6% |
| Middle Schools | 2% | 26% | 33% | 4% | 24% | 11% |
| High Schools | 4% | 32% | 13% | 7% | 29% | 15% |
| Special Schools | 5% | 22% | 25% | 17% | 19% | 12% |
| Charter Schools | N/A | N/A | N/A | N/A | N/A | N/A |

**Source**: School Board of Broward County Florida Inventory of School Houses (FISH) data 2018

### 2. Elementary Schools

There are 140 public elementary schools in Broward County as of ~~2017-18~~ 2018-19 not including Broward Virtual Elementary. There are five K-8 Combination school ~~which opened August 2016~~. A profile of the existing elementary schools is depicted in Table PSF-~~8~~9 below.

## Table PSF-9: Current Profile – Broward County Elementary Schools 2018-19

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Atlantic West Elementary | 8 | 1974-2004 | 6 | 13 | 712 | 1,009 | 70.6% |
| Banyan Elementary | 10 | 1980-2009 | 4 | 5 | 612 | 831 | 73.6% |
| Bayview Elementary | 2 | 1958-2000 | 4 | 0 | 578 | 629 | 91.9% |
| Bennett Elementary | 8 | 1952-2007 | 10 | 0 | 366 | 596 | 61.4% |
| Bethune, Mary Elementary | 18 | 1961-2008 | 12 | 0 | 436 | 1,217 | 35.8% |
| Boulevard Heights Elementary | 10 | 1961-2008 | 15 | 0 | 669 | 893 | 74.9% |
| Broadview Elementary | 10 | 1965-2006 | 5 | 8 | 806 | 1,130 | 71.3% |
| Broward Estates Elementary | 10 | 1957-2007 | 18 | 0 | 388 | 765 | 50.7% |
| Castle Hill Elementary | 9 | 1969-2007 | 8 | 17 | 621 | 817 | 76.0% |
| Central Park Elementary | 13 | 1990-2004 | 10 | 10 | 865 | 1,123 | 77.0% |
| Challenger Elementary | 8 | 2000-2004 | 3 | 0 | 1,033 | 1,100 | 93.9% |
| Chapel Trail Elementary | 10 | 1994-2003 | 6 | 0 | 808 | 1,159 | 69.7% |
| Coconut Creek Elementary | 10 | 1969-2002 | 5 | 3 | 629 | 811 | 77.6% |
| Coconut Palm Elementary | 12 | 2000-2000 | 2 | 13 | 737 | 902 | 81.7% |
| Colbert Elementary | 10 | 1952-2008 | 5 | 0 | 700 | 893 | 78.4% |
| Collins Elementary | 10 | 1957-2005 | 11 | 0 | 369 | 408 | 90.4% |
| Cooper City Elementary | 10 | 1970-2007 | 3 | 2 | 738 | 771 | 95.7% |
| Coral Cove Elementary | 12 | 2004-2004 | 3 | 0 | 666 | 913 | 72.9% |
| Coral Park Elementary | 11 | 1989-2007 | 12 | 6 | 607 | 776 | 78.2% |

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Coral Springs PreK-8 | 10 | 1974-2006 | 6 | 2 | 692 | 998 | 69.3% |
| Country Hills Elementary | 15 | 1990-2006 | 10 | 0 | 845 | 934 | 90.5% |
| Country Isles Elementary | 9 | 1987-2004 | 13 | 6 | 984 | 1,096 | 89.8% |
| Cresthaven Elementary | 10 | 1992-2008 | 7 | 0 | 585 | 776 | 75.4% |
| Croissant Park Elementary | 12 | 1992-2003 | 7 | 2 | 771 | 882 | 87.4% |
| Cypress Elementary | 13 | 1969-2010 | 8 | 2 | 758 | 960 | 79.0% |
| Dania Elementary | 7 | 1958-2007 | 11 | 3 | 461 | 626 | 73.6% |
| Davie Elementary | 9 | 1977-2003 | 5 | 5 | 740 | 815 | 90.8% |
| Deerfield Beach Elementary | 14 | 1927-2010 | 11 | 3 | 590 | 672 | 87.8% |
| Deerfield Park Elementary | 11 | 1978-2005 | 10 | 0 | 628 | 829 | 75.8% |
| Dillard Elementary | 10 | 1994-1994 | 7 | 2 | 854 | 835 | 102.3% |
| Discovery Elementary | 15 | 2008-2009 | 3 | 0 | 972 | 1,036 | 93.8% |
| Dolphin Bay Elementary | 12 | 2005-2005 | 3 | 0 | 697 | 913 | 76.3% |
| Drew Elementary | 15 | 1990-1990 | 9 | 0 | 514 | 694 | 74.1% |
| Driftwood Elementary | 8 | 1960-2003 | 13 | 12 | 640 | 758 | 84.4% |
| Eagle Point Elementary | 12 | 1994-2009 | 8 | 4 | 1,420 | 1,351 | 105.1% |
| Eagle Ridge Elementary | 12 | 1994-1994 | 6 | 0 | 862 | 959 | 89.9% |
| Embassy Creek Elementary | 14 | 1991-2008 | 7 | 0 | 1,239 | 1,196 | 103.6% |
| Endeavour Primary Learning Center | 12 | 2002-2002 | 2 | 2 | 391 | 515 | 75.9% |
| Everglades Elementary | 10 | 1998-2005 | 4 | 8 | 1,031 | 1,220 | 84.5% |
| Fairway Elementary | 11 | 1968-2005 | 10 | 0 | 707 | 1,067 | 66.3% |

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Flamingo Elementary | 14 | 1975-2006 | 4 | 9 | 666 | 779 | 85.5% |
| Floranada Elementary | 11 | 1999-1999 | 2 | 0 | 754 | 895 | 84.2% |
| Forest Hills Elementary | 8 | 1975-2004 | 4 | 2 | 726 | 875 | 83.0% |
| Foster, Stephen Elementary | 9 | 1961-2007 | 16 | 0 | 671 | 817 | 82.1% |
| Fox Trail Elementary | 25 | 1997-2004 | 4 | 7 | 1,200 | 1,304 | 92.0% |
| Gator Run Elementary | 12 | 1998-2004 | 3 | 16 | 1,313 | 1,452 | 90.4% |
| Griffin Elementary | 10 | 1979-1991 | 4 | 4 | 623 | 687 | 90.7% |
| Gulfstream Academy of Hallandale Beach | 27 | 2003-2003 | 22 | 15 | 1,598 | 1,976 | 80.9% |
| Harbordale Elementary | 4 | 1959-2008 | 13 | 0 | 497 | 528 | 94.1% |
| Hawkes Bluff Elementary | 12 | 1990-2006 | 10 | 10 | 867 | 1,044 | 83.0% |
| Heron Heights Elementary | 12 | 2007-2008 | 3 | 0 | 1,142 | 1,096 | 104.2% |
| Hollywood Central Elementary | 7 | 1992-1995 | 9 | 1 | 433 | 756 | 57.3% |
| Hollywood Hills Elementary | 12 | 1959-2007 | 9 | 0 | 755 | 845 | 89.3% |
| Hollywood Park Elementary | 12 | 1969-1991 | 4 | 0 | 502 | 652 | 77.0% |
| Horizon Elementary | 8 | 1974-2001 | 6 | 2 | 587 | 729 | 80.5% |
| Hunt, James Elementary | 13 | 1973-2004 | 6 | 0 | 625 | 925 | 67.6% |
| Indian Trace Elementary | 12 | 1990-1990 | 9 | 10 | 712 | 843 | 84.5% |
| Lake Forest Elementary | 11 | 1961-2006 | 11 | 9 | 727 | 928 | 78.3% |
| Lakeside Elementary | 12 | 1997-2001 | 3 | 3 | 749 | 831 | 90.1% |
| Larkdale Elementary | 10 | 1961-2008 | 16 | 4 | 417 | 685 | 60.9% |

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Lauderhill, Paul Turner Elementary | 11 | 1995-1995 | 6 | 0 | 674 | 959 | 70.3% |
| Liberty Elementary | 12 | 2001-2004 | 3 | 1 | 979 | 1,386 | 70.6% |
| Lloyd Estates Elementary | 8 | 1968-2008 | 9 | 8 | 528 | 691 | 76.4% |
| Manatee Bay Elementary | 7 | 2001-2004 | 3 | 10 | 1,210 | 1,320 | 91.7% |
| Maplewood Elementary | 11 | 1980-2004 | 5 | 8 | 746 | 961 | 77.6% |
| Margate Elementary | 11 | 1962-2007 | 19 | 0 | 1,024 | 1,436 | 71.3% |
| Markham, Robert C Elementary | 9 | 1967-2004 | 10 | 4 | 596 | 709 | 84.1% |
| Marshall, Thurgood Elementary | 8 | 1991-2002 | 6 | 1 | 423 | 859 | 49.2% |
| McNab Elementary | 10 | 1993-2002 | 8 | 1 | 620 | 745 | 83.2% |
| Meadowbrook Elementary | 15 | 1958-2009 | 12 | 6 | 709 | 809 | 87.6% |
| Miramar Elementary | 10 | 1991-2004 | 7 | 1 | 608 | 1,022 | 59.5% |
| Mirror Lake Elementary | 13 | 1969-2009 | 8 | 7 | 671 | 791 | 84.8% |
| Morrow Elementary | 10 | 1976-2008 | 7 | 0 | 532 | 914 | 58.2% |
| Nob Hill Elementary | 8 | 1975-2004 | 3 | 7 | 635 | 857 | 74.1% |
| Norcrest Elementary | 10 | 1976-2008 | 11 | 0 | 778 | 1,013 | 76.8% |
| North Andrews Gardens Elementary | 10 | 1996-2006 | 7 | 6 | 875 | 921 | 95.0% |
| North Fork Elementary | 10 | 1965-2007 | 10 | 0 | 442 | 784 | 56.4% |
| North Lauderdale Pre K-8 | 13 | 1974-2006 | 8 | 0 | 762 | 1,043 | 73.1% |
| North Side Elementary | 5 | 1927-2001 | 8 | 0 | 363 | 669 | 54.3% |

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Oakland Park Elementary | 7 | 1927-2004 | 13 | 0 | 603 | 924 | 65.3% |
| Oakridge Elementary | 8 | 1959-1993 | 13 | 6 | 526 | 721 | 73.0% |
| Orange Brook Elementary | 9 | 2006-2006 | 3 | 0 | 697 | 913 | 76.3% |
| Oriole Elementary | 9 | 1971-2005 | 6 | 2 | 657 | 794 | 82.7% |
| Palm Cove Elementary | 12 | 1992-2008 | 10 | 9 | 596 | 1,049 | 56.8% |
| Palmview Elementary | 10 | 1969-2009 | 6 | 3 | 609 | 732 | 83.2% |
| Panther Run Elementary | 12 | 1997-1997 | 2 | 1 | 555 | 856 | 64.8% |
| Park Lakes Elementary | 15 | 2000-2006 | 4 | 0 | 1,006 | 1,335 | 75.4% |
| Park Ridge Elementary | 10 | 1972-2008 | 7 | 0 | 579 | 601 | 96.3% |
| Park Springs Elementary | 12 | 1990-2004 | 10 | 0 | 1,011 | 1,308 | 77.3% |
| Park Trails Elementary | 12 | 2000-2008 | 4 | 0 | 2,362 | 2,559 | 92.3% |
| Parkside Elementary | 10 | 1999-2008 | 4 | 2 | 865 | 1,078 | 80.2% |
| Pasadena Lakes Elementary | 10 | 1971-2008 | 8 | 7 | 539 | 781 | 69.0% |
| Pembroke Lakes Elementary | 8 | 1976-2007 | 5 | 4 | 718 | 741 | 96.9% |
| Pembroke Pines Elementary | 9 | 1965-2008 | 6 | 8 | 592 | 709 | 83.5% |
| Perry, Annabel C PreK-8 | 10 | 1969-2005 | 9 | 8 | 735 | 1,063 | 69.1% |
| Peters Elementary | 11 | 1958-2008 | 17 | 12 | 716 | 845 | 84.7% |
| Pines Lakes Elementary | 10 | 1979-2009 | 7 | 0 | 549 | 1,020 | 53.8% |
| Pinewood Elementary | 10 | 1979-2001 | 5 | 11 | 584 | 1,038 | 56.3% |
| Plantation Elementary | 12 | 1999-1999 | 2 | 0 | 647 | 895 | 72.3% |
| Plantation Park Elementary | 10 | 1967-2002 | 4 | 0 | 543 | 637 | 85.2% |

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Pompano Beach Elementary | 19 | 1992-1992 | 9 | 2 | 502 | 628 | 79.9% |
| Quiet Waters Elementary | 23 | 1990-2008 | 12 | 17 | 1,203 | 1,600 | 75.2% |
| Ramblewood Elementary | 10 | 1977-2004 | 4 | 1 | 880 | 1,084 | 81.2% |
| Riverglades Elementary | 10 | 1991-2017 | 7 | 0 | 1,061 | 1,252 | 84.7% |
| Riverland Elementary | 10 | 1991-2008 | 7 | 0 | 557 | 696 | 80.0% |
| Riverside Elementary | 10 | 1987-2001 | 11 | 6 | 732 | 804 | 91.0% |
| Rock Island Elementary | 14 | 2001-2008 | 4 | 0 | 585 | 638 | 91.7% |
| Royal Palm Elementary | 12 | 1971-2004 | 9 | 8 | 825 | 1,012 | 81.5% |
| Sanders Park Elementary | 12 | 1965-2004 | 8 | 5 | 510 | 755 | 67.5% |
| Sandpiper Elementary | 14 | 1989-2006 | 12 | 0 | 619 | 1,000 | 61.9% |
| Sawgrass Elementary | 12 | 1993-2007 | 8 | 0 | 1,027 | 1,302 | 78.9% |
| Sea Castle Elementary | 12 | 1990-2004 | 11 | 1 | 841 | 1,111 | 75.7% |
| Sheridan Hills Elementary | 7 | 1971-2001 | 6 | 0 | 517 | 668 | 77.4% |
| Sheridan Park Elementary | 13 | 1966-2008 | 7 | 0 | 690 | 891 | 77.4% |
| Silver Lakes Elementary | 12 | 1997-1997 | 2 | 1 | 414 | 856 | 48.4% |
| Silver Palms Elementary | 14 | 1995-2001 | 3 | 0 | 635 | 898 | 70.7% |
| Silver Ridge Elementary | 13 | 1989-2008 | 14 | 6 | 1,032 | 1,002 | 103.0% |
| Silver Shores Elementary | 12 | 2002-2003 | 3 | 0 | 433 | 902 | 48.0% |
| Stirling Elementary | 9 | 1991-2007 | 7 | 4 | 602 | 771 | 78.1% |
| Sunland Park Academy | 4 | 1992-1994 | 3 | 1 | 434 | 528 | 82.2% |

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Sunset Lakes Elementary | 12 | 2002-2008 | 4 | 0 | 897 | 1,430 | 62.7% |
| Sunshine Elementary | 9 | 1964-2002 | 15 | 5 | 587 | 893 | 65.7% |
| Tamarac Elementary | 8 | 1974-2004 | 7 | 0 | 740 | 1,419 | 52.1% |
| Tedder Elementary | 12 | 1964-2004 | 14 | 0 | 583 | 1,364 | 42.7% |
| Tradewinds Elementary | 12 | 1995-2008 | 4 | 9 | 1,242 | 1,380 | 90.0% |
| Tropical Elementary | 10 | 1971-2008 | 6 | 0 | 1,011 | 1,025 | 98.6% |
| Village Elementary | 12 | 1968-2009 | 13 | 0 | 711 | 957 | 74.3% |
| Walker Elementary | 10 | 1959-2009 | 9 | 0 | 818 | 1,119 | 73.1% |
| Watkins Elementary | 10 | 1995-1995 | 2 | 0 | 528 | 895 | 59.0% |
| Welleby Elementary | 13 | 1991-2004 | 6 | 6 | 802 | 915 | 87.7% |
| West Hollywood Elementary | 11 | 1991-1991 | 5 | 5 | 535 | 687 | 77.9% |
| Westchester Elementary | 10 | 1976-2009 | 10 | 8 | 1,135 | 1,166 | 97.3% |
| Westwood Heights Elementary | 9 | 1958-2008 | 12 | 3 | 723 | 861 | 84.0% |
| Wilton Manors Elementary | 8 | 1995-1998 | 5 | 0 | 616 | 677 | 91.0% |
| Winston Park Elementary | 12 | 1990-2004 | 12 | 0 | 1,206 | 1,310 | 92.1% |
| Total | 1,480 | | 1,026 | 441 | 99,382 | 127,506 | 77.9% |

Source: School Board of Broward County, 2018

Elementary school locations and attendance zones/concurrency service areas (CSAs) are illustrated in Appendix Figure PSF-B. Elementary school enrollment, including prekindergarten, for ~~2017-18~~ 2018-19, not including Broward Virtual Elementary, centers ~~or~~ charters, or schools without attendance areas is ~~103,015~~ 99,382 students. There are~~18~~ 5 elementary schools with enrollment greater than their LOS ~~100% of their gross FISH~~ capacity, which is the adopted LOS standard (i.e. the higher of: 100 % gross capacity or

110% permanent FISH capacity (~~LOS~~). For the ~~2017-18~~ 2018-19 school year, this translates into ~~41~~3% of elementary schools in Broward County not meeting the LOS.

## 3. Middle Schools

There are ~~38~~37 public middle schools in Broward County as of ~~2017-18~~ 2018-19 not including Broward Virtual Middle or schools without attendance boundaries. A profile of these schools is shown by Table PSF-~~9~~ 10.

### Table PSF-10: Current Profile – Broward County Middle Schools 2018-19

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Apollo Middle | 15 | 1969-2007 | 8 | 16 | 1,400 | 1,558 | 89.9% |
| Attucks Middle | 24 | 1960-1997 | 8 | 0 | 814 | 1,350 | 60.3% |
| Bair Middle | 10 | 1975-1993 | 4 | 5 | 902 | 1,318 | 68.4% |
| Coral Springs Middle | 19 | 1975-2005 | 4 | 0 | 1,147 | 2,089 | 54.9% |
| Crystal Lake Middle | 14 | 1971-2002 | 3 | 16 | 1,407 | 1,583 | 88.9% |
| Dandy, William Middle | 19 | 1991-1995 | 19 | 5 | 1,003 | 1,246 | 80.5% |
| Deerfield Beach Middle | 32 | 1960-2003 | 10 | 4 | 1,175 | 1,543 | 76.2% |
| Driftwood Middle | 22 | 1961-2005 | 13 | 4 | 1,388 | 1,837 | 75.6% |
| Falcon Cove Middle | 21 | 1999-1999 | 2 | 48 | 2,284 | 2,239 | 102.0% |
| Forest Glen Middle | 20 | 1990-2004 | 19 | 8 | 1,360 | 1,788 | 76.1% |
| Glades Middle | 20 | 2006-2008 | 4 | 11 | 1,396 | 2,026 | 68.9% |
| Indian Ridge Middle | 26 | 1995-2005 | 5 | 28 | 1,982 | 2,233 | 88.8% |
| Lauderdale Lakes Middle | 14 | 1969-1976 | 4 | 17 | 868 | 1,243 | 69.8% |
| Lauderhill 6-12 | 22 | 1969-1995 | 7 | 9 | 862 | 1,054 | 81.8% |
| Lyons Creek Middle | 22 | 1999-2006 | 3 | 3 | 1,945 | 2,091 | 93.0% |
| Margate Middle | 23 | 1966-2001 | 9 | 1 | 1,211 | 1,439 | 84.2% |
| McNicol Middle | 12 | 1997-1997 | 2 | 0 | 745 | 1,433 | 52.0% |
| Millennium 6-12 Collegiate Academy | 11 | 2001-2006 | 4 | 8 | 1,648 | 1,780 | 92.6% |

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| New Renaissance Middle | 20 | 2000-2000 | 4 | 0 | 1,193 | 1,702 | 70.1% |
| New River Middle | 18 | 1995-1995 | 3 | 6 | 1,574 | 1,511 | 104.2% |
| Olsen Middle | 20 | 1954-1991 | 28 | 0 | 655 | 1,238 | 52.9% |
| Parkway Middle | 15 | 1958-2010 | 27 | 0 | 1,502 | 2,411 | 62.3% |
| Pines Middle | 21 | 1993-2005 | 3 | 0 | 846 | 1,946 | 43.5% |
| Pioneer Middle | 20 | 1975-1991 | 5 | 44 | 1,488 | 1,650 | 90.2% |
| Plantation Middle | 22 | 1969-2004 | 5 | 0 | 717 | 1,480 | 48.4% |
| Pompano Beach Middle | 12 | 1964-2008 | 10 | 9 | 1,106 | 1,227 | 90.1% |
| Ramblewood Middle | 17 | 1976-2005 | 4 | 20 | 1,235 | 1,437 | 85.9% |
| Rickards, James Middle | 13 | 1968-2004 | 5 | 0 | 882 | 1,132 | 77.9% |
| Sawgrass Springs Middle | 20 | 1995-1998 | 8 | 3 | 1,204 | 1,293 | 93.1% |
| Seminole Middle | 21 | 1958-2009 | 5 | 13 | 1,126 | 1,416 | 79.5% |
| Silver Lakes Middle | 20 | 1983-2002 | 15 | 0 | 706 | 1,163 | 60.7% |
| Silver Trail Middle | 22 | 1995-2009 | 3 | 22 | 1,470 | 1,785 | 82.4% |
| Sunrise Middle | 18 | 1991-1999 | 15 | 8 | 1,358 | 1,403 | 96.8% |
| Tequesta Trace Middle | 23 | 1990-2006 | 19 | 4 | 1,614 | 1,500 | 107.6% |
| Westglades Middle | 24 | 2001-2001 | 4 | 16 | 1,792 | 1,825 | 98.2% |
| Westpine Middle | 18 | 1990-2006 | 19 | 0 | 1,022 | 1,399 | 73.1% |
| Young, Walter C Middle | 30 | 1987-2008 | 16 | 0 | 1,108 | 1,432 | 77.4% |
| Total | 720 | | 326 | 328 | 46,135 | 58,800 | 78.5% |

**Source**: School Board of Broward County, 2018

Middle school locations and attendance zones/concurrency service areas (CSAs) are illustrated in Appendix Figure PSF-C. Middle school enrollment for ~~2017-18~~ 2018-19 is ~~46,888~~ 46,135 students not including Broward Virtual Middle, centers or charters. There are ~~36~~ middle schools with enrollment greater than their LOS ~~100% of their gross FISH~~ capacity, which is the adopted LOS standard (i.e. the higher of: 100 % gross capacity or 110% permanent FISH capacity (~~LOS~~). For the ~~2017-18~~ 2018-19 school year, this translates into ~~8~~16% of middle schools in Broward County not meeting the LOS.

~~However, the LOS is changing from 100% to 110% of gross FISH capacity beginning in 2019.~~

## 4. High Schools

There are ~~33~~ 27 public high schools in Broward County as of ~~2017-18~~ 2018-19 not including Broward Virtual High or schools without attendance boundaries. A profile of these schools is shown by Table PSF-~~10~~11.

### Table PSF-11: Current Profile – Broward County High Schools 2018-19

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Anderson, Boyd High | 32 | 1972-2010 | 14 | 1 | 1,808 | 3,112 | 58.10% |
| Coconut Creek High | 40 | 1964-2000 | 15 | 34 | 1536 | 2884 | 0.532594 |
| Cooper City High | 30 | 1971-2009 | 31 | 2 | 2,368 | 2,494 | 94.95% |
| Coral Glades High | 45 | 2003-2008 | 4 | 0 | 2485 | 2874 | 0.864649 |
| Coral Springs High | 37 | 1975-2005 | 9 | 13 | 2,816 | 3,244 | 86.81% |
| Cypress Bay High | 45 | 2001-2004 | 8 | 64 | 4,807 | 4,761 | 100.97% |
| Deerfield Beach High | 41 | 1969-2010 | 16 | 22 | 2,453 | 2,848 | 86.13% |
| Dillard High | 51 | 1959-2001 | 16 | 0 | 2,267 | 2,980 | 76.07% |
| Ely, Blanche High | 39 | 1952-2010 | 23 | 0 | 2,063 | 3,065 | 67.31% |
| Everglades High | 45 | 2002-2010 | 5 | 22 | 2,352 | 2,980 | 78.93% |
| Flanagan, Charles W High | 45 | 1995-1995 | 13 | 31 | 2,526 | 3,034 | 83.26% |
| Fort Lauderdale High | 27 | 1958-2007 | 12 | 0 | 2,132 | 2,218 | 96.12% |
| Hallandale High | 28 | 1976-1976 | 6 | 10 | 1,236 | 1,821 | 67.87% |
| Hollywood Hills High | 30 | 1968-2006 | 7 | 19 | 1,916 | 2,667 | 71.84% |
| McArthur High | 40 | 1958-2002 | 32 | 5 | 2,066 | 2,432 | 84.95% |
| Miramar High | 38 | 1969-2005 | 13 | 8 | 2,432 | 2,827 | 86.03% |
| Monarch High | 55 | 2002-2005 | 7 | 10 | 2,445 | 2,360 | 103.60% |
| Northeast High | 52 | 1958-2010 | 27 | 3 | 1693 | 2536 | 0.667587 |
| Piper High | 30 | 1971-2007 | 18 | 39 | 2,439 | 3,479 | 70.11% |
| Plantation High | 35 | 1963-2009 | 22 | 3 | 2,054 | 2,895 | 70.95% |
| South Broward High | 25 | 1947-2008 | 28 | 0 | 2,309 | 2,518 | 91.70% |
| South Plantation High | 32 | 1969-2006 | 15 | 7 | 2,290 | 2,561 | 89.42% |
| Stoneman Douglas High | 45 | 1990-2008 | 14 | 5 | 3,319 | 3,873 | 85.70% |

| Facility Name | Site Size (Acres) | Age Range | Permanent Buildings | Relocatable Buildings | Current Enrollment (Benchmark Day) | LOS Capacity | % of Capacity |
|---|---|---|---|---|---|---|---|
| Stranahan High | 38 | 1951-2004 | 27 | 2 | 1,411 | 2,613 | 54.00% |
| Taravella, J P High | 31 | 1979-2006 | 10 | 18 | 3,150 | 3,761 | 83.75% |
| West Broward High | 43 | 2007-2008 | 8 | 0 | 2713 | 3031 | 0.895084 |
| Western High | 40 | 1979-2009 | 19 | 23 | 3,383 | 3,754 | 90.12% |
| Total | 1,039 | | 419 | 341 | 64,469 | 79,622 | 80.97% |

Source: School Board of Broward County, 2018

High school locations and attendance zones/concurrency service areas (CSAs) are illustrated in Figure PSF-D. High school enrollment for ~~2017-18~~ 2018-19 was ~~70,727~~ 64,469 students not including Broward Virtual High, centers or charters, or schools without attendance boundaries. For the ~~2017-18~~ 2018-19 school year, there were 2 high schools with enrollment greater than their LOS ~~100% of their gross FISH~~ capacity, which is the adopted LOS standard (i.e. the higher of: 100 % gross capacity or 110% permanent FISH capacity. This translates to 7% of high schools that do not meet the LOS. Note: Atlantic Technical, McFatter Technical, Sheridan Technical, Nova, College Academy at BC, and Pompano Beach Institute of International Studies are not traditional high schools with attendance boundaries/concurrency service areas, and therefore are not subject to LOS requirements.

## 5. Charter Schools

There are ~~93~~ 88 charter schools operating in Broward County as of the ~~2017-18~~ 2018-19 school year. The profiles of these schools are shown in Table PSF-~~11~~12.

## Table PSF-12: Current Profile – Broward County Charter Schools 2018-19

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Academic Solutions Academy - A<br>2000 W Commercial Boulevard<br>Fort Lauderdale, FL 33309 | 250 | 196 | 54 | N/A |
| Academic Solutions Academy High School<br>2000 W Commercial Boulevard<br>Fort Lauderdale, FL 33309 | 250 | 176 | 74 | N/A |
| Alpha International Academy<br>121 S 24 Avenue<br>Hollywood, FL 33020 | 384 | 105 | 279 | N/A |
| Andrews High School<br>3500 N Andrews Avenue<br>Pompano Beach, FL 33064 | 550 | 290 | 260 | N/A |
| Ascend Career Academy<br>5251 Coconut Creek Parkway<br>Margate, FL 33063 | 1,000 | 216 | 784 | N/A |
| Atlantic Montessori Charter School<br>9893 Pines Boulevard<br>Pembroke Pines, FL 33024 | 219 | 136 | 83 | N/A |
| Atlantic Montessori Charter School West Campus<br>2550 S Flamingo Road<br>Davie, FL 33325 | 150 | 150 | 0 | N/A |
| Avant Garde Academy<br>2025 McKinley Street<br>Hollywood, FL 33020 | 750 | 568 | 182 | N/A |
| Avant Garde K-8 Broward<br>2025 McKinley Street<br>Hollywood, FL 33020 | 1,374 | 1,195 | 179 | N/A |
| Ben Gamla Charter<br>2620 Hollywood Boulevard<br>Hollywood, FL 33020 | 625 | 526 | 99 | N/A |

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Ben Gamla Charter North Campus<br>2620 Hollywood Boulevard<br>Hollywood, FL 33020 | 900 | 134 | 766 | N/A |
| Ben Gamla Charter South Broward<br>6511 W Sunrise Boulevard<br>Plantation, FL 33313 | 900 | 339 | 561 | N/A |
| Bridge Prep Academy Broward County<br>7595 NW 61 Street<br>Tamarac, FL 33321 | 1,000 | 319 | 681 | N/A |
| Bridge Prep Academy of Hollywood Hills<br>1400 N 46 Avenue<br>Hollywood, FL 33021 | 500 | 306 | 194 | N/A |
| Broward Math and Science Schools<br>6101 NW 31 Street<br>Margate, FL 33063 | 400 | 356 | 44 | N/A |
| Central Charter School<br>4525 N State Road 7<br>Lauderdale Lakes, FL 33319 | 1,293 | 1,169 | 124 | N/A |
| Championship Academy of Distinction at Davie<br>3367 N University Drive<br>Davie, FL 33024 | 692 | 559 | 133 | N/A |
| Championship Academy of Distinction at Davie High School<br>3020 NW 33 Avenue<br>Lauderdale Lakes, FL 33311 | 875 | 78 | 797 | N/A |
| Championship Academy of Distinction at Hollywood<br>1100 Hillcrest Drive<br>Hollywood, FL 33021 | 600 | 430 | 170 | N/A |
| Championship Academy of Distinction Middle School1100 Hillcrest DriveHollywood, FL 33021 | 374 | 237 | 137 | N/A |

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Championship Academy of Distinction of West Broward<br>7100 W Oakland Park Boulevard<br>Sunrise, FL 33313 | 640 | 233 | 407 | N/A |
| Charter School of Excellence<br>1217 SE 3 Avenue<br>Fort Lauderdale, FL 33316 | 310 | 302 | 8 | N/A |
| Charter School of Excellence at Davie<br>2801 N University Drive<br>Pembroke Pines, FL 33024 | 350 | 324 | 26 | N/A |
| City of Pembroke Pines Elementary<br>12350 Sheridan Street<br>Pembroke Pines, FL 33026 | 2,470 | 1,915 | 555 | N/A |
| City of Pembroke Pines High<br>17189 Sheridan Street<br>Pembroke Pines, FL 33331 | 2,144 | 2,113 | 31 | N/A |
| City of Pembroke Pines Middle<br>12350 Sheridan Street<br>Pembroke Pines, FL 33026 | 1,398 | 1,332 | 66 | N/A |
| Coral Springs Charter School<br>3205 N University Drive<br>Coral Springs, FL 33065 | 1,600 | 1,667 | -67 | N/A |
| Eagles' Nest Charter Academy<br>3698 NW 15 Street<br>Lauderhill, FL 33311 | 400 | 380 | 20 | N/A |
| Eagles' Nest Middle<br>201 N University Drive<br>Coral Springs, FL 33071 | 800 | 59 | 741 | N/A |
| Everest Charter School<br>10038-10044 W McNab Road<br>Tamarac, FL 33321 | 205 | 130 | 75 | N/A |

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Excelsior Charter of Broward<br>2099 W Prospect Road<br>Tamarac, FL 33321 | 466 | 184 | 282 | N/A |
| Franklin Academy - Pembroke Pines High School<br>5000 SW 207 Terrace<br>Pembroke Pines, FL 33332 | 1,400 | 755 | 645 | N/A |
| Franklin Academy - Sunrise<br>4500 NW 103 Avenue<br>Sunrise, FL 33351 | 1,475 | 1,338 | 137 | N/A |
| Franklin Academy Cooper City<br>6301 S Flamingo Road<br>Cooper City, FL 33330 | 1,340 | 1,310 | 30 | N/A |
| Franklin Academy F<br>5000 SW 207 Terrace<br>Pembroke Pines, FL 33332 | 1,340 | 662 | 678 | N/A |
| Franklin Academy Pembroke Pines<br>18800 Pines Boulevard<br>Pembroke Pines, FL 33029 | 1,750 | 1,388 | 362 | N/A |
| Greentree Preparatory Charter School<br>6301 SW 160 Avenue<br>Southwest Ranches, FL 33331 | 213 | 158 | 55 | N/A |
| Hollywood Academy of Arts & Science<br>1705 Van Buren Street<br>Hollywood, FL 33020 | 1,100 | 1,095 | 5 | N/A |
| Hollywood Academy of Arts & Science Middle<br>1705 Van Buren Street<br>Hollywood, FL 33020 | 400 | 431 | -31 | N/A |
| Imagine Charter School at Broward<br>9001 Westview Drive<br>Coral Springs, FL 33067 | 1,080 | 828 | 252 | N/A |

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Imagine Charter School at Weston<br>2500 Glades Circle<br>Weston, FL 33327 | 1,075 | 930 | 145 | N/A |
| Imagine Elementary School at North Lauderdale<br>1395 S State Road 7<br>North Lauderdale, FL 33068 | 745 | 598 | 147 | N/A |
| Imagine Schools - Plantation Campus<br>8200 Peters Road<br>Plantation, FL 33324 | 1,340 | 361 | 979 | N/A |
| Innovation Charter School<br>600 SW 3rd Street<br>Pompano Beach, FL 33060 | 580 | 474 | 106 | N/A |
| International School of Broward<br>3100 N 75 Avenue<br>Hollywood, FL 33024 | 675 | 85 | 590 | N/A |
| Kidz Choice Charter<br>1800 N Douglas Road<br>Pembroke Pines, FL 33024 | 750 | 182 | 568 | N/A |
| New Life Charter Academy<br>3550 Davie Boulevard<br>Fort Lauderdale, FL 33312 | 600 | 157 | 443 | N/A |
| North Broward Academy of Excellence Elementary<br>8200 SW 17 Street<br>North Lauderdale, FL 33068 | 763 | 677 | 86 | N/A |
| North Broward Academy of Excellence Middle<br>8200 SW 17 Street<br>North Lauderdale, FL 33068 | 762 | 349 | 413 | N/A |
| Panacea Prep Charter School<br>201 N University Drive<br>Coral Springs, FL 33071 | 188 | 135 | 53 | N/A |

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Paragon Academy of Technology<br>502 N 28 Avenue<br>Hollywood, FL 33020 | 500 | 141 | 359 | N/A |
| Renaissance Charter Middle School at Pines<br>10501 Pines Boulevard<br>Pembroke Pines, FL 33026 | 1,145 | 435 | 710 | N/A |
| Renaissance Charter School at Cooper City<br>2800 N Palm Avenue<br>Cooper City, FL 33026 | 1,504 | 1,199 | 305 | N/A |
| Renaissance Charter School at Pines<br>10501 Pines Boulevard<br>Pembroke Pines, FL 33026 | 1,145 | 947 | 198 | N/A |
| Renaissance Charter School at University<br>8399 N University Drive<br>Tamarac, FL 33321 | 1,504 | 1,405 | 99 | N/A |
| Renaissance Charter School of Coral Springs<br>6250 W Sample Road<br>Coral Springs, FL 33067 | 1,504 | 1,520 | -16 | N/A |
| Renaissance Charter School of Plantation<br>6701 W Sunrise Boulevard<br>Plantation, FL 33313 | 1,504 | 865 | 639 | N/A |
| RISE Academy School of Science and Technology<br>6101 NW 31 Street<br>Margate, FL 33063 | 300 | 318 | -18 | N/A |
| Somerset Academy Charter High School Miramar Campus<br>9300 Pembroke Road<br>Miramar, FL 33025 | 1,000 | 286 | 714 | N/A |

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Somerset Academy Davie<br>3788 Davie Road<br>Davie, FL 33314 | 800 | 149 | 651 | N/A |
| Somerset Academy Elementary<br>20801 Johnson Street<br>Pembroke Pines, FL 33029 | 1,001 | 646 | 355 | N/A |
| Somerset Academy Elementary South Campus<br>19620 Pines Boulevard<br>Pembroke Pines, FL 33024 | 600 | 267 | 333 | N/A |
| Somerset Academy High<br>20805 Johnson Street<br>Pembroke Pines, FL 33029 | 1,200 | 1,031 | 169 | N/A |
| Somerset Academy Key Middle School<br>959 SE 6 Avenue<br>Deerfield Beach, FL 33441 | 495 | 423 | 72 | N/A |
| Somerset Academy Middle<br>20803 Johnson Street<br>Pembroke Pines, FL 33029 | 600 | 886 | -286 | N/A |
| Somerset Academy Miramar<br>12601 Somerset Boulevard<br>Miramar, FL 33027 | 675 | 515 | 160 | N/A |
| Somerset Academy Miramar Middle<br>12601 Somerset Boulevard<br>Miramar, FL 33027 | 480 | 416 | 64 | N/A |
| Somerset Academy Pompano<br>1101 NW 33 Street<br>Pompano Beach, FL 33064 | 750 | 138 | 612 | N/A |
| Somerset Academy Riverside Charter School<br>2251 Riverside Drive<br>Coral Springs, FL 33065 | 600 | 134 | 466 | N/A |

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Somerset Academy Riverside Middle Charter School<br>2251 Riverside Drive<br>Coral Springs, FL 33065 | 400 | 45 | 355 | N/A |
| Somerset Conservatory<br>20807 Johnson Street<br>Pembroke Pines, FL 33029 | 200 | 164 | 36 | N/A |
| Somerset East Preparatory Academy<br>2000 S State Road 7<br>Miramar, FL 33023 | 500 | 238 | 262 | N/A |
| Somerset Key High Charter School<br>959 SE 6 Avenue<br>Deerfield Beach, FL 33441 | 800 | 228 | 572 | N/A |
| Somerset Miramar South<br>12425 SW 53 Street<br>Miramar, FL 33027 | 750 | 212 | 538 | N/A |
| Somerset Neighborhood<br>9300 Pembroke Road<br>Miramar, FL 33025 | 500 | 525 | -25 | N/A |
| Somerset Pines Academy<br>901 NE 33 Street<br>Pompano Beach, FL 33064 | 500 | 431 | 69 | N/A |
| Somerset Preparatory Academy Charter at North Lauderdale<br>7101 Kimberly Boulevard<br>North Lauderdale, FL 33068 | 900 | 758 | 142 | N/A |
| Somerset Preparatory Charter High at North Lauderdale<br>7101 Kimberly Boulevard<br>North Lauderdale, FL 33068 | 1,000 | 263 | 737 | N/A |
| Somerset Preparatory Charter Middle<br>9300 Pembroke Road<br>Miramar, FL 33025 | 600 | 354 | 246 | N/A |

| Facility Name & Location | Contract Capacity | Current Enrollment 2018-19 | Surplus or Deficit Capacity | Projected Enrollment 2023-24 |
|---|---|---|---|---|
| Somerset Village Academy<br>225 NW 29 Street<br>Wilton Manors, FL 33311 | 750 | 236 | 514 | N/A |
| Somerset Village Academy Middle<br>225 NW 29 Street<br>Wilton Manors, FL 33311 | 750 | 149 | 601 | N/A |
| South Broward Montessori Charter School<br>520 NW 5 Street<br>Hallandale Beach, FL 33009 | 348 | 150 | 198 | N/A |
| SunEd High of North Broward<br>1117 Banks Road<br>Margate, FL 33063 | 400 | 309 | 91 | N/A |
| SunEd High School<br>2360 W Oakland Park Boulevard<br>Oakland Park, FL 33311 | 550 | 336 | 214 | N/A |
| Sunrise High School<br>424 W Sunrise Boulevard<br>Fort Lauderdale, FL 33311 | 550 | 389 | 161 | N/A |
| Sunshine Elementary<br>502 N 28 Avenue<br>Hollywood, FL 33020 | 500 | 317 | 183 | N/A |
| The Ben Gamla Preparatory Charter High School<br>2650 Van Buren Street<br>Hollywood, FL 33020 | 600 | 501 | 99 | N/A |
| West Broward Academy<br>5281 Coconut Creek Parkway<br>Margate, FL 33063 | 910 | 556 | 354 | N/A |
| Total | 70,260 | 45,919 | 24,341 | N/A |

**Source**: Contract Capacity reported by Charter Schools Support, September 2018

Charter school locations are illustrated in Appendix Figure PSF-E. They have a District-wide attendance zone/concurrency service area, which means ~~their LOS is measured on a county-wide basis~~ they are not subject to LOS requirements. Charter school enrollment for ~~2017-18~~ 2018-19 was ~~45,093~~ 45,919 students.

## C. Projected 5 Year School Enrollment, Capacity, LOS and Improvement Costs

The analysis of the current and five (5) year projected data of school facilities is compiled in the LOS Plan contained within the Adopted District Educational Facilities Plan. It represents information for the years 2018-19~~2017-18~~ through 2022-23~~2021-22~~. The LOS Plan is a matrix that contains the data to demonstrate each elementary, middle and high school's ability to meet the adopted LOS Standard during each DEFP period by calculating the projected enrollment divided by the LOS capacity of the facility. As previously stated on page 8 (Level of Service Standard Methodology), the LOS Standard is the maximum permissible school utilization rate relative to capacity. Based upon the newly adopted Third Amended and Restated ILA ~~Up until the end of the 2018/19 school year, the~~ LOS Capacity is implemented as the higher of: 100% gross capacity ~~and commencing in the 2019/20 school year, the LOS Capacity will be~~ or 110% permanent FISH capacity. The LOS Plan therefore shows the projected enrollment for each of the five years covered by the DEFP divided by the LOS Capacity of each school. It should be noted that the LOS Plan contained in the 2018-19 to 2022-23 DEFP still reflects the previous LOS contained in the Second Amended ILA which was 100% gross capacity and commencing in the 2019/20 school year, converted to 110% permanent FISH capacity. This is because the DEFP was published prior to adoption of School Board Policy 1161 to enable implementation of the new LOS. ~~adjustments are made to the LOS Capacity of pertinent schools to include capacity from Qualified Relocatables (defined as relocatables that were purchased after 1998 and meet the standards for long-term use) as mandated by Section 163.3180(6)(e), Florida Statutes.~~

### 1. Concurrency Costs – Affected Parties

The costs associated with achieving and maintaining the LOS during the five (5) year period are paid for and shared by public and private funding sources. The Revenue and Appropriations Summary within the Adopted DEFP ~~Adopted District Educational Facilities Plan (Adopted DEFP)~~ details the primary public and private entities which pay for the capacity improvements. Millage - funds collected through property taxes which are the primary revenue source. Impact/Mitigation Fees are another source collected from developers to address capacity improvement costs.

The cost associated with the capacity additions for those school facilities not currently meeting the LOS are depicted in the Adopted DEFP. The improvement costs are derived from the financially feasible DEFP. There may be additional costs to meet concurrency which are addressed through Proportionate Share Mitigation provisions. These provisions and requirements are outlined in the Second Amended Interlocal Agreement, specifically, Sections 8.14 and 8.15.

### 2. Land Area Requirements

There are currently no new schools planned which would require additional land to meet capacity improvements. As such, the Adopted DEFP does not contain information to indicate the number of acres needed per school type or a listing of planned school site acquisitions.

The School Board adopted new "urban school" standards intended to reduce the acreage amounts required to build schools given the diminishing availability of land in Broward County.

## D. Projected 10 Year School Enrollment, Capacity, LOS and Improvement Costs

The long-term planning period for school facilities is ten years. Table PSF-13 below represents capacity needs information for the end of the ten-year period through ~~2027-28~~ 2028-29. The data compares the School District's LOS by grade level and Planning Area to the ~~2027-28~~ 2028-29 projected student enrollments and the available ~~permanent~~ LOS capacity. ~~As mentioned earlier, commencing at the 2019-20 school year, the LOS is calculated at 110% of permanent FISH capacity.~~ The cumulative information presents a total ~~permanent~~ LOS capacity ~~plus 10%~~ of ~~255,289~~ 269,257, versus a projected enrollment of ~~212,929~~ 212,278 or an excess of ~~42,360~~ 56,959 seats. The cumulative total solely based on permanent capacity is ~~232,080~~ 235,340 with an excess of ~~19,151~~ 23,062 seats.

## Table PSF-13: Projected 10 Year School Facilities by Planning Area and District-Wide

| Planning Area | School Type | LOS (110% Perm. Capacity) | Projected Enrollment 2027-28 | Surplus or (Deficit) Capacity | Improvement Strategy | Projected Cost | Projected Added Capacity |
|---|---|---|---|---|---|---|---|
| Area A | Elementary School | 20,752 | 15,059 | 5,693 | None | N/A | N/A |
| | Middle School | 8,432 | 6,786 | 1646.2 | None | N/A | N/A |
| | High School | 13,752 | 12,282 | 1470.5 | None | N/A | N/A |
| Area B | Elementary School | 21,367 | 16,108 | 5,259 | None | N/A | N/A |
| | Middle School | 9,046 | 7,383 | 1,663 | None | N/A | N/A |
| | High School | 11,157 | 8,780 | 2,377 | None | N/A | N/A |
| Area C | Elementary School | 17,499 | 13,705 | 3,794 | None | N/A | N/A |
| | Middle School | 9,172 | 7,258 | 1,914 | None | N/A | N/a |
| | High School | 9,127 | 5,965 | 3,162 | None | N/A | N/A |
| Area D | Elementary School | 19,795 | 17,646 | 2,149 | None | N/A | N/A |
| | Middle School | 8,868 | 7,385 | 1482.73 | None | N/A | N/A |
| | High School | 13,971 | 12,563 | 1408.4 | None | N/A | N/A |
| Area E | Elementary School | 13,339 | 10,145 | 3,194 | None | N/A | N/A |
| | Middle School | 5,325 | 4,260 | 1064.9 | None | N/A | N/A |
| | High School | 7,811 | 5,859 | 1,952 | None | N/A | N/A |
| Area F | Elementary School | 20,280 | 14,462 | 5,818 | None | N/A | N/A |

| Planning Area | School Type | LOS (110% Perm. Capacity) | Projected Enrollment 2027-28 | Surplus or (Deficit) Capacity | Improvement Strategy | Projected Cost | Projected Added Capacity |
|---|---|---|---|---|---|---|---|
| | Middle School | 10,541 | 7,682 | 2,859 | None | N/A | N/A |
| | High School | 14,366 | 12,297 | 2,069 | None | N/A | N/A |
| Area G | Elementary School | 17,803 | 13,470 | 4,333 | None | N/A | N/A |
| | Middle School | 7,416 | 5,613 | 1,803 | None | N/A | N/A |
| | High School | 9,438 | 7,572 | 1,866 | None | N/A | N/A |
| District-Wide | Elementary School | 130,835 | 100,596 | 30,239 | None | N/A | N/A |
| | Middle School | 58,800 | 46,366 | 12,434 | None | N/A | N/A |
| | High School | 79,622 | 65,317 | 14,305 | None | N/A | N/A |
| Total | | 269,257 | 212,278 | 56,979 | | $0 | N/A |

**Source**: School Board of Broward County, 2018.

Based on ~~permanent~~ LOS capacity ~~plus 10% (LOS)~~, there are no ~~only~~ planning areas where there is projected to be a deficit of seats ~~in 2027-28 is Planning Areas A at the high school level~~.

## E. Collocation of School Facilities

The collocation of public school facilities with local government public/civic facilities, is used in the context of this analysis as public facilities collocated or located adjacent to each other, and used by both the School Board and local governments through the use of a Recreation Lease Agreement. Shared use facilities are facilities that are not located adjacent to each other, are owned by either the School Board or the local government, but shared by both parties through mutual agreement or understanding. Article IX of the Third Amended Interlocal Agreement for Public School Facility Planning includes a process to ensure that the opportunity for collocation is maximized to the greatest extent possible.

## F. Emergency Shelters

New educational facilities located outside the Hurricane Evacuation Zones (Plan A or B) as shown on the Broward County Hurricane Evacuation Map (ND-1) are required to have core facility areas designed as Enhanced Hurricane Protection Areas unless the facility is exempted based on a recommendation by the local emergency management agency or the Department of Community Affairs. Certain factors are considered to qualify for the exemption, such as low evacuation demand, size, location, accessibility and storm surge. For example, if the County has adequate shelter capacity, a school may be exempt. Table PSF-~~13~~14 is an inventory of schools within Broward County that serve as general population emergency shelters. **Three of the general population shelters are also designated as pet friendly shelters.** Additionally, there are five (5) additional schools within Broward County designated as "Special Needs Shelters". Since these shelters are not publicly advertised by Broward County, they are not included on the inventory of schools shelter listing (Table PSF-1~~3~~4).

### Table PSF-14: List of Emergency Shelters

| SCHOOL NAME | ADDRESS |
|---|---|
| ATC - Arthur Ashe, Jr. Campus | 1701 N.W. 23 Ave. , Fort Lauderdale , FL 33311 |
| Beachside Montessori Village | 2230 Lincoln Street, Hollywood, FL 33020 |
| Challenger Elementary | 5703 NW 94 Ave., Tamarac , FL 33321 |
| Coconut Palm Elementary | 13601 Monarch Lakes Blvd., Miramar , FL 33027 |
| Coral Cove Elementary | 5100 S.W. 148 Ave., Miramar, FL 33027 |
| Coral Glades High | 2700 Sportsplex Drive, Coral Springs, FL 33065 |
| Dolphin Bay Elementary | 16450 Miramar Parkway, Miramar, FL 33027 |
| Everglades Elementary | 2900 Bonaventure Boulevard, Weston , FL 33331 |
| Everglades High (Pet Friendly) | 17100 SW 48th Court, Miramar, FL 33027 |
| Falcon Cove Middle (Pet Friendly) | 4251 Bonaventure Blvd, Weston , FL 33332 |
| Floranada Elementary | 5251 NE 14 Way, Fort Lauderdale , FL 33334 |
| Fox Trail Elementary | 1250 Nob Hill Rd., Davie, FL 33324 |
| Gator Run Elementary | 1101 Glades Parkway, Weston , FL 33327 |
| Gulfstream Academy of Hallandale Beach, South | 900 8th Street, Hallandale Beach, FL 33009 |
| Lakeside Elementary | 900 NW 136 Ave., Pembroke Pines , FL 33028 |
| Liberty Elementary | 2450 Banks Rd., Margate, FL 33063 |
| Lyons Creek Middle (Pet Friendly) | 4333 Sol Press Blvd., Coconut Creek , FL 33073 |
| Manatee Bay Elementary | 19200 Manatee Isles Drive, Weston, FL 33332 |
| Monarch High | 5050 Wiles Rd., Coconut Creek , FL 33073 |

| SCHOOL NAME | ADDRESS |
|---|---|
| New Renaissance Middle | 10701 Miramar Boulevard, Miramar, FL 33027 |
| Orange Brook Elementary | 715 S. 46 Ave., Hollywood , FL 33021 |
| Panther Run Elementary | 801 NW 172 Ave., Pembroke Pines , FL 33029 |
| Park Lakes Elementary | 3925 N. State Rd. 7, Lauderdale Lakes, FL 33319 |
| Park Trails Elementary | 10700 Trails End, Parkland , FL 33076 |
| Parkside Elementary | 10257 NW 29 St., Coral Springs , FL 33065 |
| Pines Middle | 200 NW Douglas Rd., Pembroke Pines , FL 33024 |
| Plantation Elementary | 651 NW 42 Ave., Plantation , FL 33317 |
| Pompano Beach High | 600 NE 13 Avenue, Pompano Beach , FL 33060 |
| Rock Island Elementary | 2350 N.W. 19 St., Fort Lauderdale, FL 33311 |
| Silver Lakes Elementary | 2300 SW 173 Ave., Miramar , FL 33029 |
| Silver Palms Elementary | 1209 NW 155 Ave., Pembroke Pines , FL 33028 |
| Silver Shores Elementary | 1701 SW 160 Ave., Miramar, FL 33027 |
| Silver Trail Middle (currently out of commission due to re-roofing) | 18300 Sheridan St., Pembroke Pines , FL 33331 |
| Sunset Lakes Elementary | 18400 SW 25 St., Miramar, FL 33029 |
| Tradewinds Elementary | 5400 Johnson Rd., Coconut Creek , FL 33073 |
| Watkins Elementary | 3520 SW 52 Ave., Pembroke Park , FL 33023 |
| West Broward High School | 500 NW 209th Ave, Pembroke Pines, FL 33029 |

Source: Broward County Emergency Management Division, October 2018

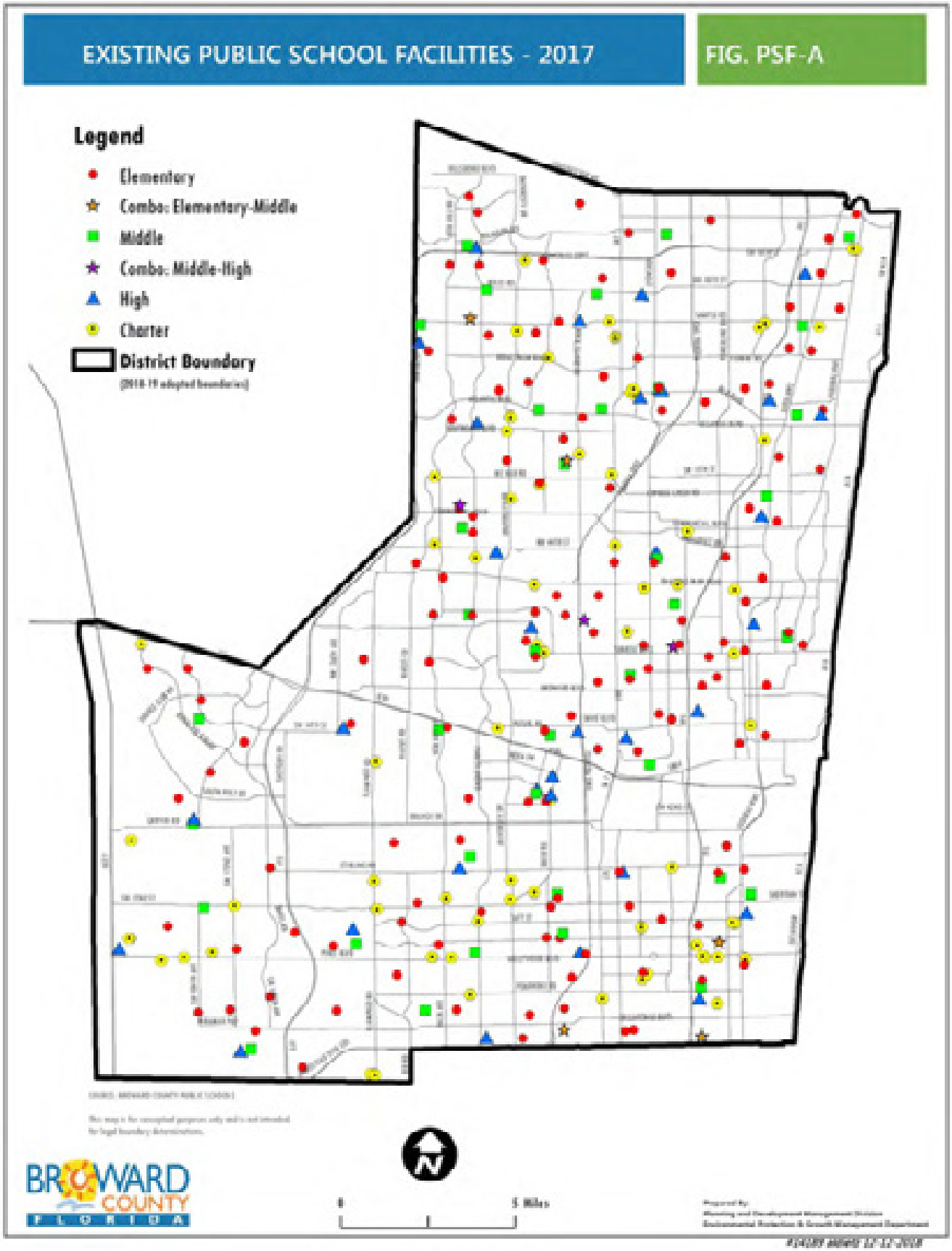
## G. Funding Sources for Capital Improvements

The School Board of Broward County has total projected revenue, and financing sources of ~~$2.68~~ $2.8 billion for public school capital improvements for the 5-year period ending ~~2021-22~~ 2022-23 as depicted in the Revenue and Appropriations Summary of the Adopted DEFP. The major sources of revenues are millage, which is collected from local property taxes, and a voter approved general obligation bond. They comprise ~~89%~~ 88% of total revenues. The primary appropriations are for construction programs, debt service, and renovation of district facilities, which comprise ~~83%~~ 85% of total appropriations.

The projected capital outlays, by school facility for the 5-year period are depicted in the 5-Year Adopted DEFP.

## H. Operating Cost Considerations

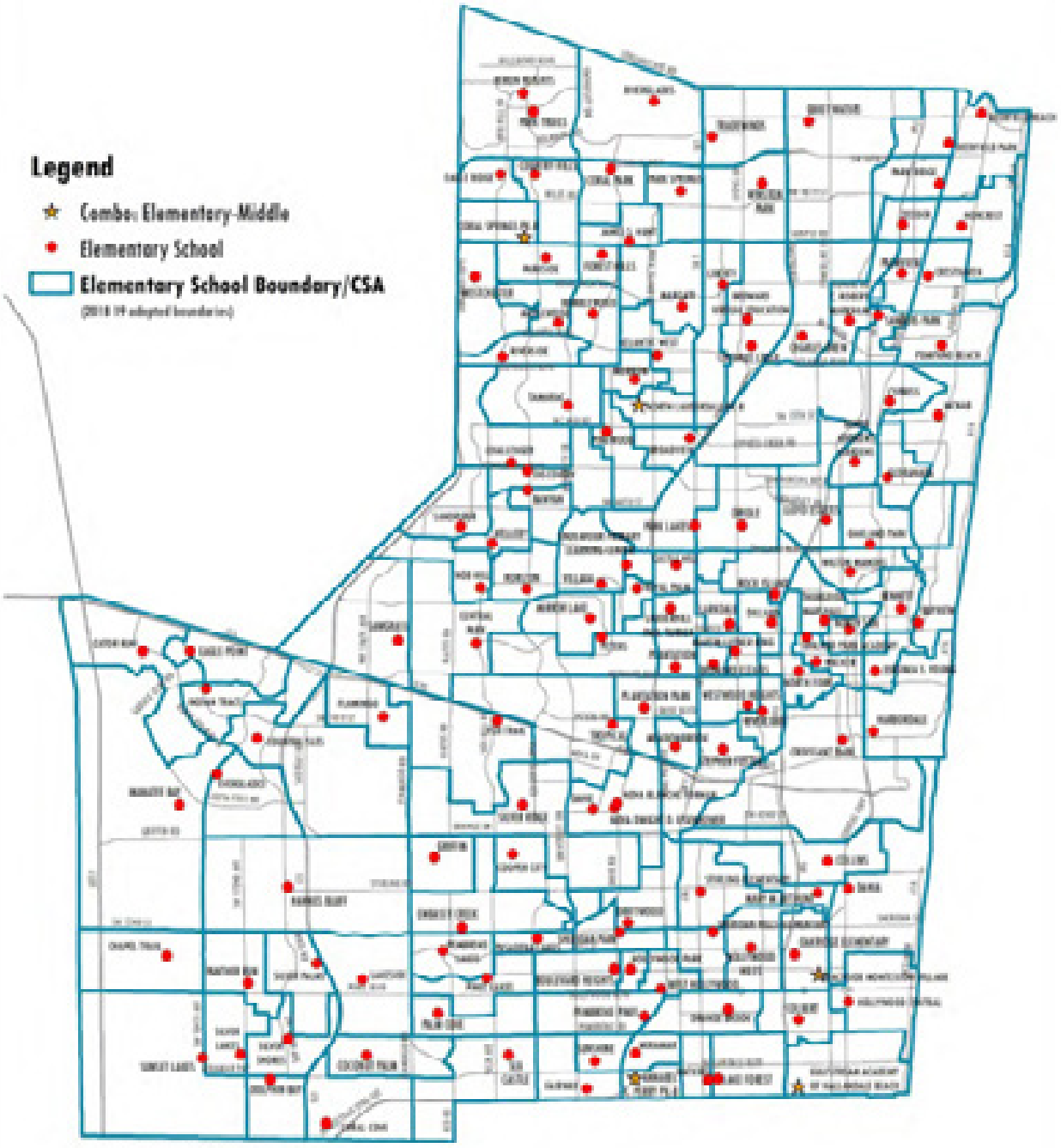
There are just under 1,000 school buses used by Broward District Schools on daily routes, transporting more than 73,000 students to and from school, and driving more than 16 million miles to 234 locations. ~~There are over 1,000 school buses used by the District on daily routes, transporting more than 80,000 students to and from school, and driving more than 18 million miles to over 290 locations. A total of 98 new eco-friendly school buses were recently purchased, which will be less expensive to fill up because they use propane gas instead of diesel.~~


EXISTING PUBLIC SCHOOL FACILITIES - 2017
FIG. PSF-A
Legend
Elementary
Combo: Elementary-Middle
Middle
Combo: Middle-High
High
Charter
District Boundary
BROWARD COUNTY
FLORIDA
N
0
5 Miles

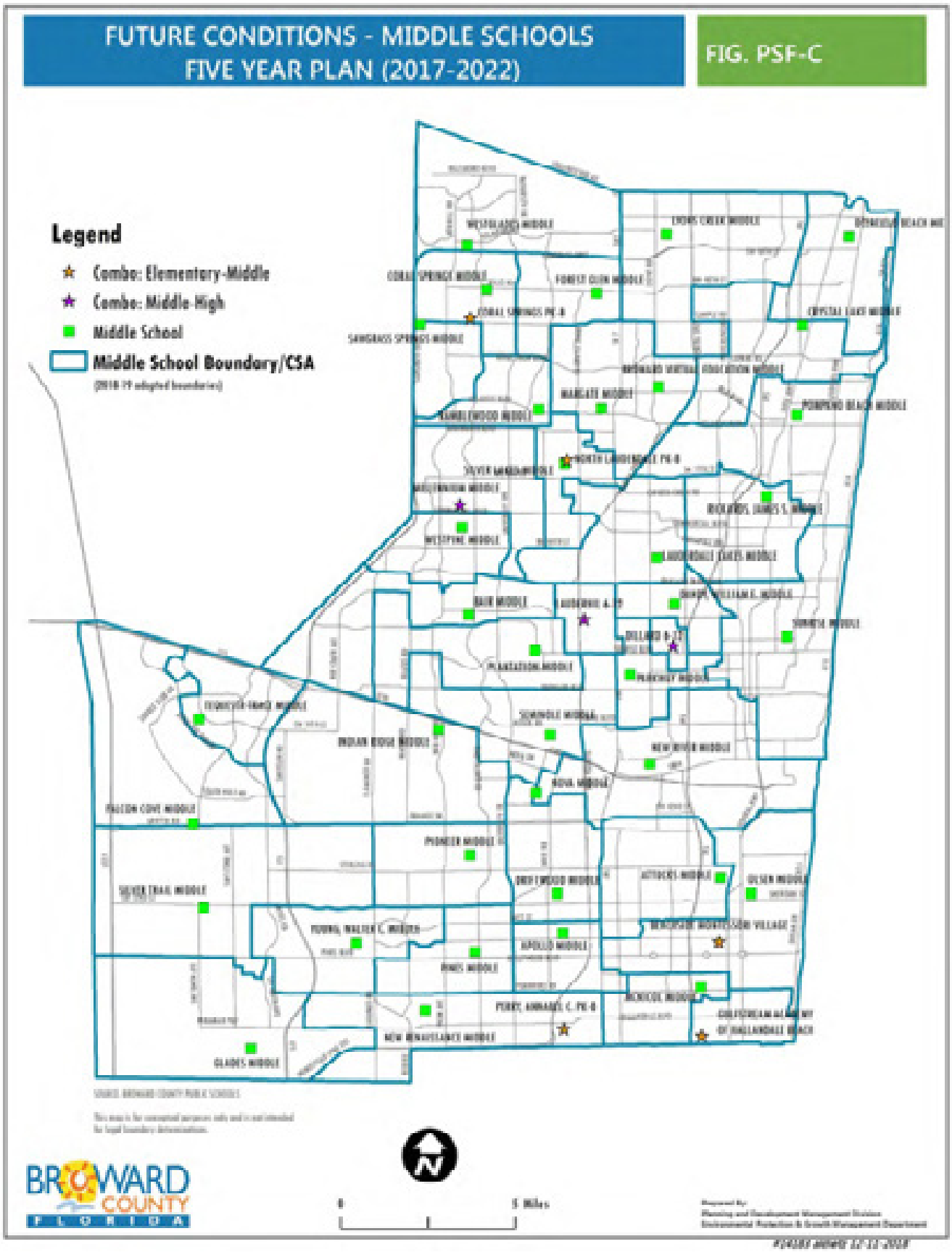
Appendix PSF-B

# FUTURE CONDITIONS - ELEMENTARY SCHOOLS FIVE YEAR PLAN (2017-2022)

FIG. PSF-B



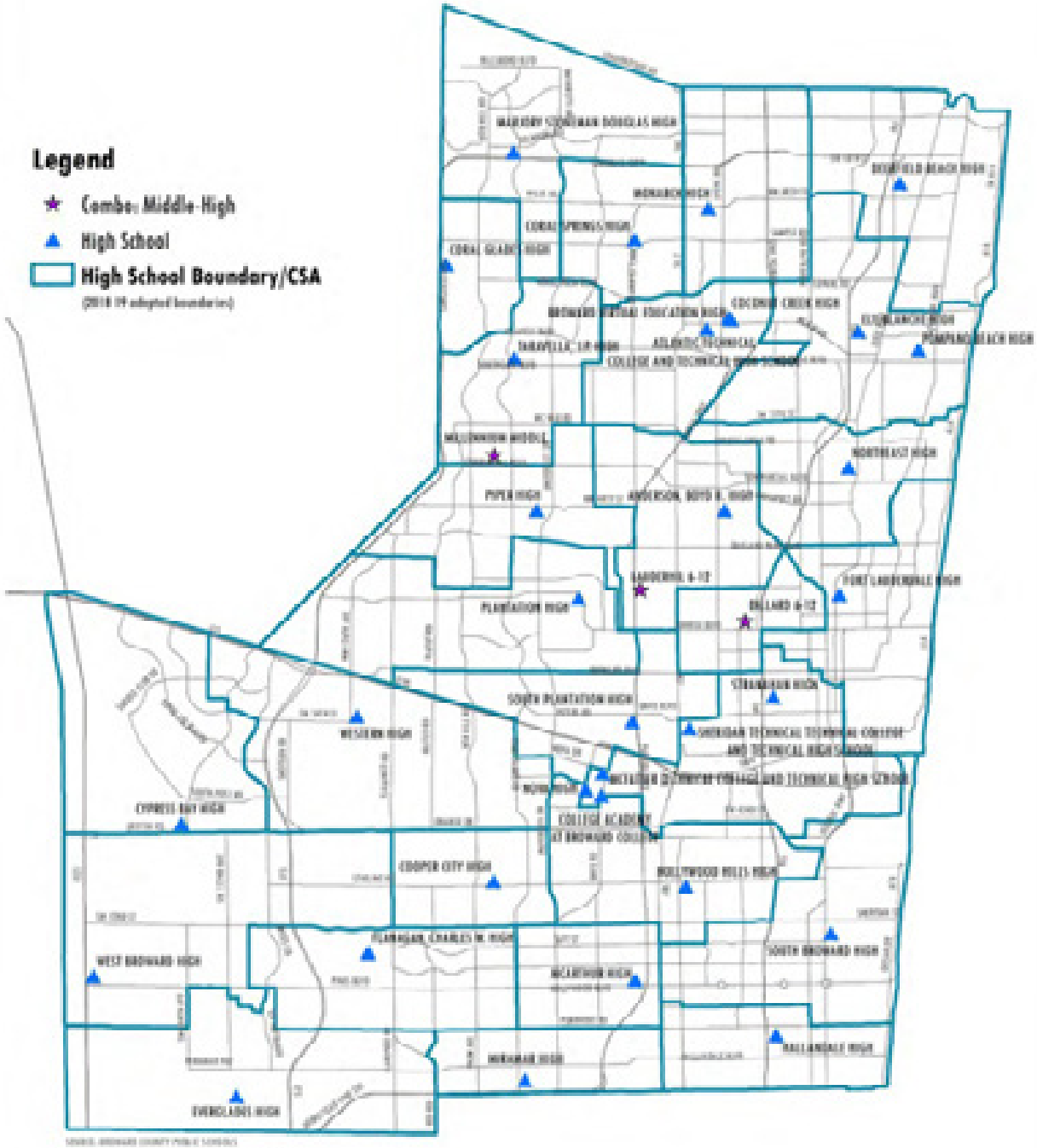
Appendix PSF-C



Appendix PSF-D

# FUTURE CONDITIONS - HIGH SCHOOLS
# FIVE YEAR PLAN (2017-2022)

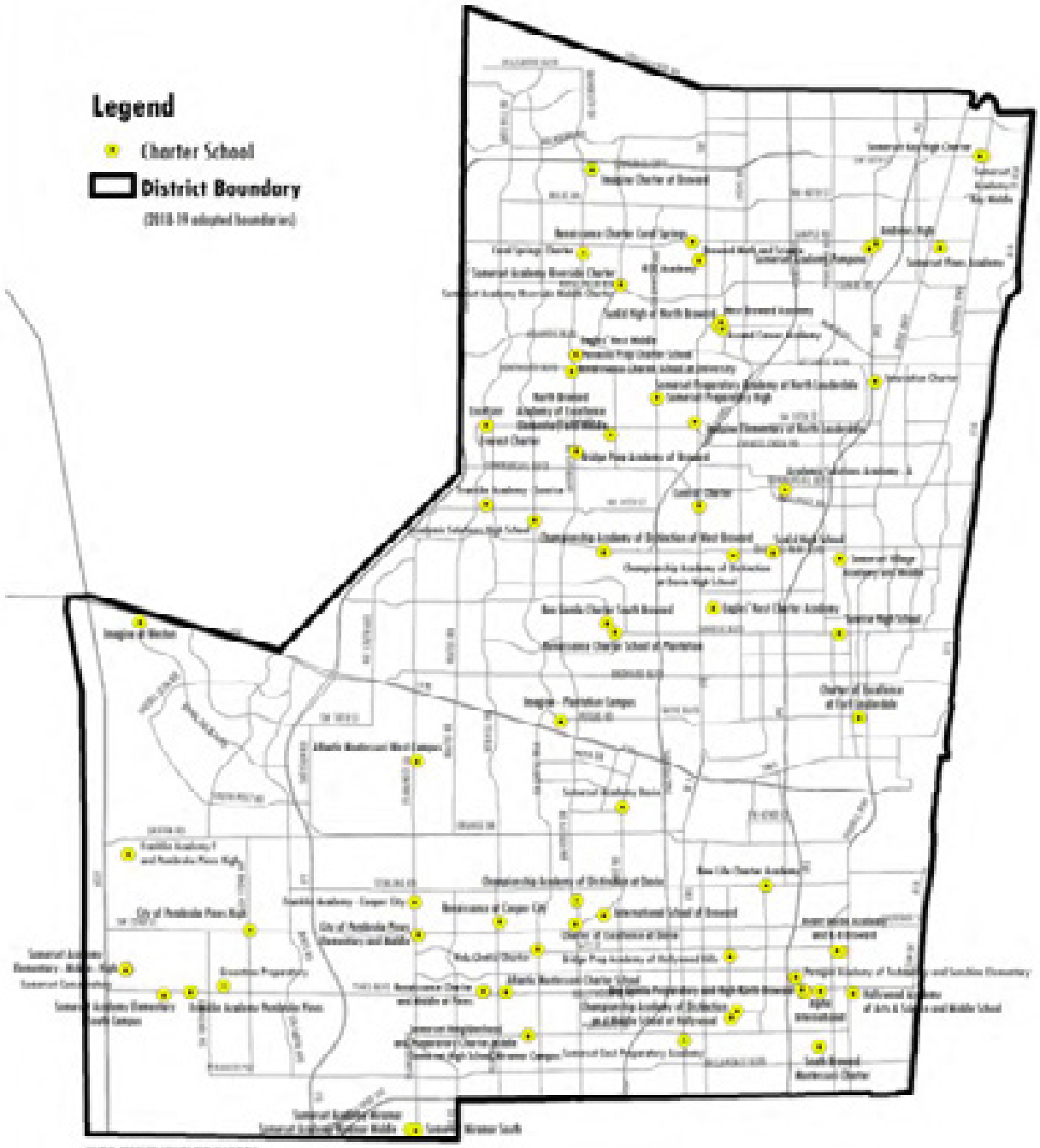
FIG. PSF-D



Appendix PSF-E

# FUTURE CONDITIONS - CHARTER SCHOOLS FIVE YEAR PLAN (2017-2022)

FIG. PSF-E

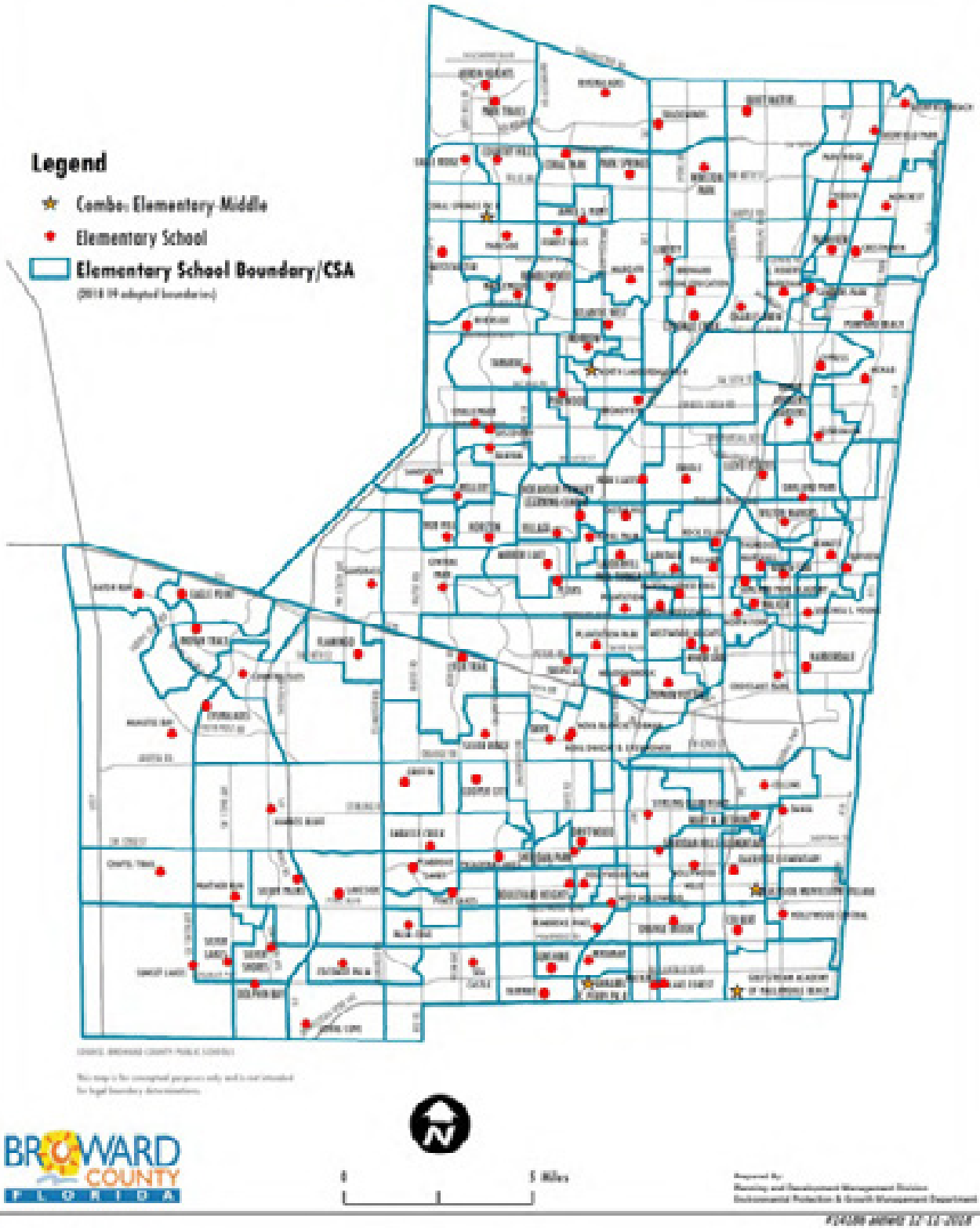



BROWARD COUNTY FLORIDA

Appendix PSF-F

# FUTURE CONDITIONS - ELEMENTARY SCHOOLS TEN YEAR PLAN (2017-2027)

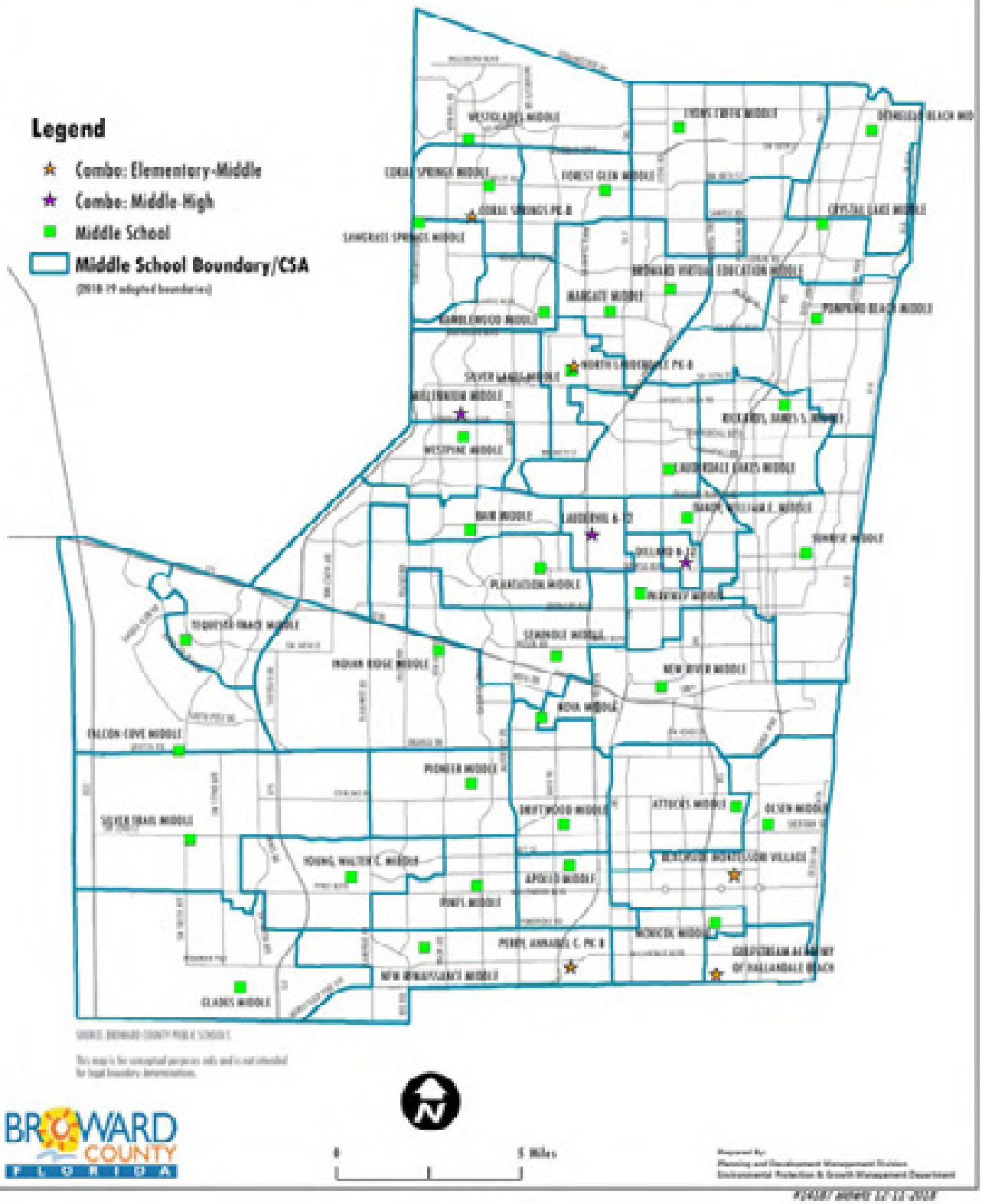
FIG. PSF-F



Appendix PSF-G

# FUTURE CONDITIONS - MIDDLE SCHOOLS TEN YEAR PLAN (2017-2027)

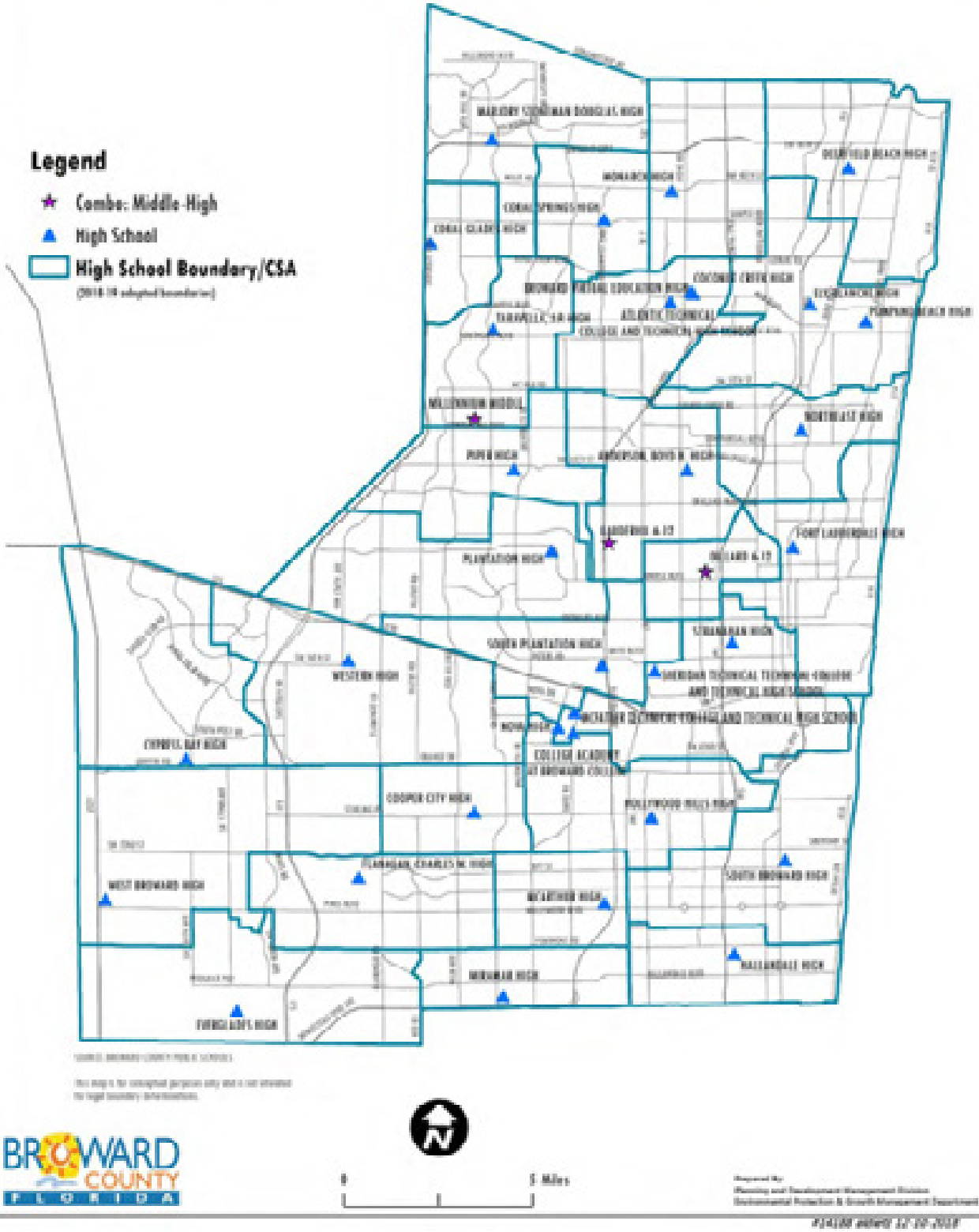
FIG. PSF-G



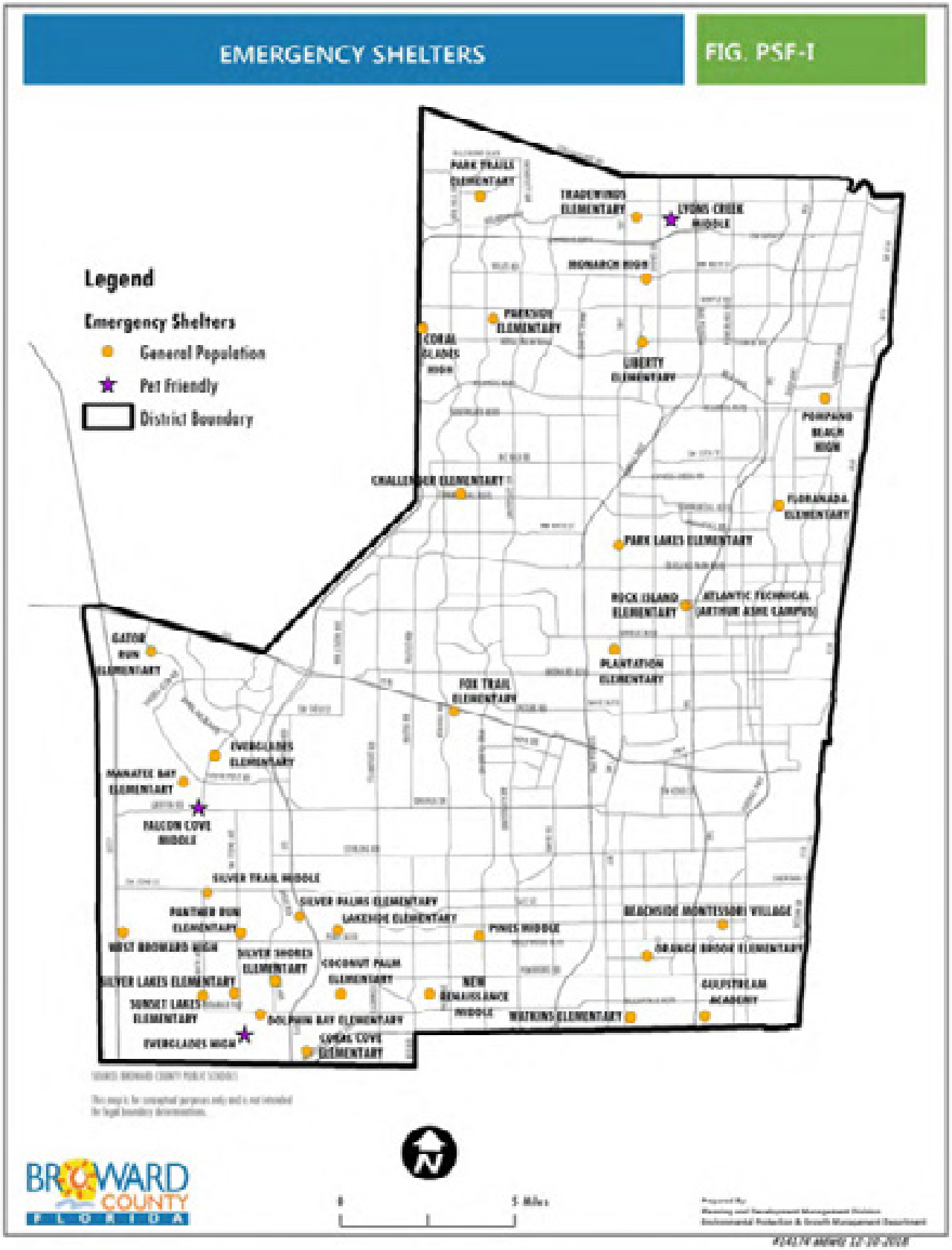
Appendix PSF-H

# FUTURE CONDITIONS - HIGH SCHOOLS
# TEN YEAR PLAN (2017-2027)

FIG. PSF-H

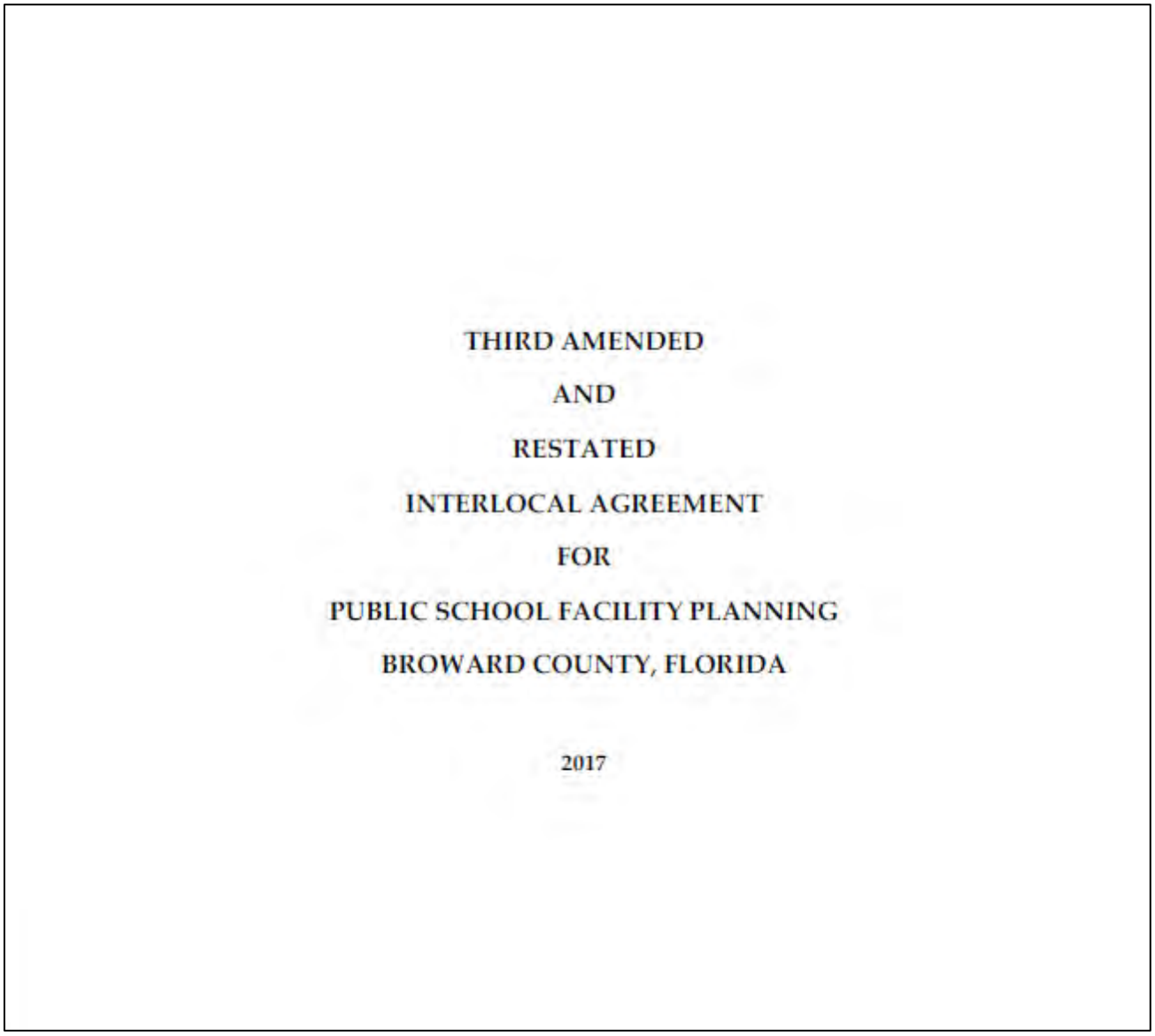


Appendix PSF-I



Appendix PSF-J

# Third Amended and Restated Interlocal Agreement for Public School Facility Planning, Broward County, Florida, 2017



THIRD AMENDED

AND

RESTATED

INTERLOCAL AGREEMENT

FOR

PUBLIC SCHOOL FACILITY PLANNING

BROWARD COUNTY, FLORIDA

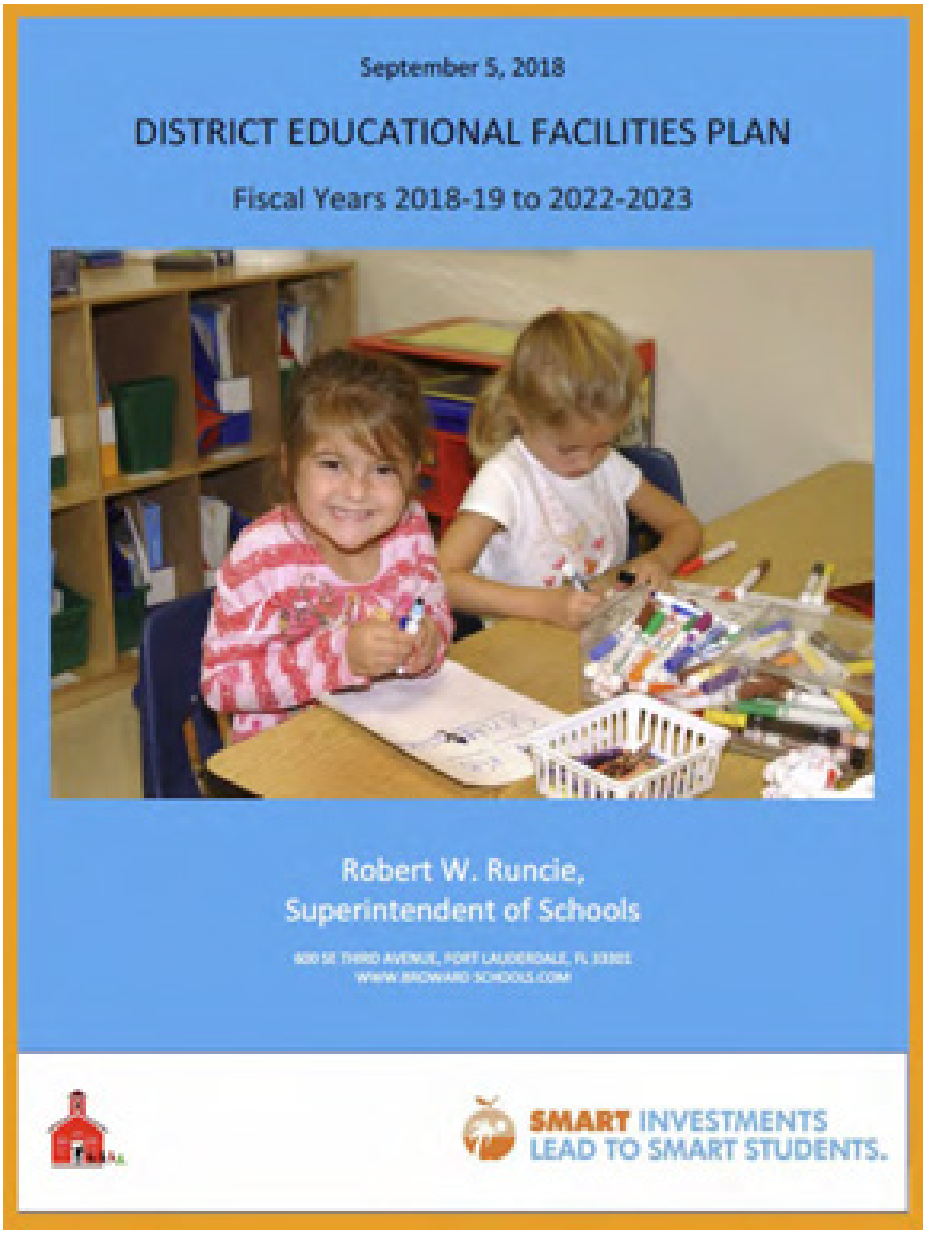
2017

Appendix J can be found on the Broward County Public Schools web page by clicking the image above or clicking the hyperlink below at:

http://bcpsagenda.browardschools.com/agenda/01303/Item%20L-17%20(36645)/SUPP_DOCS/Exhibits/Doc4.pdf

Appendix PSF-K

Adopted 5 Year Broward County Public Schools District Educational Facilities Plan (DEFP)
~~Fiscal Years 2017-18 to 2021-2022~~ Fiscal Years 2018-19 to 2022-2023




Appendix K can be found on the Broward County Public Schools web page by clicking the image above or clicking the hyperlink below at:

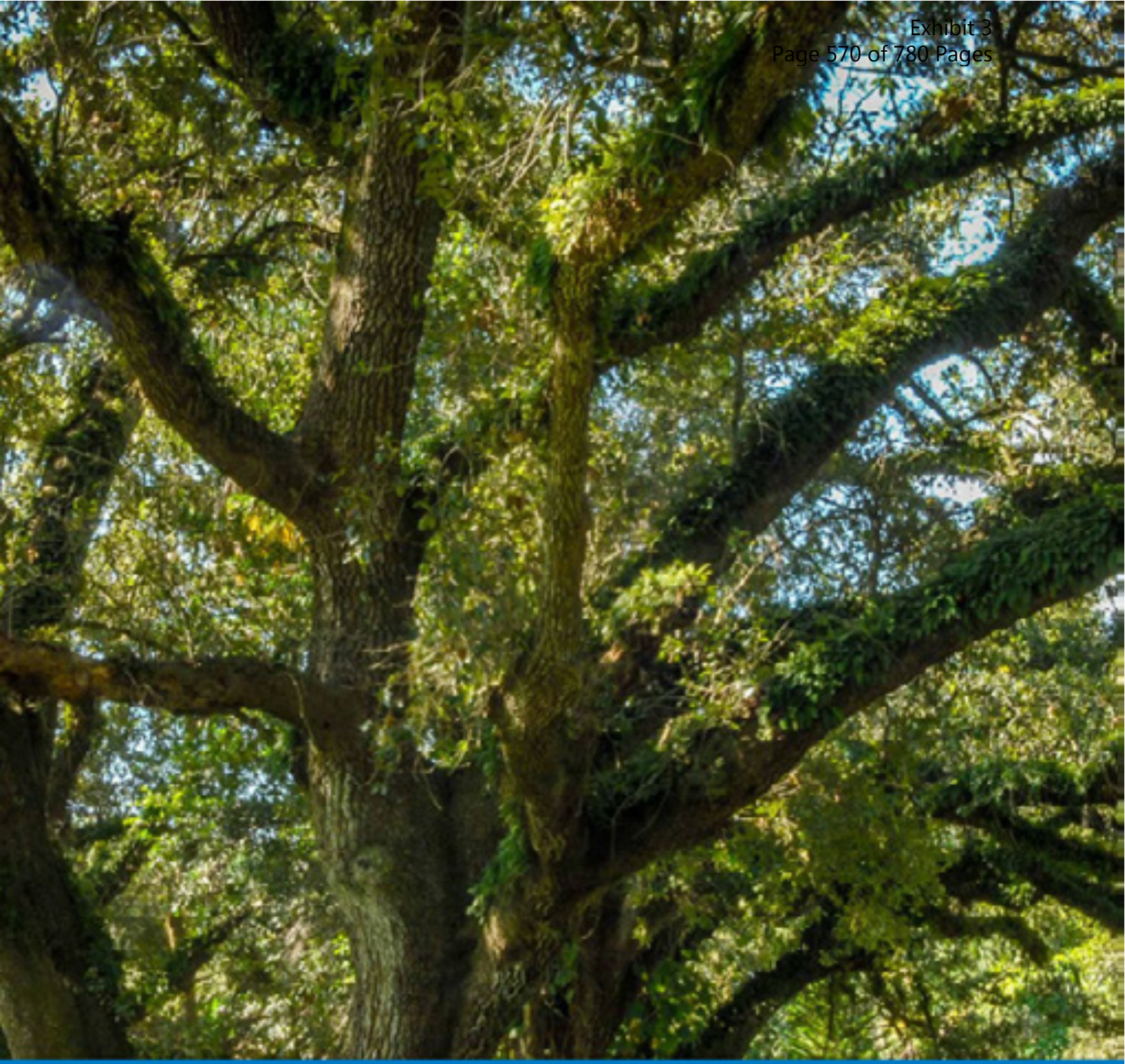
http://bit.ly/BCPS_ADEFP-FY19

# Appendix PSF-L

## Educational Plant Five Year (2015-2020) Survey Report: Broward County School District, Number 4 – Version 1

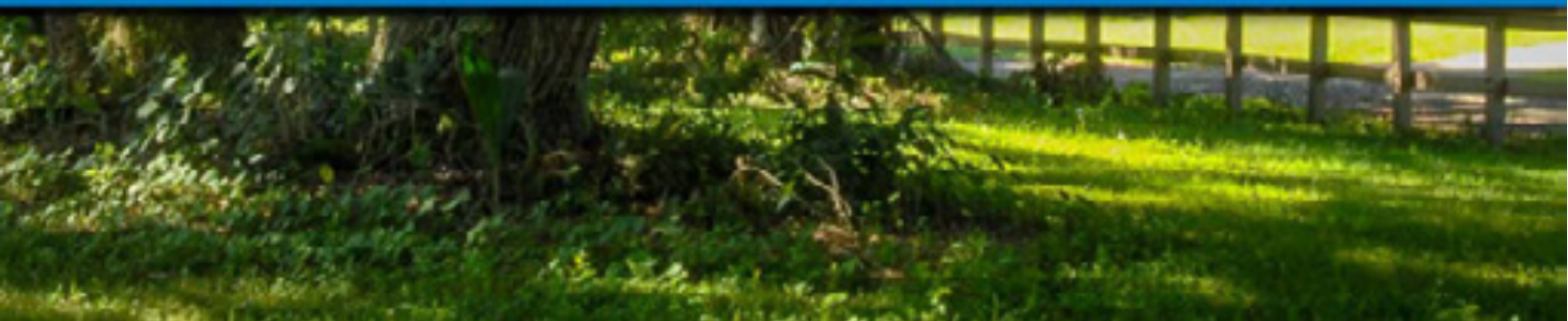
Appendix L can be found on the Broward County Public Schools, Facility Planning and Real Estate Department web page by clicking the hyperlink below at:

http://www.broward.k12.fl.us/propertymgmt/new/facilityplanning/docs.html



BROWARD COUNTY
FLORIDA

# Recreation and Open Space Element Support Document



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Activity-Based Park – A park featuring active facilities such as baseball, basketball, handball, and tennis courts.

Blueways – A water path or trail that is developed with launch points, camping locations and points of interest for boaters, canoeists and kayakers.

Community Cultural Facilities – A building or structure whose purpose is to further cultural activities, including visual art facilities, performing art facilities, museums, planetariums and botanical gardens.

Corridor – A narrow strip of land. Corridors are typically used to connect natural or man-made feature to one another, such as a local park to a regional park.

Corridor, Conservation – Less extensive linear protected areas that serve as biologically connecting corridors and, in many cases, also provide outdoor, resource-based recreational opportunities.

Corridor, Recreation – Linear open spaces that are sites of moderate to intense recreational uses.

Corridor, Scenic – Corridors of land protected for scenic quality and other aesthetic considerations.

Corridor, Utilitarian – Linear features, such as power line and pipeline rights-of-way and canals that may be used to connect recreational, cultural, or natural system features.

Ecological Sites – Smaller sites that conserve important or unique natural or geologic features.

Greenbelt – Protected natural lands or working landscapes surrounding cities. Greenbelt serve to preserve agricultural productivity, as well as to balance and direct urban and suburban growth

Greenway System – A greenway system is composed of large hubs, links, and smaller sites. Hubs anchor the system and provide an origin and destination for people and wildlife moving to or through it. Hubs come in many different sizes, from large protected reserves to smaller regional parks and preserves. Links or corridors are the connections that enable the system to work. They range in size and function from large landscaping links to smaller conservation and recreation corridors. Sites are smaller features that serve as points of origin and destination but are not always linked with hubs or with each other.

Golf Course – A large tract of landscaped land consisting of a series of 9 or 18 holes spaced apart, known as a course and laid out for the playing of golf

Landscape Linkages – Large, linear protected areas that provide sufficient areas of space for native plants and animals to flourish while serving as corridors connecting ecosystems and landscapes. Landscape linkages can also provide space for the protection of historic sites and opportunities for human uses like hunting, fishing, canoeing, swimming, and hiking.

Local Park – A designation which includes both neighborhood and community parks designed to serve recreational needs of residents in the BMSD. It also includes ten percent or ten acres per regional park, whichever is less.

Public Access – The ability of the public to physically reach, enter or use recreation sites including beaches and shores.

Recreation – The pursuit of leisure time activities occurring in an indoor or outdoor setting.

Recreation Facility – A component of a recreation site used by the public such as a trail, court, athletic field, or swimming pool.

Regional Park – A park having over forty (40) acres, which is intended to serve the recreational needs of the population of the entire County. A park 40 acres or smaller may be classified as a regional parks, provided it possesses unique recreation, environmental, or cultural resources.

Reserves – Large protected areas that serve as primary sites for conserving biological diversity and natural resources such as fisheries and fresh water. Reserves also can protect important historical and cultural sites and provide some nature-based recreation opportunities.

Resourced-Based Park – A park featuring passive facilities such as picnic areas, shelters, swimming and oriented toward the natural resources of the park site.

Special Park – A park specifically for the elderly and the physically impaired.

Trails – Designated trails provide access to and appreciation of the values of natural areas, green spaces, and historic sites, present diverse resource-based outdoor recreational opportunities, and enhance the understanding of historical sites and cultural diversity.

BROWARD COUNTY COMPREHENSIVE PLAN

Support Document

# Recreation & Open Space Element

## INTRODUCTION

### A. General

Consistent with Florida Statute 163.3177, the purpose of the Recreation and Open Space Element (ROSE) is to plan for a comprehensive system of public and private recreation sites, including, but not limited to, natural reservations, parks and playgrounds, parkways, beaches and public access to beaches, open spaces, waterways, greenways, and other recreational facilities. The ROSE Support Document provides the data and analysis that is the basis for the ROSE Goals, Objectives and Policies (GOPs).

### B. Service Area

The ROSE service area depends upon the type of recreation. For local parks, the service area is the Broward Municipal Service District, BMSD (Unincorporated Area). For regional parks, the service area is the entire County, including the municipalities.

### C. Planning Horizons

For purposes of the ROSE, the short-term planning horizon is 2023, while the long-term planning horizon is 2030.

## DATA REQUIREMENTS

Florida Statute 163.3177 (1) (a) requires the ROSE be based upon relevant and appropriate data and an analysis by the local government that may include, but not be limited to, surveys, studies, community goals and vision, and other data available at the time of adoption. This section addresses the above-described statute requirements. In addition to meeting the requirements of state statute,

the Recreation and Open Space Element must meet the parks requirements of the Broward County Land Use Plan (BCLUP). The BCLUP defines two types of parks: community parks and regional parks. A community park is defined as a park used by the local government to meet the three (3) acres per thousand population community parks requirement of the BCLUP. A regional park is defined as a park that is used to meet the three (3) acre per thousand regional parks requirement of the BCLUP. Section 2 of the BCLUP includes criteria for the classification of community and regional parks. While the ROSE includes information about various types of recreational facilities, the primary intent is to ensure level-of-service standards are met.

## A. Existing Recreation Sites

An abundance of recreational opportunities are provided throughout Broward County. These include opportunities for hiking, hunting, water sports, fishing, picnicking, and team sports. Recreational opportunities also are provided for all age groups and physical abilities. Map ROS-1 depicts the Water Conservation Areas (WCAs), County, State, and Municipal parks within Broward County. The full extent of the WCAs is not shown on the map, but they include the remnants of the historic Florida Everglades and comprise approximately two-thirds of Broward County. Map ROS-1 shows Broward County has an extensive system of recreation and open space within its urbanized area.

### 1. Cultural Arts

Besides the many conventional forms of recreation, cultural arts facilities offer leisure opportunities. The Broward County Cultural Division provides a museum and gallery guide that includes information about various museums and cultural attractions throughout Broward County. It may be accessed at the following link: Broward County Museum+Galleries.

Broward County supports the development of community cultural facilities and is committed to working with both the public and private sectors in the development of cultural facilities. (See ROSE Policies 2.3 and 2.4). Broward County developed a plan for the arts and cultural development called *Creative*BROWARD 2020. It may be accessed at the following link: Creative Broward 2020.

### 2. Local Parks (Broward Municipal Services District)

Table R-1 lists local parks that primarily serve residents of the Broward Municipal Services District. Some parks listed below have a more regional draw due to their location or the specialized type of recreation they offer. These include Dillard Green Space, Delevoe Park, Sewell Lock, and South Fork Canoe Launch.

Table R-1: Local Parks in the BMSD

| Name | Acres | Address |
|---|---|---|
| Boulevard Gardens Community Center | 1.31 | 313 NW 28th Terrace |
| Delevoe Park | 28.14 | 2520 NW 6th Street |
| Dillard Park Green Space | 3.93 | N W 27th Ave |
| Franklin Park | 3.07 | 2501 Franklin Park Drive |
| Lafayette Hart Park | 2.66 | 2851 NW 8th Rd |
| Lewis-Chisholm Park | .44 | 2620 NW 8th St |
| Roosevelt Gardens Park | 5.43 | 2841 NW 11th St |
| Sewell Lock | 4.03 | Davie Rd |
| South Fork Canoe Launch | .47 | SR 7 and Dania Cutoff Canal |
| Sunview Park | 21.27 | 1500 SW 42nd Street |
| Washburn Park | .64 | 1955 SW 50th Ave |
| Total | 71.39 | |

Source: Planning and Development Management Division, 2018.

## 3. Regional Parks (Broward County)

Regional parks are intended to serve the recreation needs of the entire County. They vary in size from fractions of an acre to thousands of acres. Most sites are large, however, small parcels that provide unique types of recreation and open space may be classified as regional parks. For instance, Boaters Park is only 6.5 acres and can only be accessed by boat.

Table R-2: Regional Parks, Natural Area Sites, and Dog Parks

| Type | Name | Acres | Address |
|---|---|---|---|
| Regional | Aviation Greenbelt Viewing Area | 30.68 | North side of Griffin Road, south side of Broward County's Fort Lauderdale-Hollywood International Airport |
| Regional | Boaters park | 6.5 | Accessible only by boat. N Side Of Dania Cut Off Canal. Nautical coordinates: $26^0$ 4' 5.45" N, $80^0$ 10' 17.76"W |
| Regional | Brian Piccolo Sports Park and Velodrome | 175.2 | 9501 Sheridan Street, Cooper City, FL, 33024 |
| Regional | Carpenter House at Hollywood North Beach Park | .54 | 4414 Surf Road, Hollywood, FL, 33019 |

| Type | Name | Acres | Address |
|---|---|---|---|
| Regional | CB Smith Park | 299 | 900 N Flamingo Road, Pembroke Pines, FL, 33028 |
| Regional | Central Broward Regional Park and Stadium | 110 | 3700 NW 11th Place, Lauderhill, FL, 33311 |
| Regional | Easterlin Park | 46.6 | 1000 NW 38th Street, Oakland Park, FL, 33309 |
| Regional | Everglades Holiday park | 39 | 21940 Griffin Road, Fort Lauderdale, FL, 33332 |
| Regional | Hollywood North Beach Park | 56 | 3601 N Ocean Drive, Hollywood, FL, 33019 |
| Regional | Markham Park and Target Range | 760 | 16001 W SR 84, Sunrise, FL, 33326 |
| Regional | Miramar Pineland | 157 | 3600 S University Drive, Miramar, FL 33025 |
| Regional | Plantation Heritage Park | 88.5 | 1100 S Fig Tree Land, Plantation, FL, 33317 |
| Regional | Quiet Waters Park | 431.4 | 401 S Powerline Rd, Deerfield Beach, FL, 33442 |
| Regional | Tradewinds Park and Stable | 625 | 3600 W Sample Rd, Coconut Creek, FL, 33073 |
| Regional | Tree Tops Park | 243.3 | 3900 SW 100 Ave, Davie, FL, 33328 |
| Regional | T.Y. (Topeekeegee Yugnee) Park | 138.6 | 3300 N Park Rd, Hollywood, FL, 33021 |
| Regional | Vista View Park | 272 | 4001 SW 142 Ave, Davie, FL, 33330 |
| Regional | West Lake Park | 1,566.5 | 1200 Sheridan St, Hollywood, FL, 33019 |
| Regional | Anne Kolb Nature Center | 1,500 | 751 Sheridan St, Hollywood, FL, 33019 |
| Regional | Deerfield Island Park | 53.3 | 1720 Deerfield Island Park, Deerfield Beach, FL, 33441 |
| Regional | Fern Forest Nature Center | 247.1 | 201 Lyons Rd. South, Coconut Creek, L, 33063 |
| Regional | Long Key Nature Center and Natural Area | 164.8 | 3501 SW 130 Ave, Davie, FL, 33330 |
| Regional | Secret Woods Nature Center | 57 | 2701 W State Rd. 84, Dania Beach, FL, 33312 |
| Natural Area | Crystal Lake | 24.3 | 3299 NE 3rd Ave, Pompano Beach, FL, 33064 |

| Type | Name | Acres | Address |
|---|---|---|---|
| Natural Area | Deerfield Highlands Nature Preserve | 10 | 701 NE 1st St, Deerfield Beach, FL, 33064 |
| Natural Area | Helene Klein Pineland Preserve | 13 | 4701 W Hillsboro Blvd, Coconut Creek, FL, 33073 |
| Natural Area | Highlands Scrub | 34.3 | 4050 W Dixie Highway, Pompano Beach, FL, 33064 |
| Natural Area | Hillsboro Pineland | 44 | 5591 NW 74th Place, Coconut Creek, FL, 33073 |
| Natural Area | Military Trail | 19.9 | 4600 NW 9th Ave, Deerfield Beach, FL, 33064 |
| Natural Area | Pine Island Ridge | 101 | 3900 SW 100th Ave, Davie, FL, 33328 |
| Natural Area | Saw Palmetto | 11.9 | 4950 71st Place, Coconut Creek, FL, 33073 |
| Natural Area | Snake Warrior's Island | 53.3 | 3600 SW 62nd Ave, Miramar, FL, 33023 |
| Natural Area | Tall Cypress | 66.4 | 3700 Turtle Run Boulevard, Coral Springs, FL, 33065 |
| Natural Area | West Creek Pineland | 7.43 | 4900 Hillsboro Blvd, Coconut Creek, FL, 33073 |
| Natural Area | Woodmont | 21.6 | 7250 NW 80th Ave, Tamarac, FL, 33321 |
| Dog Park | Barkham at Markham Park | NA | 16001 W SR 84, Sunrise, FL, 33326 |
| | Total: | 7,346.97 | |

**Source:** Planning and Development Management Division, 2018.

## B. Existing Open Space

Open space includes both undeveloped passive recreation and conservation use land, as well as parks designed for active use. Broward County recognizes the importance of recreation and open space land for recreation; protection of air, water, and soil resources; and conservation of wildlife and plant habitat. Broward County also recognizes that recreation and open space has a significant role in the economic development and sustainability of Broward County. Broward County has a robust system of recreation and open space due to the County's current and past commitment to land acquisition and park development.

### 1. Parks

Parks are the most familiar type of open space. The primary role of these lands is to provide the general public with recreational opportunities. Broward County ensures parks are provided by requiring development to meet the local and regional park level-of-service of standards of Broward County's Land Development Code. See ROSE Objective R.3 and Policy R3.2.

### 2. Corridor Open Space

Corridor open spaces are linear green spaces and may include greenways, conservation corridors, and bike paths, among others. Broward County's vision for corridor open space is set forth in its "Broward County Potential Greenways System" map, which may be accessed through the following link: Broward County Greenways Map. Open space corridors may serve as both green space and transportation routes. Broward County also encourages the development of equestrian trails and promotes the interconnectivity between the County's equestrian trails and municipal equestrian trails. See ROSE Policy R1.4.

## C. Recreation and Open Space Level of Service (LOS) Standards

Broward County maintains parks level-of-service standards for regional parks and local parks. Regional parks serve the county as a whole, while local parks serve the Broward Municipal Services District. The Broward County Land Use Plan Policy 2.5.1 requires each municipality, as well as the Broward Municipal Services District to provide three (3) acres of local parks per thousand population. The Broward County Land Use Plan Policy 2.5.2 requires Broward County to provide three (3) acres of regional parks per thousand population. The adopted LOS standards are shown in Table R-3.

Objective R3 addresses level-of-service requirements. Level-of-service standards must be satisfied prior to the issuance of a development order or permit in accordance with the procedures contained in the Broward County Land Development Code. Sections 5-182 (i) and (s) address regional and local park level-of-service standards, respectively. They may be accessed via the following link: Parks Level of Service Standards.

Table R-3: Adopted Parks Level of Service Standards

| Park Type | Level of Service Standard |
|---|---|
| Local | Three (3) acres per 1,000 persons (minimum) |
| Regional | Three (3) acres per 1,000 persons (minimum) |

Source: Broward County Land Development Code, 2016.

Broward County LDC Sections 5-182(s) and 5-182(i) respectively requires the local park and regional park LOS standards be satisfied prior to the issuance of a development order or permit in the BMSD. A developer may satisfy the Broward County parks concurrency requirement through the payment of impact fees, dedication of land in lieu of fees, or a combination of both at the discretion of the Broward County Board of County Commissioners. Impact fees must be used for land acquisition, new park development or the development of new recreational facilities in existing parks.

## ANALYSIS REQUIREMENTS

Florida Statute 163.3177 (1) (a) requires the ROSE be based upon relevant and appropriate data and an analysis by the local government that may include, but not be limited to, surveys, studies, community goals and vision, and other data available at the time of adoption. ROSE Part III addresses the above-described statute requirements.

### A. Current Demand for Parks

Tables R-4 and R-5 show the current demand for local and regional parks. Many factors influence the demand for various types of recreation sites and facilities. Broward County recognizes these demands change over time based upon age, trends, and other factors. Broward County further recognizes that it is essential to ensure enough land is dedicated for recreational purposes. As demand for various types of recreation change, land may be repurposed to serve the changing demand.

#### 1. Regional Parks Demand

Table R-4 shows the current acreage of regional parks, as well as the demand. It shows that Broward County currently provides a surplus of regional parks.

Table R-4: Existing Acreage and Demand - Regional Parks

| Existing Acreage[1] | Level of Service Standard | Population[2] | Acreage Demand | Surplus (Deficiency) | Acres Per 1,000 Persons |
|---|---|---|---|---|---|
| 7,478.65 | 3 acres per thousand population | 1,827,005 | 5,481.01 | 1,997.64 | 4.09 |

Sources:
[1] Planning and Development Management Division, 2018.
[2] Broward County Population Forecasting Model estimate, 2017.

### 2. Local Parks Demand

Table R-5 shows the current acreage of local parks, as well as the demand. It shows Broward County currently provides surplus of local parks.

Table R-5: Existing Acreage and Demand - Local Parks

| Existing Acreage[1] | Level of Service Standard | Population[2] | Acreage Demanded | Surplus or (Deficiency) | Acres Per 1,000 Persons |
|---|---|---|---|---|---|
| 77.27 | 3 acres per thousand population | 14,934 | 44.8 | 32.47 | 5.2 |

Sources:
[1] Planning and Development Management Division, 2018.
[2] Broward County Population Forecasting Model estimate, 2017.

### 3. Public Availability of Sites and Facilities

Public availability of sites and facilities means adequate access is provided. Access to recreation sites and facilities may be provided by transit, roads, bicycle paths, pedestrian ways, and waterways. All Broward County parks have adequate access. Objective R1 addresses access to parks and recreation facilities.

## B. Projected Demand for Parks

Demand for both local and regional parks is expected to increase as population increases.

### 1. Regional Parks

Table R-6 shows the future need for regional parks. The existing supply of regional parks is projected to be sufficient to meet the demand through at least 2045.

**Table R-6: Future Needs for Regional Parks**

| Year[1] | Population[2] | Existing Acreage | Acreage Demanded | Surplus or Deficiency | Acres Per 1,000 Persons |
|---|---|---|---|---|---|
| 2045 | 2,199,812 | 7,478.65 | 6,599.44 | 879.21 | 3.4 |

Sources:
[1] Planning and Development Management Division, 2018.
[2] Broward County Population Forecasting Model estimate, 2017.

### 2. Local Parks

Table R-7 projects future recreation demand for local parks. The existing supply of local parks is projected to meet the projected demand through at least 2045.

**Table R-7: Future Needs for Local Parks**

| Year | Population[1] | Existing Acreage | Acreage Demanded | Surplus or Deficiency | Acres Per 1,000 Persons |
|---|---|---|---|---|---|
| 2045 | 22,834 | 77.27 | 68.5 | 8.77 | 3.39 |

Source:
[1] Broward County 2014 Traffic Analysis Zones and Municipal Forecasts Update

## C. Sustainable Future

Climate change impacts, such as rising tides and storm surges have impacted the costs to maintain public beaches. Objective R4 and associated policies address ensuring a sustainable future. Conservation Element Policy C6.9 addresses the assessment of species, habitats, landscapes, and ecosystems that are vulnerable to climate change and the development of adaptation strategies and plans. Conservation Element Policy C6.13 addresses the restoration of shorelines and dunes. Conservation Element Objective C9 and C10 address manatee protection.

## D. Connectivity

Many transportation and recreation and open space programs are interrelated and addressed in both the Recreation and Open Space Element and Transportation Element. For instance, greenways provide both transportation and recreational opportunities. Policies R1.4 through

R1.7, and Policy R2.7 address efforts to improve access and connectivity to parks through better transportation networks, including expansion of complete streets and greenways. Transportation Element Objective T1.3 addresses development of greenways, blueways, off-network paths, and complete streets.

# IMPLEMENTATION

## A. Countywide Master Plan

As population in the County has increased so has the demand for recreation and open space. This coupled with the additional pressures of climate change have established the need for a countywide master plan that responds and anticipates the impacts of changing conditions to establish a clear plan moving forward. Objective R4 addresses providing for a sustainable future.

## B. Authority

The Broward County Parks and Recreation Division was established through Chapter 13, Part IX, Broward County Administrative Code, to administer parks and recreation programs of the County. The Division provides regional parks and local parks in the BMSD.

## C. Sources

The Broward County Parks and Recreation Division is the primary source for the data and analysis included in this Element. Other sources include the Broward County Planning and Development Management Division and the Broward County Cultural Division.

## D. Future Recreation and Open Space

Broward County is fully developed, the supply of park land is not expected to grow, and the current supply of local and regional parks is sufficient to meet the projected demand through 2040. However, the types of programs and facilities may change in response to population changes.


BROWARD COUNTY
FLORIDA

# Transportation Element Support Document

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Airport facility – An area of land or water improved, maintained or operated by a governmental agency for the landing and takeoff of aircraft, or privately owned paved runways of 4,000 or more feet in length, and any appurtenant area which is used for airport buildings, or other airport facilities or rights-of-way.

Arterial road – A roadway providing service which is relatively continuous and of relatively high traffic volume, long trip length, and high operating speed. In addition, every United States numbered highway is an arterial road.

Bicycle and pedestrian ways – Any road, path or way which is open to bicycle travel and traffic afoot and from which motor vehicles are excluded.

Bicycle lane – A portion of a roadway which has been designed by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists (American Standards of State Highway and Transportation Officials (AAHSTO)).

Bike path – A bikeway physically separated from motorized vehicular traffic by an open space or barrier and located either within the highway right-of-way or within an independent right-of-way (AASHTO).

Blueway – A waterway which has been designated for conservation, recreation, or both and which may be connected with greenway hubs, sites, and linkages.

Broward County Trafficways Plan – The plan promulgated by the Broward County Planning Council which depicts a network of trafficways for Broward County (Land Development Code). The Broward County Trafficways Plan is a roadway right-of-way preservation plan. To accommodate the impacts of new development, right-of-way is required of developing parcels to provide for an adequate regional roadway network.

Carpool and vanpool – Carpool is an arrangement where two or more people share the use and cost of privately owned automobiles in traveling to and from pre-arranged destinations together, and vanpool is an arrangement which a group of passengers share the use and cost of a van in traveling to and from pre-arranged destinations together (U.S Department of Transportation (DOT)).

Capacity – The maximum sustainable flow rate at which vehicles or persons reasonably can be expected to traverse a point or uniform segment of a lane or roadway during a specified time period under given roadway, geometric, traffic, environmental, and control conditions; usually expressed as vehicles per hour, passenger cars per hour, or persons per hour. (Transportation Research Board).

Container– A large standard sized metal box into which cargo is packed for shipment; containers are designed to be moved with common handling equipment, functioning as the transfer unit between modes rather than the cargo itself (Intermodal Association of North America).

Farebox recovery ratio – The ratio of fare revenue to operating expenses (Federal Transit Administration (FTA)).

Greenway – A corridor of protected open space established for conservation, recreation or both. (Florida Department of Environmental Protection).

Intelligent Transportation System (ITS) – Electronic communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system (DOT).

Intermodal facility– An intermodal facility is a single or closely related transportation facility used by two or more modes of transportation. Intermodal system is one providing connections between different modes, such as adequate highways to ports or bus feeder services to rail transit; individual modes working together to provide the user with the best choices of services (Florida Department of Transportation (FDOT)).

Level of Service – A quantitative stratification of quality of service into six letter grades. LOS provides a generalize and conceptual planning measure that assesses multimodal service inside the roadway environment (essentially inside the right-of-way) (FDOT).

Local road – A roadway providing service which is of relatively low traffic volume, short average trip length or minimal through traffic movements, and high-volume land access for abutting property.

Long Range Transportation Plan – A document resulting from regional or statewide collaboration and consensus on a region or state's transportation system, and serving as the defining vision for the region's or state's transportation systems and services. In metropolitan areas, the plan indicates all of the transportation improvements scheduled for funding over the next 20 years.

Modal split – The proportion of total person trips that use each of various specified modes of transportation (DOT).

Multimodal system – A transportation system consists of more than one mode of travel to serve transportation needs in a given area (FDOT).

Minor arterial– A roadway interconnects with and augments the urban principal arterial system.

Neighborhood Transit Center – Means a facility needed to provide service to 2-3 mainline Broward County Transit(BCT) routes and one local circulator with total daily ridership of 1,000 to 2,000 passengers.

Paratransit – Transit services which are characterized by their nonscheduled, non-fixed route nature such as ride sharing, car or van pools, demand responsive buses, and other public transit services.

Planning analysis hour factors ($K_{100}$) – The ratio of a highway section's volume in the year's 100th highest volume hour to its annual average traffic volume. In developed areas the year's 100th highest volume hour represents a typical weekday peak traffic hour during the area's peak travel season, i.e., that area's peak season rush hour, usually in the late afternoon. The K100 factor refers to a demand volume, not necessarily a measured volume.

Right-of-way– Land in which the state, a county, or a municipality owns the fee simple title or has an easement dedicated or required for a transportation or utility use.

Runway Protection Zone (RPZ) – An area off the runway end used to enhance the protection of people and property on the ground (FAA).

Strategic Intermodal System (SIS) – The Florida transportation system composed of transportation corridors and facilities of statewide and interregional significance that play an important role in the movement of people and goods (FDOT).

Terminal – Any location where passenger or freight either originates, terminates, or is handled in the transportation process; or where commercial motor carriers maintain operating facilities (DOT).

Traffic Review and Impact Planning System, (TRIPS) Model – A computer model maintained in the Broward County Development Management Division which accounts for the traffic from approved but not built development. See Committed Trip (Land Development Code, Broward County).

Transit-oriented development (TOD) – or Transit Node is the land area around a major transit/rail stop. TOD or Transit nodes can include neighborhood transit centers, park-and-ride lots, Tri-Rail stations, BCT terminals and transit facilities.

Transportation Concurrency Management Area (TCMA) – A compact geographic area with existing or proposed multiple, viable alternative travel paths or modes for common trips. The purpose of this optional alternative transportation concurrency approach is to promote infill development or redevelopment within selected portions of urban areas in a manner that supports the provision of more efficient mobility alternatives, including public transit.

Transportation corridors – Major routes used for moving people and goods by one or more transportation options

Transportation Demand Management (TDM) – Transportation demand management (TDM) refers to a set of strategies aimed at reducing the demand for roadway travel, particularly in single occupancy vehicles. These strategies address a wide range of externalities associated with driving, including congestion, poor air quality, less livable communities, reduced public health, dependence on oil, reduced environmental health, and climate change and GHG emissions. Some TDM strategies are designed to reduce total travel demand, while others are designed to reduce peak period demand, which may disproportionately contribute to these externalities.

Transportation disadvantaged – those persons who because of physical or mental disability, income status, or age are unable to transport themselves or to purchase transportation and are, therefore, dependent upon others to obtain access to health care, employment, education, shopping, social activities, or other life-sustaining activities, or children who are handicapped or high-risk or at-risk as defined in s. 411.202 Florida Statutes.

Transportation System Management (TSM) – Means improving roads, intersections, and other related facilities to make the existing transportation system operate more efficiently. Transportation system management techniques include demand management strategies, incident management strategies, and other actions that increase the operating efficiency of the existing system.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| ADA | Americans with Disabilities Act |
| ATMS | Advance Traffic Management Systems |
| BCT | Broward County Transit |
| CPTED | Crime Prevention through Environmental Design |
| CSX | Coastal Seaboard Railroad |
| DMS | Dynamic Message Signs |
| DRI | Development of Regional Impact |
| EV | Electric Vehicle |
| FEC | Florida East Coast Railroad |
| FAA | Federal Aviation Administration |
| FAR | Federal Aviation Regulation |
| FDOT | Florida Department of Transportation |
| FIHS | Florida Intrastate Highway System |
| HOT | High Occupancy Toll |
| ICM | Integrated Corridor Management |
| ITS | Intelligent Transportation System |
| LOS | Level of Service |
| LRTP | Long Range Transportation Plan |
| MPO | Metropolitan Planning Organization |
| MTP | Metropolitan Transportation Plan |
| MUTCD | Manual on Uniform Traffic Control Devices for streets & highways |
| PTC | Positive Train Control |
| RTP | Regional Transit Plan |
| SFRTA | South Florida Regional Transportation Authority |

| | |
|---|---|
| SHS | State Highway System |
| SIS | Strategic Intermodal System |
| SSPP | Safety System Program Plan |
| TCMA | Transportation Concurrency Management Area |
| TDM | Transportation Demand Management |
| TDP | Transit Development Plan |
| TIP | Transportation Improvement Programs |
| TOD | Transit Oriented Development |
| TNC | Transportation Network Companies |
| TSM | Transportation System Management |
| TSM&O | Transportation System Management & Operations |

BROWARD COUNTY COMPREHENSIVE PLAN

# Support Document

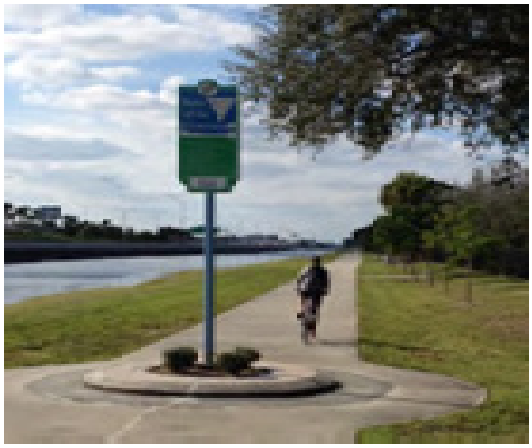
## Transportation

The Transportation support document provides the data and analysis used as the basis for the goals, objectives, and policies presented in the transportation element of the comprehensive plan. The transportation element sets a core vision for transportation within Broward County and defines the path to realizing the vision.

The body of the Support Document is developed in four parts:

- Data Requirements and Analysis
- Projected Growth and Travel Patterns
- Plans to Meet Transportation Network Needs
- Implementation

*B-Cycle Station in Downtown Hollywood*



*New River Greenway*

# INTRODUCTION

## A. General

The Transportation Element of the Comprehensive Plan is intended to set the core vision for mobility while recognizing the connection between development patterns and transportation systems. The goals, objectives, and policies are intended to clearly lay out this vision. The Transportation Support Document contains the data and analysis to substantiate the goals, objectives, and policies outlined in the Transportation Element. As described in the Transportation Element, Broward County is shifting from its traffic and auto-centric policies to policies that prioritize context sensitive implementation of multimodal and regional transportation. The organization of this support document will be reflective of these priorities.

## B. Service Area

The Transportation Element service areas are different for the various transportation system features. Roadway systems are countywide and include roadways classified as collectors and above that are maintained by the State, Broward County, and municipalities; the transit system consists of multiple operators including Broward County Transit (BCT), South Florida Regional Transportation Authority (SFRTA), Brightline, and municipal community ~~bus~~ shuttle programs; bikeways and pedestrian ways that are limited in this Element to roadways classified as collectors and above; greenways and blueways, as designed on the Broward County Greenways System Master Plan; waterways including both navigable waterways and Port Everglades which is confined to the Port Jurisdiction Area (PJA); aviation including both the Fort Lauderdale/Hollywood International Airport (FLL) and the North Perry Airport (HWO); the countywide railway system; county recreational roadways; and a countywide intermodal system. The FLL, HWO, and PJA are the general aviation and air carrier airports and port that are owned and operated by the County and addressed in this Element. There are two municipal general aviation airports, Pompano Airpark and the Fort Lauderdale Executive Airport that are not owned by Broward County.

## C. Planning Horizon

The Transportation Element planning horizon spans from 2023 to 2045. This span for the Element is variable to allow Broward County to meet and identify short term priorities while also identifying more aspirational policies to be worked towards in the longer term. The year 2045 is consistent with the timeframe for the upcoming update of the Broward Metropolitan Planning Organization (MPO) Metropolitan Transportation Plan (formerly, Long Range Transportation Plan).

# DATA REQUIREMENTS & ANALYSIS

Chapter 163.3177 (required and optional elements of comprehensive plan; studies and surveys) provides data and analysis requirements for all mandatory and optional elements of the comprehensive plan. Section 6(b) outlines requirements specific to the transportation element, and consist of the following:

1. The existing transportation system levels of service and system needs and the availability of transportation facilities and services.
2. The growth trends and travel patterns and interactions between land use and transportation.
3. Existing and projected intermodal deficiencies and needs.
4. The projected transportation system levels of service and system needs based upon the future land use map and the projected integrated transportation system.
5. How the local government will correct existing facility deficiencies, meet the identified needs of the projected transportation system, and advance the purpose of this paragraph and the other elements of the comprehensive plan.
6. All alternative modes of travel, such as public transportation, pedestrian, and bicycle travel.
7. Aviation, rail, seaport facilities, access to those facilities, and intermodal terminals.
8. The capability to evacuate the coastal population before an impending natural disaster.
9. Airports, projected airport and aviation development, and land use compatibility around airports.
10. An identification of land use densities, building intensities, and transportation management programs to promote public transportation systems in designed public transportation corridors so as to encourage the population densities sufficient to support such systems.
11. The provision of efficient public transit services based upon existing and proposed major trip generators and attractors, safe and convenient public transit terminals, land uses, and accommodation of the special needs of the transportation disadvantaged.
12. Plans for port, aviation, and related facilities coordinated with the Transportation Element.
13. Plan for the circulation of recreational traffic, including bicycle facilities, exercise trails, riding facilities, and such other matters as may be related to the improvement and safety of movement of all types of recreational traffic.

This Support Document will provide details, data, and analysis on each of these topics respectively.

## A. The Existing Transportation System

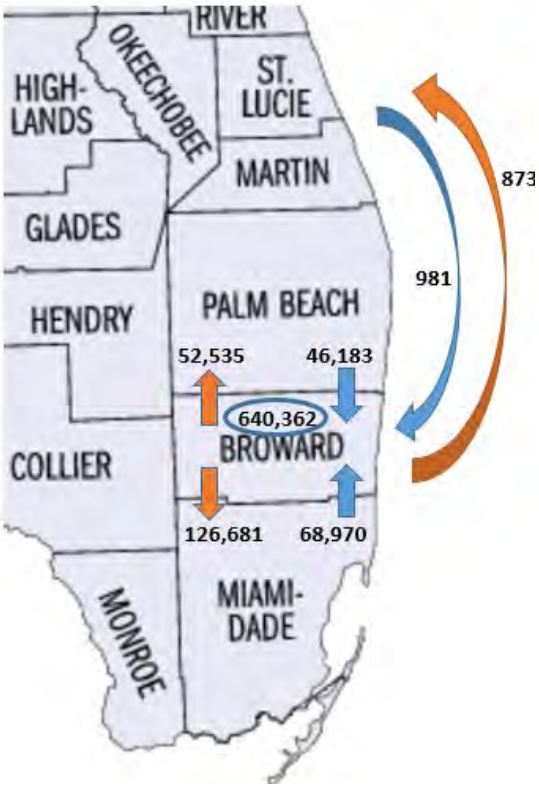



Figure T-1: Southeast Florida Commuting Patterns, US Census Bureau, 2009-2013 American Community Survey Commuting Flows.

To understand the transportation needs of Broward County, it is useful to start by looking at Broward in the context of the Southeast Florida region. Each day, 640,362 Broward County residents are traveling, but staying within, the County for work. However, within the region (Miami-Dade north to Indian River County), another 180,089 Broward County residents are commuting to other counties within the region, particularly Miami-Dade (126,681) and Palm Beach (52,535). In addition to this commuting pattern, another 116,134 residents of other Southeast Florida counties are commuting into Broward County for work. Looking at these figures, Broward County is a "donor" County, meaning more people are leaving the County for work than people who are coming into Broward County for work. These patterns are intertwined with housing and land use patterns, and highlight the importance of looking at transportation regionally. Simultaneously, Broward County must also address the transportation needs of the 640K+ people who commute within the County.

This section of the Support Document will inventory and address the existing transportation system components, plans, and challenges that set the stage for the goals, objectives, and policies identified in the Transportation Element.

### 1. Strategic Intermodal System (SIS)

Florida's Strategic Intermodal System (SIS) comprises Florida's statewide network of high priority transportation facilities, including the state's largest and most significant airports, spaceports, deepwater seaports, freight rail terminals, interregional rail and bus terminals, rail corridors, urban fixed guideway transit corridors, waterways, and highways. SIS facilities are the primary means for moving people and freight between Florida's diverse regions, as well as between Florida and other states and nations. The SIS is Florida's highest statewide priority for transportation capacity improvements. There are three types of designated facilities:

- Transportation hubs (ports and terminals) moving people or goods;
- Interregional corridors (highways, rail lines, waterways and urban fixed guideway transit

facilities) connecting major origin/destination markets; and

- Intermodal connectors (highways, rail lines, or waterways and other exclusive use facilities) linking hub-to-corridor; hub-to-hub; or strategic military installation-to-corridor.

Additional information on the SIS network can be found at http://www.dot.state.fl.us/planning/sis/.

## 2. Florida ~~Intrastate~~ Highway System

The Florida ~~Intrastate~~ Highway System (F~~I~~HS) is one of the key components of the Strategic Intermodal System. These high capacity corridors are essential highways for the movement of people and freight through the region. Table T-1 lists the F~~I~~HS corridor and is followed by a description of each thoroughfare.

### Table T-1: Florida ~~Intrastate~~ Highway System (F~~I~~HS) of the Strategic Intermodal System

| SIS/F~~I~~HS ROADWAYS | ROADWAY SEGMENTS | CENTERLINE MILES |
|---|---|---|
| Florida Turnpike | Broward - Miami-Dade County line to Broward - Palm Beach County line | 25.9 |
| Turnpike Extension | Broward - Miami-Dade County line to Turnpike | 7.7 |
| Interstate 95 | Broward - Miami-Dade County line to Broward - Palm Beach County line | 25.3 |
| Interstate 595 | I -75 to US 1 | 12.9 |
| Sawgrass Expressway | I -75 to Florida's Turnpike | 21.8 |
| Interstate 75 | Broward - Miami-Dade County line to US 27. | 18.7 |
| Interstate 75 | US 27 to Broward - Collier County Line | 26.7 |
| US 27/SR 25 | Broward - Miami-Dade County line to I – 75 | 3.0 |
| US 27/SR 25 | I – 75 to Broward - Palm Beach County line | 14.7 |
| Total | | 166.7 |

Source: Broward County Federal Functional Classification, FDOT, District 4, 2010

#### Interstate 95

Interstate 95 (I-95) travels through eastern Broward County, a few miles inland and just west of the downtown urban hubs of coastal Broward County. The corridor is parallel to the CSX corridor, located just to the west, and the FEC rail corridor, located to the east.

As of the 2017 update of the Roadway Capacity and Level of Service published by the MPO, I-95 is operating at LOS F and will continue to operate at LOS F in the future. Express Lane projects that incorporate public transit have been constructed and are currently being expanded in northern Broward County. Express lane improvements will provide additional

options for commuters utilizing the I-95 corridor. Additionally, Tri-Rail, operated by South Florida Regional Transportation Authority, runs daily service that parallels the corridor.

Due to I-95's proximity to the urban core of many of Broward County's coastal municipalities, the roadway can function as a barrier, by reducing east-west connectivity to bicyclists and pedestrians. Broward County supports complete streets projects to lessen the impact of I-95 and other highways on residential and commercial development near the corridor.

## Interstate 595

I-595 is a 12.9-mile east-west highway through central Broward County that connects Interstate 75 in the west with Florida's Turnpike, Interstate 95, Fort Lauderdale-Hollywood International Airport, and US 1, before terminating at Port Everglades in the east. The eastern terminus serves as the major access point to the Port for freight traffic, particularly vehicles carrying cargo to and from Southport and well as providing direct connectivity via US 1 to downtown Fort Lauderdale and Fort Lauderdale-Hollywood International Airport.

Through a 35-year Public-Private Partnership (P3), a $1.2 billion design and construction of the I-595 Express Corridor was completed in 2014. The improvement included three (3) reversible express toll lanes from I -75 to Florida's Turnpike, continuous connection of SR 84 frontage road between Davie Road and SR 7, auxiliary lanes with combined ramps, cross-road bypasses, and grade separated entrance and exit ramps, construction of the New River Greenway, 13 sound barriers, implementation of Express Bus service, and provision of a transit envelope within the corridor to accommodate potential future transit options. The project was designed to alleviate traffic congestion, reduce merge, weaving, and diverging movements, and to provide transit options along the corridor.

Additional information on I-595 Express can be accessed here.

## Interstate 75

Interstate-75, primarily serves southwest Broward County, provides access to the municipalities of Weston, Davie, Southwest Ranches, Sunrise, Pembroke Pines, and Miramar. From the south, the I-75 corridor enters the county in Miramar, then winds North before curving west at the I-595 and Florida 869 (Sawgrass Expressway) interchange. In an east-west trajectory I-75 then stretches across the Florida Everglades, where it exits the county and continues westward towards Naples.

A $485 million project is near completion along I-75 that will expand the managed lane network. The project includes two express lanes in each direction with direct connection to 595-Express, Palmetto Express, and Homestead Extension of the Florida's Turnpike (HEFT), integrated Intelligent Transportation System, sound barrier walls, and emergency access for

first responders. The project will improve mobility, relieve congestion, and provide additional travel options along the existing I-75 corridor.

Additional information on I-75 Express can be accessed here.

## Sawgrass Expressway (State Road 869)

Sawgrass Expressway is a 21.2 mile limited access highway that was constructed in the late 1980s to accommodate the future growth of Broward County's suburbs. The limited access highway portion of the corridor from Florida's Turnpike to I-595 is a six (6) lane toll facility that operates as a western bypass to the Fort Lauderdale urban core. From the south, the Sawgrass Expressway begins at a junction of Interstate 75 and Interstate 595 in Sunrise, and extends north before turning eastward in northern Broward County. The expressway ends at Exit 17, Florida's Turnpike, but the state road continues eastward as a surface street known as SW 10th St. that connects with I-95.

The Sawgrass Expressway is currently being studied as part of a Project Development and Environmental (PD&E) study. Potential enhancements include the expansion of the Florida managed lane network, new intersection and ramps including diverging diamond design, and new exits to serve the Sawgrass Corporate Park and BB&T Center. Additionally, Broward MPO recently completed a study that aims to extend Sawgrass Expressway to its originally planned terminus at Interstate 95. Recommendations for moving forward a concept that was acceptable to neighborhoods along the route are in the contained in the SW 10th Street Consensus Report. FDOT is currently conducting the SW 10th Street Connector PD&E to thoroughly examine potential designs for the corridor.

## Florida Turnpike & Homestead Extension of the Turnpike

Florida's Turnpike (State Road 91) is a major north-south corridor traveling north-south through central Broward County west of the I-95 and east of Sawgrass Expressway/I-75. The Florida's Turnpike includes the "Mainline" which travels from Golden Glades (Miami) to Central Florida, as well as; the Homestead Extension (HEFT), which diverges westward along the Broward – Miami-Dade county line before turning southward to Florida City in Miami-Dade County.

Several improvements are currently under PD&E, design, or construction along Florida's Turnpike in Broward County. One improvement travelers will notice shortly will be the conversion off all electronic tolling as well as improvements to key interchanges, such as Sunrise Blvd, that will reduce congestion and provide a more direct connection with the Turnpike.

## US Highway 27

US 27 is Broward County's only rural highway. Located in the western periphery of the urbanized area, US 27 is a heavily utilized route for freight as well as a bypass to the urban

core. As large-scale developments come online in Miami-Dade County it is expected that US 27 will become more heavily utilized by commuters seeking an alternative to I-75 or Homestead Extension of Florida's Turnpike. The entire Broward County segment contains 4 lanes, two (2) in each direction. In 2013 FDOT completed the US 27 Transportation Alternatives Study that evaluated several options for enhancing the corridor. Any future improvement to the corridor will need to be context sensitive to the location and balance between commuter, freight, and safety needs.

## 3. Rail Corridors

Broward County is served by two (2) parallel rail corridors. The Florida East Coast (FEC) rail, which operates closest to the urban core of the County and CSX Transportation Rail, which operates parallel to Interstate-95. Both rails are vital to distribution of freight that comes into the metropolitan region as well as regional passenger services.

### Florida East Coast Rail Corridor

The Florida East Coast (FEC) Railway, whose railroad was constructed by Henry M. Flagler, began operations in Broward County in 1896. The FEC Railway track runs 351 miles north-south between Jacksonville and Miami. Its path along Florida's east coast provides direct access to South Florida's Ports, allowing for efficient freight transportation. Throughout Broward County, the FEC railway corridor generally runs parallel to and east of Dixie Highway. The railway right-of-way corridor is approximately 100 feet wide. A single-track spur line, approximately 1.5 miles long, connects it to the South Florida Rail Corridor at NW 3th Street in Pompano Beach just west of the Pompano Beach Airport. Another 1.5-mile spur line serves Port Everglades and runs from the FEC north of Fort Lauderdale-Hollywood International Airport to the Port. With daily train departures of both intermodal shipments and traditional cargo products, the FEC corridor is still primarily used for connecting consumers with commerce via the FEC Railway.

Historically the FEC was heavily utilized for freight and passenger service and is credited with the development of South Florida, however, passenger services ceased on the rail in 1968. In 2018, Brightline began passenger rail service on the FEC. Brightline runs from West Palm Beach to Miami with a stop in Fort Lauderdale and is the first privately owned and operated passenger rail system in the United States in nearly 50 years. Brightline plans to expand passenger service northward to Orlando. Additionally, there has been extensive planning on utilization of the FEC rail as an eastern compliment to Tri-Rail commuter service along the CSX line. The first portion of the project will be implemented when Tri-Rail trains utilize the Brightline Station in downtown Miami via a switch in Miami-Dade County.

Additional information on FEC Railway can be accessed here.

Additional information on Brightline can be accessed here.

### CSX Corridor

The CSX Transportation rail corridor is freight and passenger rail corridor that operates parallel to Dixie Highway and/or I-95 through most of Broward County. The corridor is essential for freight and passenger movements through the region.

The South Florida Regional Transportation Authority (SFRTA) operates a seventy-two (72) mile commuter rail system (Tri-Rail), as well as a shuttle bus system. The SFRTA service area spans three counties, Palm Beach, Broward, and Miami-Dade. The system, which began service in 1989, consists of eighteen (18) stations between Mangonia Park to Miami International Airport. The line, which was originally a single track with extensive sidings, was double tracked under a Full Funding Grant Agreement (FFGA) from the Federal Transit Administration (FTA). The Double Track Corridor Improvement Program included reconstruction along 72 miles of the South Florida Rail Corridor and a second mainline track parallel to the existing track that was completed in 2006. In 2015, through agreements and coordination with CSX and FDOT, SFRTA gained control of rail corridor dispatch and maintenance which improved service reliability and system performance.

Tri-Rail service operates at 20 to 30-minute headways during rush hour on weekdays, and has hourly service during off-peak hours on weekdays and weekends.

## Table T-2: Tri-Rail Operation Schedule

| DAY OF TRAVEL | OPERATING TIMES | PEAK FREQUENCY |
|---|---|---|
| Southbound Weekday | 4:00AM – 10:35PM | 20 minutes |
| Northbound Weekday | 4:15AM – 11:35PM | 20 minutes |
| Southbound Weekend/Holiday | 5:50AM – 11:00PM | 60 minutes |
| Northbound Weekend/Holiday | 5:17AM – 11:45PM | 60 minutes |

Source: SFRTA Transit Development Plan, FY 2018-2027

Tri-Rail ridership has increased significantly since 2010. In 2015, ridership was up by 19 percent over 2010 ridership figures. While ridership dropped slightly in 2017 from 2015 levels, ridership had exceeded 2010 levels by 18 percent. The data suggests that rail ridership is more resilient than bus ridership which has declined in recent years. Table T-3 includes Tri-Rail ridership statistics.

## Table T-3: Tri-Rail Ridership

| FISCAL YEAR | RIDERSHIP | % CHANGE FROM FY 2010 |
|---|---|---|
| 2010 | 3,604,526 | - |
| 2015 | 4,292,380 | 19.1% |
| 2017 | 4,251,777 | 18.0% |

Source: SFRTA Transit Development Plan, 2018-2027

Amtrak passenger rail also operates along the CSX corridor. Amtrak serves three (3) Broward County stations along the CSX corridor located in Hollywood, Fort Lauderdale, and Deerfield Beach. Amtrak provides rail service across the country, providing regional and national transportation services to Broward County residents.

## Table T-4: Amtrak Service

| Line | Service | Start | End |
|---|---|---|---|
| Silver Meteor | Daily | New York, NY | Miami, FL |
| Silver Star | Daily | New York, NY | Miami, FL |

Source: Amtrak System Timetable - Updated January, 2018

### 4. Bus Transit Service

Broward County has one primary operator of fixed route bus transportation, Broward County Transit (BCT). A secondary system of local circulators, commuter rail shuttles, and community ~~buses~~ shuttles are also operated in partnership with municipalities, FDOT, BCT, and SFRTA.

#### Broward County Transit (BCT)

BCT operates fixed route bus service, community ~~bus~~ shuttle service as well as paratransit across the County. BCT's primary service area is Broward County; however, BCT operates six (6) express bus, three (3) Breeze (limited stop), and six (6) local routes with connections into Palm Beach and Miami-Dade counties. In 2010, BCT and FDOT partnered to begin the commuter express service to Miami via I-95 Express Lanes. Today, the system, which is funded through toll revenue collections from express lanes and fares, has expanded to six (6) routes. Ridership on the express buses is often limited by the number of available parking spaces. To accommodate demand, FDOT and BCT are currently planning to expand park and lot sites. Additional express bus routes along I-75 are expected to become operational in 2019.

Table T-5 highlights key facts about BCT service:

## Table T-5: BCT Service Overview

| | |
|---|---|
| TRANSIT FLEET | Fixed Route Buses: 352 |
| | Community ~~Buses~~ Shuttles: 51 |
| | Paratransit Vehicles: 206 |
| ROUTES | Weekdays: 44 routes |
| | Saturdays: 31 routes |
| | Sundays: 29 routes |
| BUS STOPS | 4,575 |
| BUS SHELTERS | 1,076 |
| ANNUAL SERVICE MILEAGE | 15.1 million miles |
| DAILY RIDERSHIP | 95,235 daily passenger trips |
| ANNUAL RIDERSHIP | 29.0 million passenger trips |
| COMMUNITY ~~BUS~~ SHUTTLES SERVICE LOCATIONS | Coconut Creek |
| | Coral Springs |
| | Dania Beach |
| | Davie |
| | Deerfield Beach |
| | Fort Lauderdale |
| | Hallandale Beach |
| | Hillsboro Beach |
| | Hollywood |
| | Lauderdale-By-The-Sea |
| | Lauderdale Lakes |
| | Lauderhill |
| | Lighthouse Point |
| | Margate |
| | Miramar |
| | Pembroke Pines |
| | Pompano Beach |
| | Tamarac |
| | West Park |

Source: Broward County Transit Website

## Tri-Rail Shuttles

SFRTA, operator for Tri-Rail also operates a free shuttle service that provides connections to and from the rail stations. The services typically operate the same span as the commuter rail and routes are timed appropriately to facilitate seamless transfers between the shuttles and the rail. Shuttle

routes are typically funded in partnership with local municipalities, transportation management associations, and/or FDOT.

### Community ~~Bus~~ Shuttle

Community ~~bus~~ shuttle routes provide service to local scale retail, recreation, and employment centers. These services are typically operated as a partnership between a municipality or transportation management association and Broward County Transit. Currently, 19 municipalities partner with BCT; however, some municipalities, such as City of Sunrise, operate community ~~bus~~ shuttle services independently. Community ~~bus~~ shuttle services also provide a critical first and last mile links to BCT bus routes. Most services are provided without a fare; however, municipalities are not prohibited from requiring fares. Data from BCT has shown that many community ~~bus~~ shuttle routes have highly elastic ridership, meaning that small adjustments in fares can have a significant impact on ridership.

## 5. Water Taxi Service

The Intracoastal Waterway between the Florida mainland and barrier islands provides an excellent route for local water taxi services. Currently most water taxis are operated by private vendors that cater specifically to tourists; however, the Fort Lauderdale Transportation Management Association has created a partnership to provide frequent water taxi service to areas around downtown Fort Lauderdale.

## 6. Broward County Airports

Fort Lauderdale-Hollywood International Airport (FLL) and North Perry Airport (HWO), are owned and operated by Broward County. These airports form a diverse and dynamic airport system that serves the needs of 29.2 million passengers and the general aviation community throughout South Florida.

### Fort Lauderdale-Hollywood International Airport (FLL)

FLL is located in the heart of eastern Broward County and shares land area within the City of Fort Lauderdale and City of Hollywood. The airport has two active runways, the longest of which is 9,000 feet. Facilities at the airport can support a full range of commercial and general aviation aircraft. With over 11.7 million enplaning commercial passengers annually, FLL is ranked 21st in the U.S. in total passenger traffic and 13th in domestic origin and destination passengers. ~~There are more than 325 departure and arrival flights a day~~. FLL offers nonstop service to 140 U.S. cities and flights to Canada, Bahamas, Caribbean, Mexico, Latin America, and Europe. FLL averages 640 commercial flights per day on 26 airlines. There are also 100 private flights. Each day an average of 80,000 travelers pass through the four terminals at FLL. The airport has recently completed significant improvements as part of the FLL Airport Improvements and

Renovations Program (FLLAIR). Construction projects involved in FLLAIR include the South Runway Expansion Project, which expanded the airport's south runway to 8,000 feet, and Terminal 4 Redevelopment and Expansion, which increased the number of gates from 10 to 14, and increased concession choices for passengers.

The predominant future land uses adjacent to FLL are light industrial with an intermixing of residential, recreational, and commercial uses, to the north; Port Everglades seaport to the northeast; vacant parcels zoned for industrial uses, a rental car facility, manufacturing facilities and wetlands, to the east; residential neighborhoods, to the south; and industrial properties in the Port 95 Commerce Park, to the west.

### North Perry Airport (HWO)

In Pembroke Pines, North Perry Airport serves many types of general aviation activities, primarily; flight training, recreational aviation activities, and blimp advertising. The airport has two sets of parallel, intersecting runways, the longest of which is 3,350 feet and can accommodate smaller multi-engine general aviation aircraft. North Perry also has 160 T-Hangars for aircraft storage.

The predominant land uses adjacent to North Perry Airport are community facilities and residential. Most residential uses are one-story, single family. There are some commercial developments on the north side. Broward Community College abuts the airport on the northeast, and Florida State Hospital is located to the west. While it is preferable that developments surrounding an airport be low density and intensity, it is not feasible to promote redevelopment of the existing properties adjacent to North Perry.

### Municipal Airports

Other airports within the county include Pompano Airpark and the Fort Lauderdale Executive Airport which function as two municipal general aviation airports, and are not owned or operated by the county. Broward County Aviation Department coordinates with the cities of Fort Lauderdale and Pompano Beach to ensure consistency and safety of all airports facilities located within Broward County.

## 7. Regionally Significant Parking Facilities

Significant public and private parking facilities are defined as facilities with greater than 500 parking spaces. Significant parking facilities in Broward County and their durational limits are listed in table T-6. The amount of parking available in most Broward County municipalities meets or exceeds demand. One area where additional parking need has been identified is at transit park and lots for

express bus service. This shortage of parking is currently being addressed by BCT and FDOT. Existing parking facilities are being expanded and new lots are being sited to ensure adequate parking for growing passenger demand.

## Table T-6: Significant Parking Facilities

| Facility | Location | Spaces | Duration |
|---|---|---|---|
| Ft Lauderdale Central Parking Garage | SE 1st Ave./SE 1st St. | 2,156 | Long & short-term |
| Pompano Beach Pier Garage | 3460 NE 3rd ST. Pompano Beach | 663 | Long & short-term |
| Hollywood Beach Garage | 359 Harrison, ST. Hollywood Beach | 800 | Long & short-term |
| West Regional Courthouse/Library | Broward Blvd./Pine Island Rd. | 989 | Short-term |
| Broward County Governmental Center | Broward Blvd./ SW 1st Ave | 1,550 | Short-term |
| Broward County Public Safety Complex | Broward Blvd./ NW 27th Ave | 785 | Short-term |
| Broward Center for Performing Arts | SW 2nd St. /SW 5th Ave. | 953 | Short-term |
| Ft. Lauderdale/Hollywood International Airport | 100 Terminal Dr. Fort Lauderdale | 15,240 | Long & short-term |
| Port Everglades/Convention Center Parking Garage | SE 20th St./Eisenhower Blvd. Fort Lauderdale | 2,500 | Long & short -term |
| Midport Parking Garage | Eller Drive/ Midport | 1,000 | Long & short-term |
| BB&T Center | 1 Panther Parkway, Sunrise | 7,523 | Short-term |
| Westfield Broward Mall | 8000 W Broward Blvd., Plantation | 4,775 | Short-term |
| Hollywood Hard Rock Hotel and Casino | 1 Seminole Way, Hollywood | 12,000 | Short-term |
| Pembroke Lakes Mall | 11401 Pines Blvd., Pembroke Pines | 1,668 | Short -term |
| Galleria Mall | 2414 E Sunrise Blvd. Fort Lauderdale | 4,699 | Short-term |
| Sawgrass Mills Mall | 12801 W Sunrise Blvd, Sunrise | 14,000 | Short-term |
| Gulfstream Park Racetrack | 901 S Federal Hwy, Hallandale Beach | 5,097 | Short-term |
| Racetrack at Pompano Park | 777 Isle of Capri Circle, Pompano Beach | 3,100 | Short-term |
| Seminole Coconut Creek Casino | 5550 NW 40th ST, Coconut Creek | 4,500 | Short-term |
| Broward College | North, Central and South Campus | 10,376 | Short-term |

Note: Number of parking spaces is approximate. Source: Planning and Development Management Division

## 8. Roadway Jurisdiction and Classification

Roadways in Broward County are under the jurisdiction of either the State, Broward County, or a local jurisdiction (municipality or BMSD). In addition to the jurisdiction, roadways are classified as arterials, collectors or local roads.

The roadway network includes: roadway segments or links, intersections, bridges, rights-of-way, signalization, signage, roadway amenities, significant parking facilities and safety.

### Segments

A roadway segment or link is a portion of a roadway defined for the purpose of traffic analysis. The segment origination and termination points are typically signalized intersections or the point where the number of lanes on a roadway change. Segments can be classified by lanes and functions.

Functional classification of roadway refers to the FHWA approved designation that divides roadways into a hierarchy of types ranging from arterials to locals. This hierarchy based on traffic mobility and land access. Table T-7 depicts the federal functional classification system for roadways. A road located within the urban area as defined by the census is classified as urban, while those outside the urban area are classified as rural.

### Arterial Roadways

Arterial roadways are classified, per FHWA, as either principal or minor. A roadway serving only one of the arterial road purposes is classified as a minor arterial, while one serving more than a single purpose is classified as a principal arterial road. All limited access highways and roads which connect urbanized areas are considered to serve several trip purposes, and thus are classified as principal arterial roads.

### Collector Roads

Collector roads are classified as either major or minor. A minor collector road's significant purpose is providing access to diffuse land use areas; all other rural collector roads are classified as major. The Federal Highway Administration has developed a federal functional classification for Broward County's roadways.

When evaluating the function of a road, the U.S. Department of Transportation considers a road's trip purposes in relation to the total public roadway network. A road is classified based upon its most significant trip purpose; however, a road may serve more than one significant trip purpose. The federal functional classification system recognizes twelve (12) significant trip purposes.

## Table T-7: Functional Classification by Trip Purpose

| FUNCTIONAL CLASSIFICATION | TRIP PURPOSE |
|---|---|
| Arterial | Travel to and through urbanized areas |

| | |
|---|---|
| Arterial | Travel to and through small urban areas |
| Arterial | National defense |
| Arterial | Interstate and regional commerce |
| Arterial | Access to airports, seaports, and major rail terminals or intermodal facilities |
| Arterial | Access to major public facilities |
| Arterial | Access to minor public facilities |
| Collector | Interconnection of major thoroughfares |
| Collector | Interconnection of minor thoroughfares |
| Collector | Access to concentrated land use areas |
| Collector | Access to diffused land use areas |
| Local | Travel between home, work, entertainment, and shopping destinations and nearest road on the primary network composed of arterial and collector roads |

Source: Highway Functional Classification Concepts, Criteria and Procedures, Federal Highway Administration

## Broward County Road Jurisdiction and Classification

Map T-1 of the Comprehensive Plan Map Series identifies jurisdiction of roadways across Broward County. This maps also identifies the classification of each roadway. Table T-8 lists roadways that, in full or part, are Broward County facilities.

### Table T-8: Broward County Jurisdictional Roadways

| East-West Corridors | |
|---|---|
| Atlantic Boulevard | Baily Road |
| Broward Boulevard | Coconut Creek Parkway |
| Griffin Road | Lakeview Drive |
| Loxahatchee Road | McNab Road |
| Miramar Parkway | Miramar Parkway |
| NW 26th Street | Nova Drive |
| NW 15th Street | NW 19th Street |
| NW 62nd Avenue | NW 57th Street |
| Oakland Park Boulevard | NW 6th Street |
| Prospect Road | Peters Road |
| Sample Road | Rock Island Road |
| Sunrise Boulevard | Stirling Road |
| Wiles Road | |
| **North-South Corridors** | |
| Andrews Avenue | Blount Road |
| Coral Ridge Road | Davie Road |
| Douglas Road | Flamingo Road |
| Hiatus Road | Lyons Road |
| North 21st Avenue | NW 6th Avenue |
| Nob Hill Road | NW 21st Avenue |
| NW 31st Avenue | NW 7th Avenue |
| Palm Avenue | Pine Island Road |
| Riverside Drive | Rock Island Road |
| SW 31st Avenue | SW 4th Avenue |

Note: All roads within the Broward Municipal Services District are Broward County Jurisdictional Roadways. Some roads listed above have multiple jurisdictional owners, see map T-1 for details. Source: Broward County Public Works Department

## 9. High Occupancy Vehicle Lanes and High Occupancy Toll Lanes

High Occupancy Vehicle (HOV) lanes, are facilities designated for exclusive use by High Occupancy Vehicles (HOVs): specified vehicles with 2 passengers or more. These lanes were positioned next to the median divider of I-95 running 28.7 centerline miles through all of Broward County. Preferential treatment of HOVs is intended to encourage the driving public to shift from low to high occupancy vehicles such as: buses, vanpools and carpools. HOV lanes aimed to reduce congestion, optimize person-moving capabilities along a corridor, and provide sufficient capacity to meet future transportation demands. However, HOV lanes, as well as general lanes, along the I-95 corridor were consistently not meeting LOS.

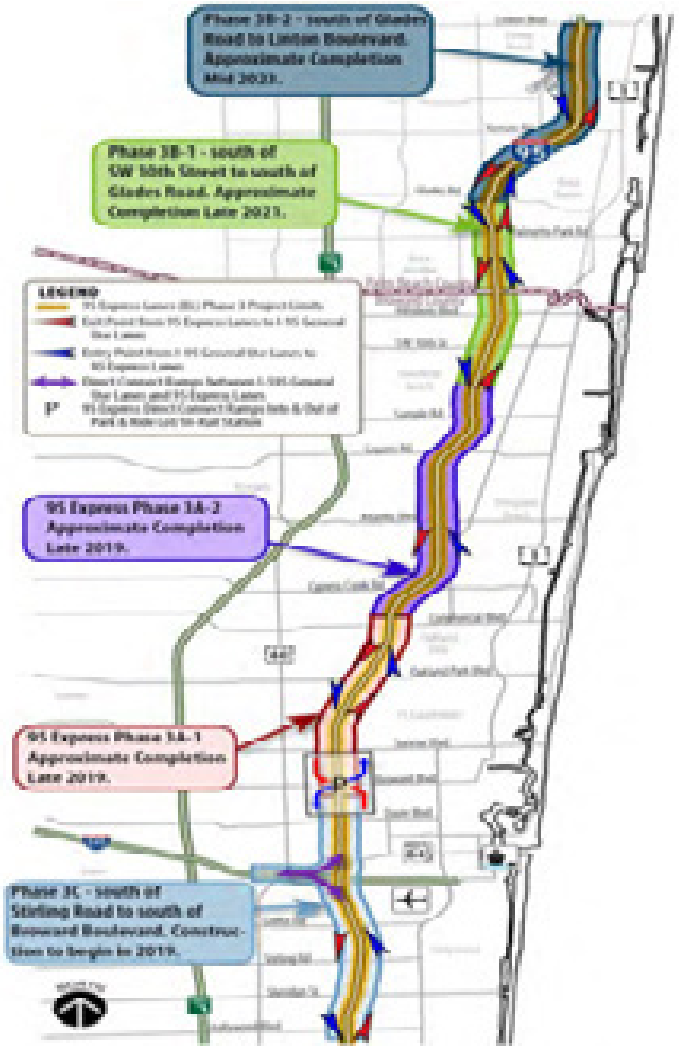
In 2009, FDOT began to implement a Managed Lane Network. The first phase of the project was located on I-95 and included the conversion of HOV lanes into two (2) High Occupancy Toll (HOT) lanes to provide enhanced carpooling and commuting options for motorists. HOT lanes manage congestion using dynamic tolling, access, and eligibility. The toll for express lanes increases as demand increases, discouraging congestion. The 95-express also manages congestion by allowing HOVs (3 + passengers) to use the express lane toll-free, including; registered carpools, registered South Florida vanpools, registered over-the-road motor coach vehicles, Miami-Dade and Broward County Express Buses, and regular transit. Other toll exempt vehicles include motorcycles and registered hybrid vehicles. Trucks with three or more axles are not allowed on 95 Express unless they are designated as emergency vehicles.

With the opening of the express lanes, drivers are experiencing improved speeds above 40 MPH in the general lanes and 50 MPH in the express lanes in the northbound and southbound directions during rush hour periods. Data from the initial segment has led FDOT and Florida Turnpike Enterprise to make substantial investments in managed lanes. The goal is to create an interconnected regional network of managed lanes that will permit users to have more reliable options for commuting along the busiest thoroughfares.

### I-95 Express

Since its inception, the 95 Express has undergone several structural enhancements to better serve the South Florida community. Now in Phase III, the 95 express lanes are under construction and are pending future developments to further; improve mobility, relieve congestion, provide additional travel options, enhance transit services, enhance emergency evacuation, accommodate future growth and development in the region, and improve system connectivity between key limited access facilities in South Florida (See Figure T-2).

Figure T-2: I-95 Express Phase III

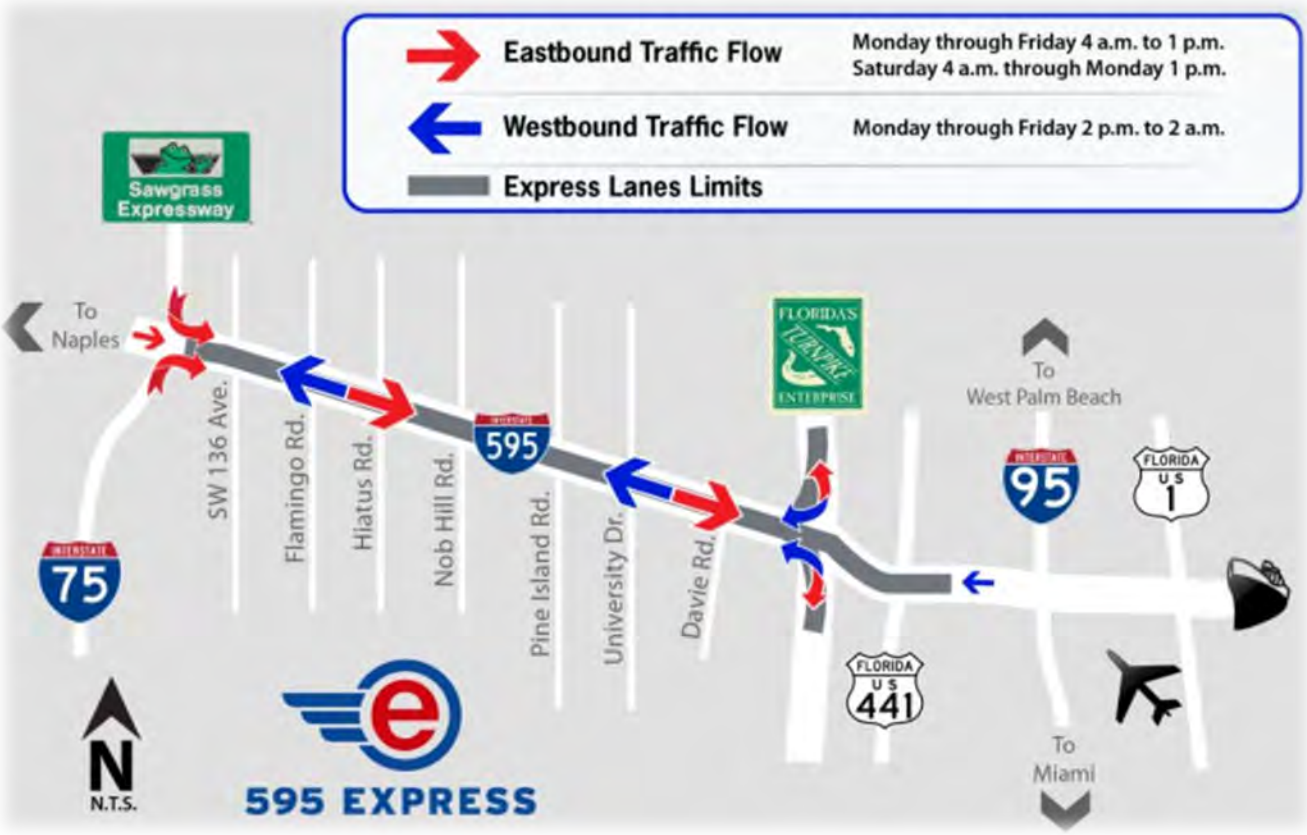



Source: FDOT 95 Express Phase 3

## I-595 Express

In March 2014, FDOT opened three tolled, reversible lanes on Interstate 595. The reversible lanes switch direction to optimize east-west commuter travel to and from Fort Lauderdale. The express lane system runs approximately 9.5 miles long and is located in the median of I-595. A permanent concrete barrier wall separates the express lane from the general traffic. These lanes are open for use to all motor vehicles including trucks and motorcycles. BCT provides an Express Bus service for the 595 Express from the BB&T Center Park & Ride in Sunrise and the Davie Park & Ride. Figure T-3 illustrates the entry and exit points of the express lane along the 595 as well as the hours the lane is open for use. A future project will extend 595 express lanes eastward to offer direct connections with I-95 express.

## Figure T-3: I-595 Express Lane Entry and Exit Locations




Source: FDOT, 595 Express Operations

### I-75 Express

FDOT's I-75 Express Lanes Project will create 28 miles of express lanes along the I-75 and SR 826 (Palmetto Expressway) corridors, from just south of the SR 836 (Dolphin Expressway), in Miami-Dade County, to I-595 in Broward County. The project began construction in 2014 and opened to traffic in 2018. The project is a part of the South Florida managed lanes network initiative and will improve mobility, relieve congestion, provide additional travel options, and accommodate future growth in the area. Figure T-4 illustrates the entrance and exit points of the of the express lane along the I-75. Commuter express transit services to Miami-Dade County are planned as part of I-75 Express implementation.

Additional information can be accessed on the I-75 Express Lanes Project website..

Figure T-4: I-75 Express Lane Entry and Exit Locations


Source: FDOT, I-75 Express Lanes Project

## B. SAFETY AND SECURITY

Reports such as Smart Growth America's Dangerous By Design have highlighted the fact that metropolitan regions across the State consistently rank as the among the worst the country for injuries and deaths for pedestrians and bicyclists. In fact, 9 of the top 11 regions with the worst "Pedestrian Danger Index" were located in the State of Florida. The Miami-Fort Lauderdale-West Palm Beach Metro was ranked 11th worst in the nation. Broward County recognizes that the transportation system of tomorrow must provide for the safety of all users regardless of mode choice, age, or ability. The tables and statistics in this section will focus safety and security of transportation in Broward County.

Data provided in this section focus on the of number vehicular crashes, injuries, deaths that occurred in 2005, 2010, and 2012-2016. While the data shows a significant increase in crashes as a percentage from 2005, effective 7/1/2012 Florida Statute 316.066 was amended by the Florida Legislature to require law enforcement agencies to report additional crashes to the Department of Highway Safety and Motor Vehicles which the agencies were not previously required to submit. The statutory change

resulted in more crash reports being received at the state level for inclusion in the statistics below. Regardless, an upward trend in the number of crashes in Broward County between 2012 and 2016 continue to challenge planners and law enforcement. The statistics suggest that despite investment in Complete Streets that typically result in a reduction of crashes, additional focus and investment in safety is necessary to see impact of projects on a countywide scale.

## Table T-9: Vehicular Crashes in Broward County and State of Florida: (2005-2016)

| CALENDAR YEAR | BROWARD COUNTY | | STATE OF FLORIDA | |
|---|---|---|---|---|
| | CRASHES | PERCENT CHANGE SINCE 2005 | CRASHES | PERCENT CHANGE SINCE 2005 |
| 2005 | 27,399 | --- | 268,605 | --- |
| 2010 | 27,992 | 2.2% | 235,461 | -12.3% |
| 2012 | 31,151 | 13.7% | 281,340 | 4.7% |
| 2013 | 32,595 | 19.0% | 316,943 | 18.0% |
| 2014 | 34,833 | 27.1% | 344,170 | 28.1% |
| 2015 | 38,409 | 40.2% | 374,342 | 39.4% |
| 2016 | 41,755 | 52.4% | 395,785 | 47.4% |

Source: Traffic Crash Facts, FDHSMV 2005, 2010, 2012-2016

Table T-10 identifies the total number of individuals injured in accidents, including motorists, bicyclist, pedestrians and other transportation system users. Although injuries declined in Broward County during the economic recession, the more recent trend shows an upward trajectory in the number of injuries.

## Table T-10: Injuries in Broward County and State of Florida: (2005-2016)

| CALENDAR YEAR | BROWARD COUNTY | | STATE OF FLORIDA | |
|---|---|---|---|---|
| | INJURIES | PERCENT CHANGE SINCE 2005 | INJURIES | PERCENT CHANGE |
| 2005 | 22,880 | --- | 233,930 | --- |
| 2010 | 20,635 | -9.80% | 195,104 | -16.60% |
| 2012 | 21,348 | -6.70% | 198,032 | -15.30% |
| 2013 | 21,580 | -5.70% | 210,887 | -9.90% |
| 2014 | 22,154 | -3.20% | 225,608 | -3.60% |
| 2015 | 23,473 | 2.60% | 243,316 | 4.00% |
| 2016 | 25,361 | 10.80% | 254,155 | 8.60% |

Source: Traffic Crash Facts, FDHSMV 2005, 2010, 2012-2016

Table T-11 identifies the number of fatalities, including motorists, bicyclists, pedestrians and other transportation system users. Using 2005 as a baseline, both Broward County and Florida have maintained a reduction in fatalities. However, between 2010 and 2016 the number of fatalities have increased in Broward and the State.

## Table T-11: Fatalities in Broward County and State of Florida: (2005-2016)

| CALENDAR YEAR | BROWARD COUNTY | | STATE OF FLORIDA | |
|---|---|---|---|---|
| | FATALITIES | PERCENT CHANGE SINCE 2005 | FATALITIES | PERCENT CHANGE SINCE 2005 |
| 2005 | 263 | --- | 3,533 | --- |
| 2010 | 179 | -32.00% | 2,444 | -30.80% |
| 2012 | 182 | -30.80% | 2,430 | -31.2 |
| 2013 | 180 | -31.60% | 2,402 | -32 |
| 2014 | 173 | -34.20% | 2,494 | -29.4 |
| 2015 | 221 | -16.00% | 2,939 | -16.8 |
| 2016 | 245 | -6.80% | 3,176 | -10.10% |

Source: Traffic Crash Facts, FDHSMV 2005, 2010, 2012-2016

Table T-12 identifies the number of crashes, injuries, and fatalities amongst vulnerable road users including; pedestrians, bicyclists, and motorcyclists in Broward County, between 2005 and 2016. Vulnerable road users are of particular interest to the Broward County. Pedestrian and bicycle crashes, injuries, and fatalities will be consistently monitored. Per Broward MPO and FDOT adopted FHWA standards, Broward County seeks to have zero (0) pedestrian and bicycle injuries or deaths.

## Table T-12: Vulnerable Road User Crash and Injury Report, Broward County (2005-2016)

| | 2005 | 2010 | 2012 | 2013 | 2014 | 2015 | 2016 | % CHANGE 2005 - 2016 |
|---|---|---|---|---|---|---|---|---|
| Pedestrian Crashes | - | 1012 | 1035 | 990 | 1061 | 1098 | 1040 | n/a |
| Pedestrian Injuries | 956 | 917 | 889 | 894 | 950 | 980 | 929 | -2.8% |
| Pedestrian Fatalities | 41 | 53 | 58 | 50 | 60 | 59 | 64 | 56.1% |
| Bicyclist Crashes | - | 569 | 822 | 845 | 855 | 816 | 759 | n/a |
| Bicyclist Injuries | 530 | 540 | 770 | 808 | 829 | 767 | 709 | 33.7% |
| Bicyclists Fatalities | 8 | 5 | 15 | 13 | 12 | 14 | 13 | 62.5% |
| Motorcyclists Crashes | - | 621 | 719 | 724 | 742 | 818 | 823 | n/a |
| Motorcyclists Injuries | 593 | 571 | 630 | 629 | 628 | 634 | 660 | 11.3% |
| Motorcyclists Fatalities | 41 | 24 | 41 | 36 | 42 | 41 | 35 | -14.6% |

Note: 2005 crash data is unavailable. Source: Traffic Crash Facts, FDHSMV 2005, 2010, 2012-2016

The League of American Bicyclists; Pedestrian and Bicycle Information Center has recognized Broward County's efforts in creating a more bicycle friendly community by meeting requirements as a bronze-ranked Walk and Bicycle Friendly Community (See Figure T-5).

## Figure T-5: Florida's Walk and Bicycle Friendly Communities

## Alert Today Alive Tomorrow Campaign

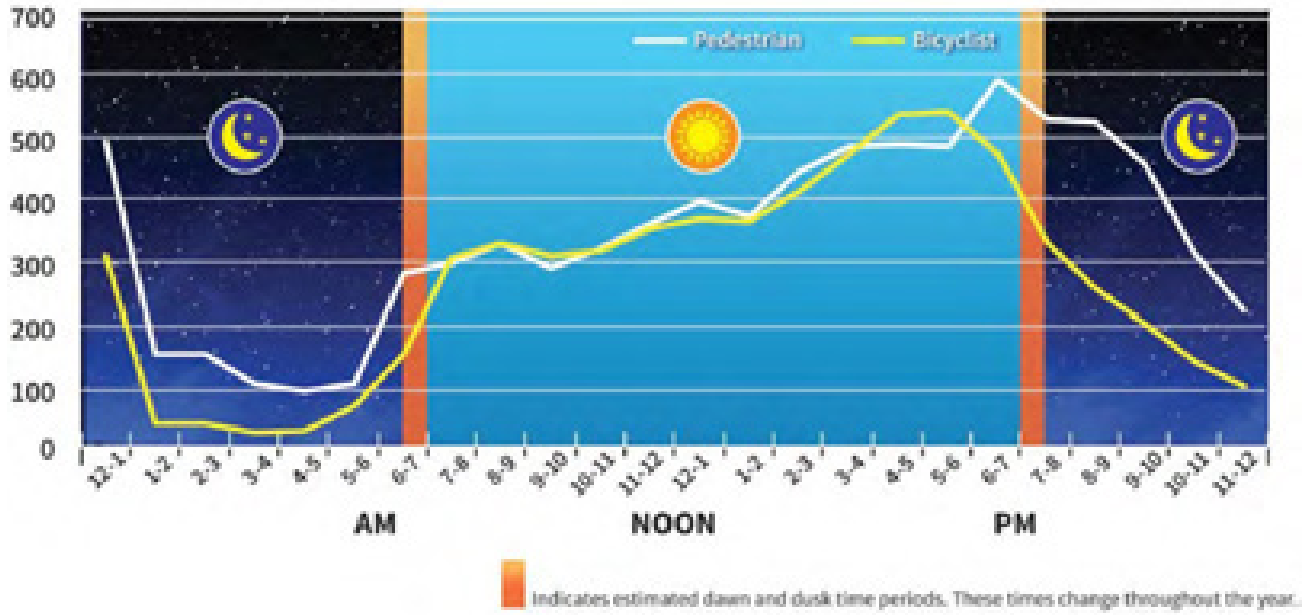
Broward County supports FDOT's Alert Today Alive Tomorrow campaign. The campaign was launched in 2013 and designed to increase the safety of vulnerable road users such as pedestrians and bicyclists by encouraging all road users to pay attention, avoid distracted driving, and to follow the road rules. The campaign focuses on engineering, education, and enforcement to save lives. FDOT has utilized various media channels and on a range of social media platforms with the message that "safety doesn't happen by accident" to remind all roadway users to pay attention and follow the rules of the road. Counties identified as priority areas for this campaign are shown in Figure T-8. The entire Miami metropolitan area is included in the priority area. As part of the campaign's initiative, road users can make a pledge to be a safe pedestrian, bicyclist and motorist. The focal projects of this campaign include:

### 1. Alert Tonight Alive Tomorrow

In Florida 75% of pedestrian fatalities occur at night. This special campaign aims to spread awareness of this issue through coordination with law enforcement, public outreach, and on social media with the #AlertTonightFlorida and #CanYouSeeMeNow, encouraging road users to be visible and predictable especially at night.

In Florida, bicycle and pedestrian crashes by time-of day follow a similar trend as depicted in Figure T-6 which also illustrates that the majority of pedestrian and bicyclist crashes occur in the day (between dawn and dusk) increasing steadily and peaking shortly before dusk. In contrast, pedestrian and bicycle fatalities in Florida by time-of-day do not follow the same trend. While a high proportion of pedestrian fatalities occur during periods of darkness, bicyclist fatalities are comparatively more evenly distributed across hours of daylight and darkness. Also, bicyclist fatalities reach its minimum during the AM period before dawn, while pedestrian fatalities maintain its minimum for a longer period during daylight hours. There are two major peaks in pedestrian fatality by hour of day. The main peak or highest peak occurs between 8:00 and 9:00 PM following dusk, and the second peak occurs at dawn. Bicyclist fatalities reaches its highest point of more than 10 persons, at 9:00-10:00 pm, however there are several other peaks. Changes in bicyclist fatality by time of day are more gradual, while average fatality number's changes sharply throughout the 24 period. Both pedestrian and bicyclist fatalities decline at dawn, then plateau throughout the day with some fluctuation and begin to increase nearing dusk.

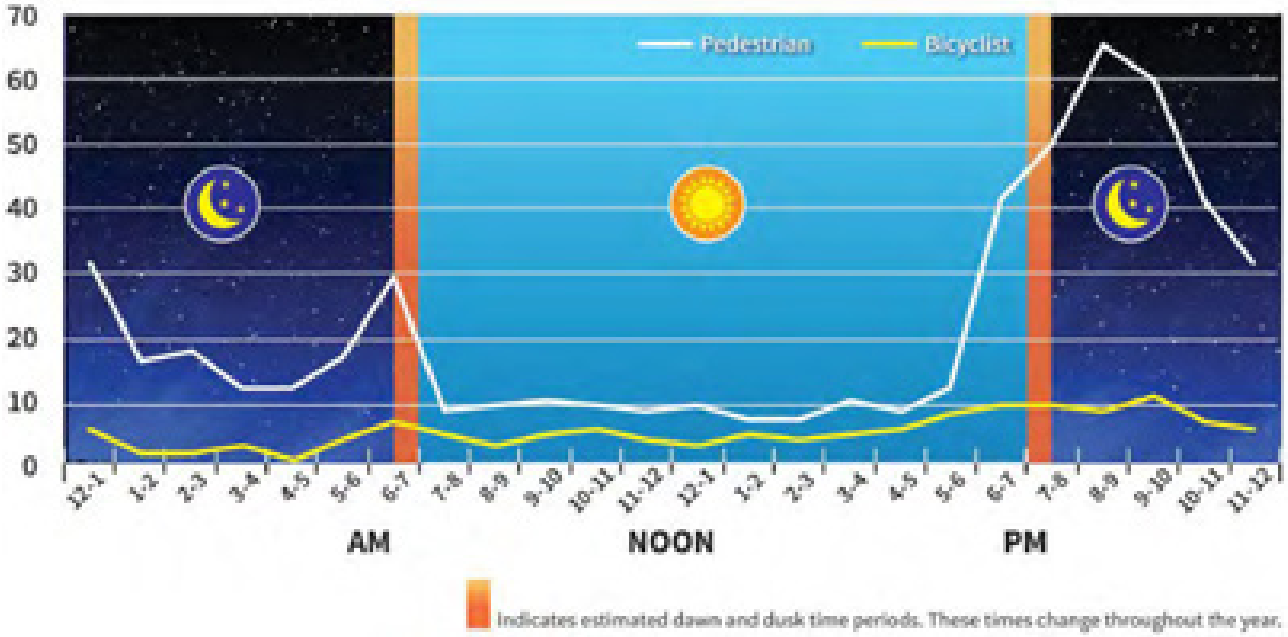
## Figure T-6: Average Number of Pedestrian and Bicyclist Crashes in Florida by Time-of-day, 2011-2015




Source: FDOT's Florida Pedestrian and Bicycle Strategic Safety Plan, 2017 update.

## Figure T-7: Average Number of Pedestrian and Bicyclist Fatalities in Florida by Time-of-day, 2011-2015

Source: FDOT's Florida Pedestrian and Bicycle Strategic Safety Plan, 2017 update.



## 2. Every Life Counts

The 'every life counts' slogan is part of the Discover Your Role Campaign. This campaign urges motorists to understand and accept the role they play in ensuring the safety of pedestrians and bicyclists. The campaign emphasizes that each person motorists come in contact with during their daily commute, is a daughter, son, wife, husband, father or mother, and each life is invaluable. In Florida, from 2011 to 2016, bicyclist fatalities have increased by 16.6% and pedestrian fatalities have increased by 29.7% (See Tables T-13, and T-14).

### Table T-13: Pedestrian Fatalities in Florida 2011-2016

| YEAR | PEDESTRIAN FATALITIES | % CHANGE SINCE 2011 |
|---|---|---|
| 2011 | 498 | - |
| 2012 | 480 | -3.6% |
| 2013 | 498 | 0.0% |
| 2014 | 607 | 21.9% |
| 2015 | 632 | 26.9% |
| 2016 | 646 | 29.7% |

Source: FDOT's Florida Pedestrian and Bicycle Strategic Safety Plan, 2017 update.

### Table T-14: Bicyclist Fatalities in Florida 2011-2016

| YEAR | BICYCLIST FATALITIES | % CHANGE SINCE 2011 |
|---|---|---|
| 2011 | 120 | - |
| 2012 | 117 | -2.5% |
| 2013 | 135 | 12.5% |
| 2014 | 135 | 12.5% |
| 2015 | 154 | 28.3% |
| 2016 | 140 | 16.6% |

Source: FDOT's Florida Pedestrian and Bicycle Strategic Safety Plan, 2017 update.

## One Foolish Act

This campaign launched in 2013 urges motorists not to drive while impaired, as this could be the difference between life and death especially for vulnerable road users. Bringing life to its catchphrase 'One foolish act can ruin a thousand great ones', the campaign creates the image of the life pedestrians and bicyclists could have had, had they not been killed by an impaired driver. Tables T-15 and T-16 show the number of crash fatalities attributed to drugs and/or alcohol. In the three-year period from 2014-2016, alcohol related crash fatalities declined while drug related crash fatalities increased.

## Table T-15: Drug and Alcohol Crash Fatalities in Florida 2013-2016

| | 2013 | 2014 | 2015 | 2016 | %CHANGE |
|---|---|---|---|---|---|
| Alcohol Confirmed Fatalities | 474 | 459 | 508 | 461 | -2.74 |
| Drug Confirmed Fatalities | 232 | 219 | 281 | 322 | 38.79 |
| Drug & Alcohol Confirmed Fatalities | 257 | 221 | 269 | 299 | 16.34 |

Source: Traffic Crash Facts, FDHSMV, 2013-2016 (Access here)

## Table T-16: Drug and Alcohol Crash Fatalities in Broward County 2014-2016

| | 2014 | 2015 | 2016 | %CHANGE |
|---|---|---|---|---|
| Alcohol Confirmed Fatalities | 20 | 24 | 15 | -25.0% |
| Drug Confirmed Fatalities | 3 | 7 | 4 | 33.3% |
| Drug & Alcohol Confirmed Fatalities | 9 | 19 | 11 | 22.2% |

Source: Traffic Crash Facts, FDHSMV, 2013-2016

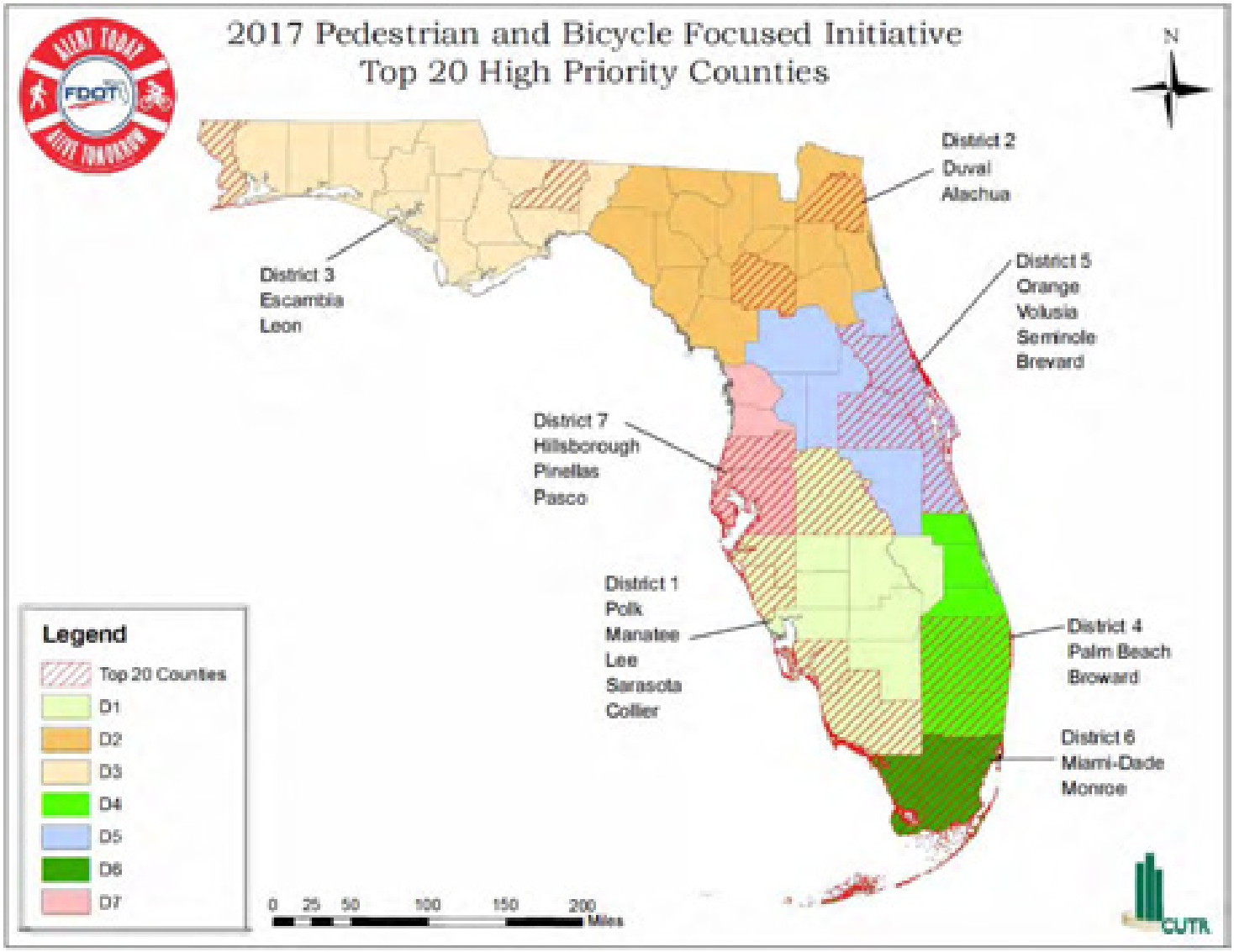
### 3. Stop on Red

This campaign aims to increase road safety by urging motorists to stop on red, and encouraging pedestrians to observe the pedestrian signal when crossing. Alert Today Florida partnered with the National Coalition for Safer Roads, and Florida's Safe Mobility for Life Coalition to promote the 2017 National Stop on Red Campaign with Stop on Red Week (August 6th -August 12th.)

### 4. White Cane Law

This campaign aims to increase road safety for visually impaired pedestrians by spreading awareness on Florida's White Cane Law.

Figure T-8: Top 20 High Priority Counties




Source: FDOT Alert Today Alive Tomorrow, 2017

## Airport Safety

Broward County has adopted an Airport Zoning Ordinance that provides for protection of airspace in unincorporated Broward County. Tall structures, such as cellular towers, buildings and cranes can penetrate the airspace surrounding an airport and affect the operations of the airport. This Ordinance enables the County to control tall structure construction in unincorporated areas that would impact aviation capacity around County-owned airports. Chapter 333 Florida Statutes governs airspace in municipalities where no airport zoning ordinance has been adopted.

## Natural Disasters and Evacuation

Another critical component of safety and security in Broward County is the ability to facilitate timely evacuations before and after natural disasters, such as hurricanes. Tables T-17A and T-17B identify hurricane evacuation routes in Broward County. These routes are also identified on Transportation Map T-1 in the Comprehensive Plan Map Series.

### Table T-17A: Arterial Evacuation Routes

| Evacuation Route | East Terminus | West Terminus | Roadway Jurisdiction | Barrier Island Access |
|---|---|---|---|---|
| Hillsboro Blvd. | A1A | I-95 | FDOT | Yes |
| SW 10th Street | US 1 | Sawgrass Expressway | FDOT / City of Deerfield Beach | No |
| Sample Road | US 1 | I-95 | FDOT | No |
| Copans Road | US 1 | I-95 | Broward County | No |
| NE 14th Street | A1A | US 1 | FDOT | Yes |
| Atlantic Blvd. | A1A | I-95 | City of Pompano Beach / FDOT | Yes |
| Cypress Creek Rd | US 1 | I-95 | Broward County | No |
| Commercial Blvd. | A1A | I-95 | FDOT | Yes |
| Oakland Park Blvd. | A1A | I-95 | FDOT | Yes |
| Sunrise Blvd. | A1A | I-95 | FDOT | Yes |
| Broward Blvd. | US 1 | I-95 | FDOT | No |
| Las Olas Blvd. | A1A | US 1 | FDOT / City of Fort Lauderdale | Yes |
| Davie Blvd | US 1 | I-95 | FDOT | No |
| SE 17th Street | Harbor Beach Pkwy | US 1 | FDOT | Yes |
| SR 84 | US 1 | I-95 | FDOT | No |
| Griffin Road | US 1 | I-95 | FDOT | No |
| Dania Beach Blvd. | A1A | US 1 | FDOT | Yes |
| Stirling Road | US 1 | I-95 | FDOT | No |
| Sheridan Street | A1A | I-95 | FDOT | Yes |
| Johnson Street | US 1 | I-95 | City of Hollywood | No |
| Hollywood Blvd. | A1A | I-95 | FDOT / City of Hollywood | Yes |
| Pembroke Road | US 1 | I-95 | FDOT | No |
| Hallandale Beach. Blvd. | A1A | I-95 | FDOT | Yes |

Source: Broward County Planning and Development Management Division, 2018

## Table T-17B: Highway Evacuation Routes

| Evacuation Route | East Terminus | West Terminus | Roadway Jurisdiction | Barrier Island Access |
|---|---|---|---|---|
| Federal Highway (US 1) | North County Line | South County Line | FDOT | No |
| Interstate 95 | North County Line | South County Line | FDOT | No |
| Florida's Turnpike | North County Line | South County Line | FDOT / Turnpike Enterprise | No |
| Homestead Extension of Florida's Turnpike | Florida's Turnpike | South County Line | FDOT / Turnpike Enterprise | No |
| Sawgrass Expressway | Waterways Blvd. | I-75 | FDOT / Turnpike Enterprise | No |
| Interstate 75 | West County Boundary | South County Boundary | FDOT | No |
| Interstate 595 | Eller Drive | I-75 | FDOT | No |

Source: Broward County Planning and Development Management Division, 2018

Barrier island residents and business are particularly vulnerable to hurricane and storm surge flood impacts. Bridges which connect the island to the mainland are critical to hurricane evacuations. The bridge length and deck width are shown as well as the closed clearance above the Intracoastal Waterway. These bridges correspond to the evacuation routes identified in Table T- 18.

## Table T-18: Bridges Critical to Hurricane Evacuation

| Bridge Name | Length and Deck Width in Feet | Closed Clearance in Feet |
|---|---|---|
| Hillsboro Blvd. Bridge | 423/57 | 21 |
| NE 14th Street, Pompano Beach | 351/71 | 15 |
| Atlantic Blvd. Bridge | 378/55 | 15 |
| Commercial Blvd. Bridge | 350/58 | 15 |
| Oakland Park Blvd. Bridge | 456/57 | 22 |
| Sunrise Blvd. Bridge | 362/54 | 16 |
| Las Olas Bridge | 1,095/62 | 31 |
| 17th Street Bridge | 999/57 | 25 |
| Dania Beach Blvd. Bridge | 495/59 | 18 |
| Sheridan Street Bridge | 354/57 | 22 |
| Hollywood Blvd. Bridge | 1,284/68 | 25 |
| Hallandale Beach Blvd. Bridge | 436/57 | 22 |

Source: Broward County, 2006

## C. COMMUTING PATTERNS AND TRAVEL TIMES

Commuting patterns in Broward County closely mirror those at the statewide level. The most common form of commuting is by single occupancy car, truck or van, with nearly 80% commuting this way. Another important commuting pattern to assess is the length of commute. Using this metric, Broward County is similar to statewide commuting times. Between 2009-2016, the mean travel time to work in Broward County increased from 26.9 minutes to 28.0 minutes. Similarly, the percentage of population with one-way commutes of 30 minutes or greater has increased from 43.3% to 44.5% over the same period. Population increase is expected to place additional strain on roadways that already exceed or will approach capacity. Managed lane, express bus, and ITS will offer relief for some Broward County residents; however, increasing mode split to public transit, carpools, walking, and bicycling is widely seen as the long-term solution to accommodate population growth while maintaining an acceptable level of service. Tables T-18 and T-19 compare Broward County and the State of Florida on key journey to work metrics.

### Table T-19: Existing Commuting Patterns in Broward County and Florida: (2012-2016 Five Year Estimates)

| COMMUTING METHOD | BROWARD COUNTY | STATE OF FLORIDA | DIFFERENCE |
|---|---|---|---|
| | PERCENT | PERCENT | |
| Car, Truck, Van (Alone) | 79.4% | 79.5% | -0.1% |
| Car, Truck, Van (Carpool) | 9.4% | 9.3% | +0.1% |
| Public Transit | 3.0% | 2.1% | +0.9% |
| Walk | 1.3% | 1.5% | -0.2% |
| Bicycle | 0.6% | 0.7% | -0.1% |
| Taxi/Motorcycle/Other | 1.5% | 1.5% | 0.0% |
| Work at Home | 4.9% | 5.4% | -0.5% |

Source: 2012-2016 5-Year American Community Survey; U.S Census Bureau, Table S0801

### Table T-20: Commute Travel Time in Broward County and Florida: (2012-2016 Five Year Estimates)

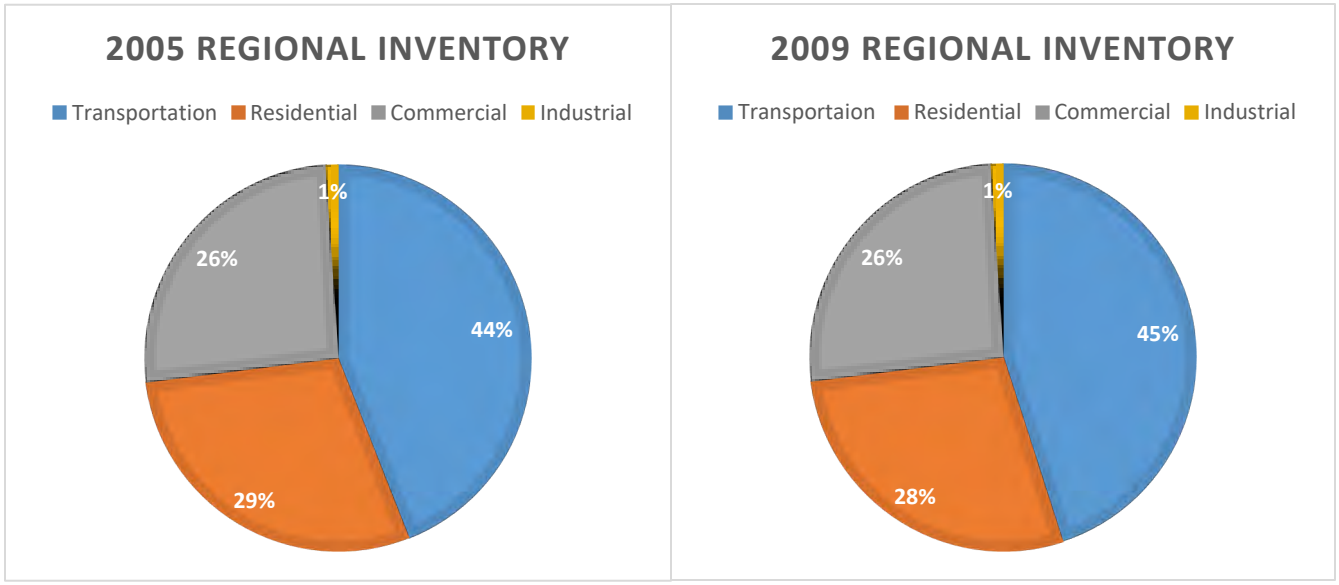
| One-Way Commute Time | Broward County | State of Florida | Difference |
|---|---|---|---|
| | Percent | Percent | |
| Less than 5 minutes | 1.5% | 1.9% | -0.4% |
| 5 to 9 minutes | 6.1% | 7.4% | -1.4% |
| 10 to 14 minutes | 10.7% | 12.4% | -1.7% |
| 15 to 19 minutes | 14.1% | 15.4% | -1.3% |
| 20 to 24 minutes | 16.1% | 16.3% | -0.2% |
| 25 to 29 minutes | 7.0% | 6.7% | 0.2% |
| 30 to 34 minutes | 18.9% | 16.6% | 2.3% |
| 35 to 39 minutes | 3.3% | 3.2% | 0.1% |
| 40 to 44 minutes | 4.6% | 4.1% | 0.5% |
| 45 to 59 minutes | 9.5% | 8.6% | 0.9% |
| 60 to 89 minutes | 6.3% | 5.4% | 0.9% |
| 90 or more minutes | 2.1% | 2.1% | 0.0% |

Source: 2012-2016 5-Year American Community Survey; U.S Census Bureau, Table B08012

## D. ENVIRONMENTAL AND HEALTH IMPACTS

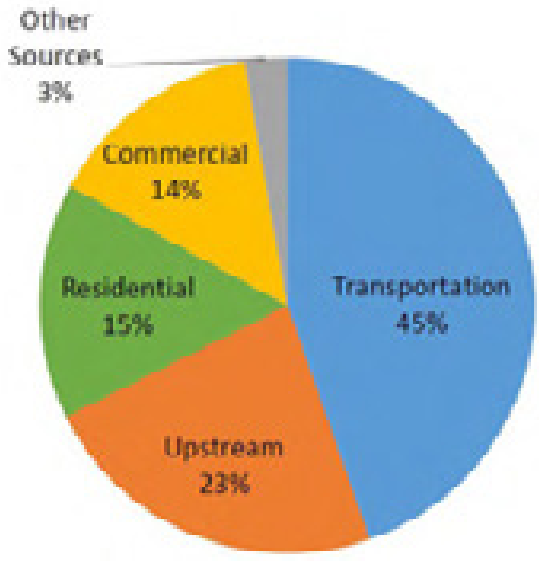
The transportation sector produces the largest share of greenhouse gas (GHG) emissions in Broward County and the Southeast Florida region. In 2005, carbon emissions produced from the transportation sector made up approximately 44% (≈ 28.8 million metric tons of $CO_2$) of total regional emissions. In 2009, the percentage share of transportation-related carbon emissions increased 1% (see Figure T-9). Between 2011 to 2014, GHG emissions produced by the transportation sector made up 45% of total emissions in Broward County, and 56% of County emissions when upstream energy was combined (see figures T-10 & T-11). Upstream energy includes the extraction of raw fossil fuels (mining and drilling) as well as the processing, refining, and transport of fossil fuels.

## Figure T-9: Regional GHG Emissions by Sector 2005 vs. 2009



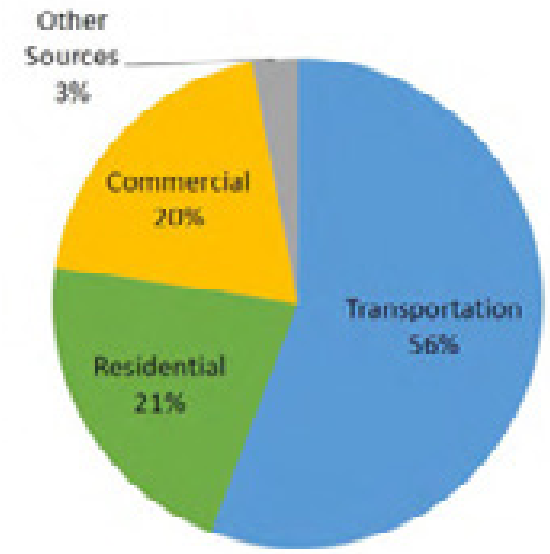

Source: Southeast Florida Regional Climate Compact, Regional Greenhouse Gas Emissions Inventory Baseline Period: 2005-2009

## Figure T-10: Percentage GHG Emissions in Broward County by Sector 2011-2014, Upstream Energy Separated




Source: Broward County Communitywide Greenhouse Gas Emissions Inventory, 2011-2014

## Figure T-11: Percentage GHG Emissions in Broward County by Sector 2011-2014, Upstream Energy Combined




Source: Broward County Communitywide Greenhouse Gas Emissions Inventory, 2011-2014

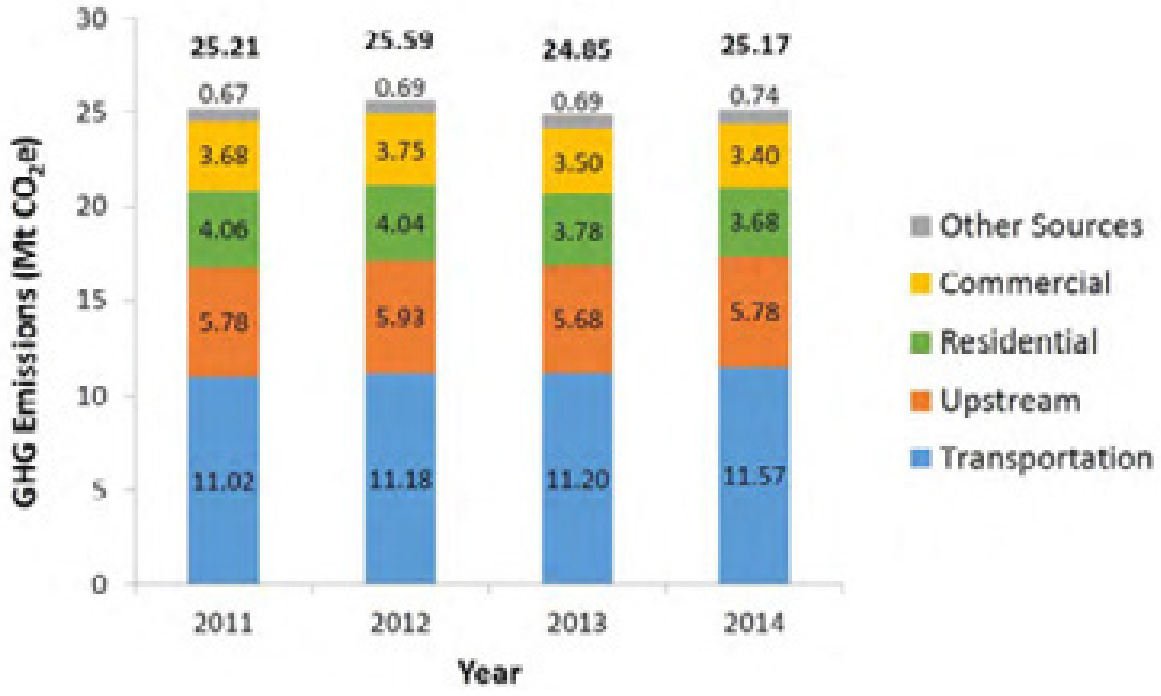
GHG emissions attributed to transportation within Southeast Florida, showed a general decline from 30.79 million metric tons $CO_2e$ ($MMTCO_2e$) in 2005 to 28.78 $MMTCO_2e$ in 2014 (See Table T-21). There was a steady increase in GHGs emitted from the transportation sector within Broward County from 11.02 $MTCO_2e$ in 2011, to 11.57$MTCO_2e$ in 2014 (See Figure T-12).

## Table T-21: Regional Emissions by Sector (metric tons $CO_2e$)

| SECTOR | 2005 | 2006 | 2007 | 2008 | 2009 | 5-YEAR AVERAGE |
|---|---|---|---|---|---|---|
| Residential | 19,963,638 | 19,989,441 | 18,685,833 | 18,186,887 | 18,237,990 | 19,012,758 |
| Commercial | 17,884,893 | 18,212,353 | 17,356,621 | 17,314,930 | 17,083,810 | 17,570,521 |
| Industrial | 1,075,980 | 1,103,572 | 961,884 | 888,112 | 811,017 | 968,113 |
| Transportation | 30,793,880 | 30,853,046 | 30,373,200 | 29,300,926 | 28,784,969 | 30,021,204 |
| Totals | 69,718,390 | 70,158,412 | 67,377,537 | 65,690,855 | 64,917,786 | 67,572,596 |

Source: Southeast Florida Regional Climate Compact, Regional Greenhouse Gas Emissions Inventory Baseline Period: 2005-2009

## Figure T-12: Broward County GHG Emissions by Source 2011-2014




Source: Broward County Communitywide Greenhouse Gas Emissions Inventory, 2011-2014

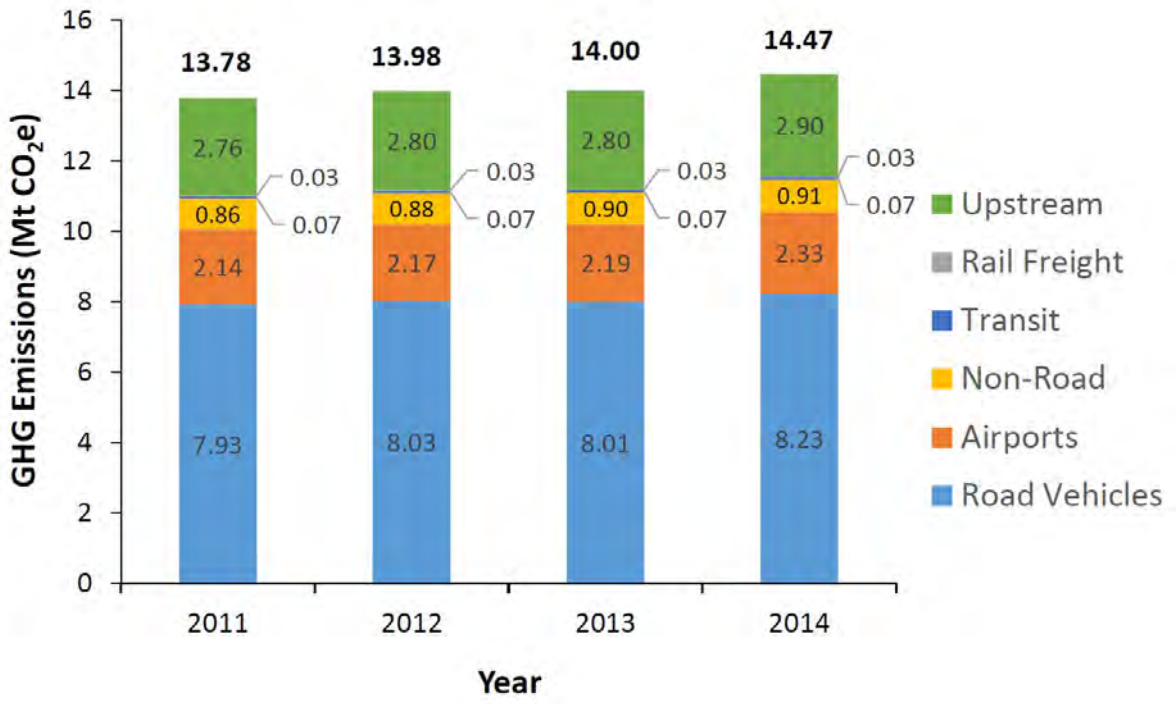
Table T-22 identifies categories within Broward County's Transportation Sector and their corresponding, GHG emission sources, and fuel sources. Among the categories within the transportation section, road vehicles consistently contributed significantly higher GHG emissions annually from 2011 to 2014, accounting for 57% of total transportation GHG emissions within the four-year period (See Figure 13 & 14). Upstream (20.0%), Airports (15.7%), and Non-road vehicles (6.3%) were also major GHG sources, while transit (0.5%) and rail freight (0.2%) did not contribute significantly to the total transportation GHG emissions.

## Table T-22: Transportation Categories, Emission Sources, and Fuel Sources

| CATEGORY | GHG EMISSION SOURCES | FUEL SOURCES |
|---|---|---|
| Airports | Airplanes, airport fleet vehicles, and ground support equipment operating at: FLL, FXE, HWO, PMP | Aviation Gasoline<br>Biodiesel<br>CNG<br>Diesel<br>Jet Fuel<br>Motor Gasoline |
| Marine | Cruise ships, freight vessels, recreational vessels, and support equipment operating in Port Everglades (inventory in development) | Biodiesel<br>Diesel<br>Fuel Oil<br>Motor Gasoline |
| Non-Road Vehicles and Equipment | Agricultural equipment<br>Commercial equipment<br>Construction equipment<br>Industrial equipment<br>Lawn and garden equipment<br>Logging equipment<br>Oil field equipment<br>Railway maintenance equipment<br>Recreational marine equipment<br>Recreational vehicles | CNG<br>Diesel<br>Motor Gasoline<br>LPG |
| Rail Freight | CSX Freight and Switchyard Locomotives<br>FEC Freight and Switchyard Locomotives | Diesel |
| Road Vehicles | Passenger Cars<br>Light Duty Trucks<br>Heavy Duty Trucks | Diesel<br>Motor Gasoline |
| Transit | Broward County Community ~~Buses~~ Shuttles<br>Broward County Paratransit Buses<br>Broward County Transit Buses<br>SFRTA Tri-Rail Commuter Rail Locomotives<br>SRTA Tri-Rail Connector Buses<br>Amtrak Intercity Rail Locomotives | Biodiesel<br>Diesel<br>Motor Gasoline |
| Upstream Impacts | Extraction, processing, and delivery of transportation fuels | Aviation Gasoline<br>CNG<br>Diesel<br>Jet Fuel<br>Motor Gasoline |

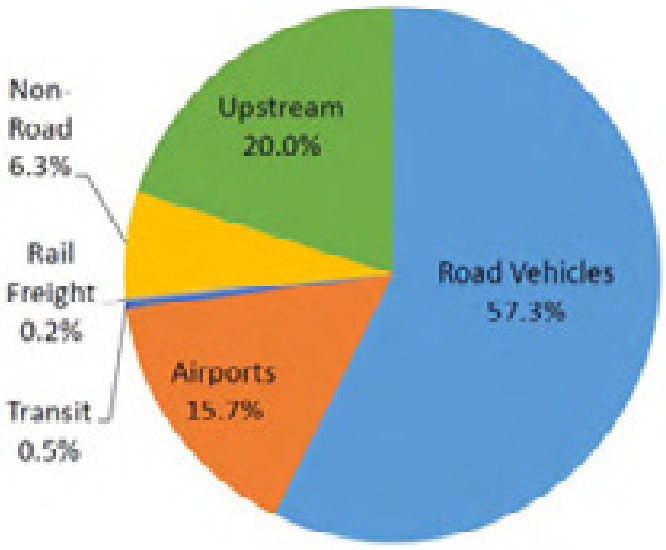
Source: Broward County Communitywide Greenhouse Gas Emissions Inventory, 2011-2014

## Figure T-13: Broward County Transportation Sector GHG Emissions 2011-2014




Source: Broward County Communitywide Greenhouse Gas Emissions Inventory, 2011-2014

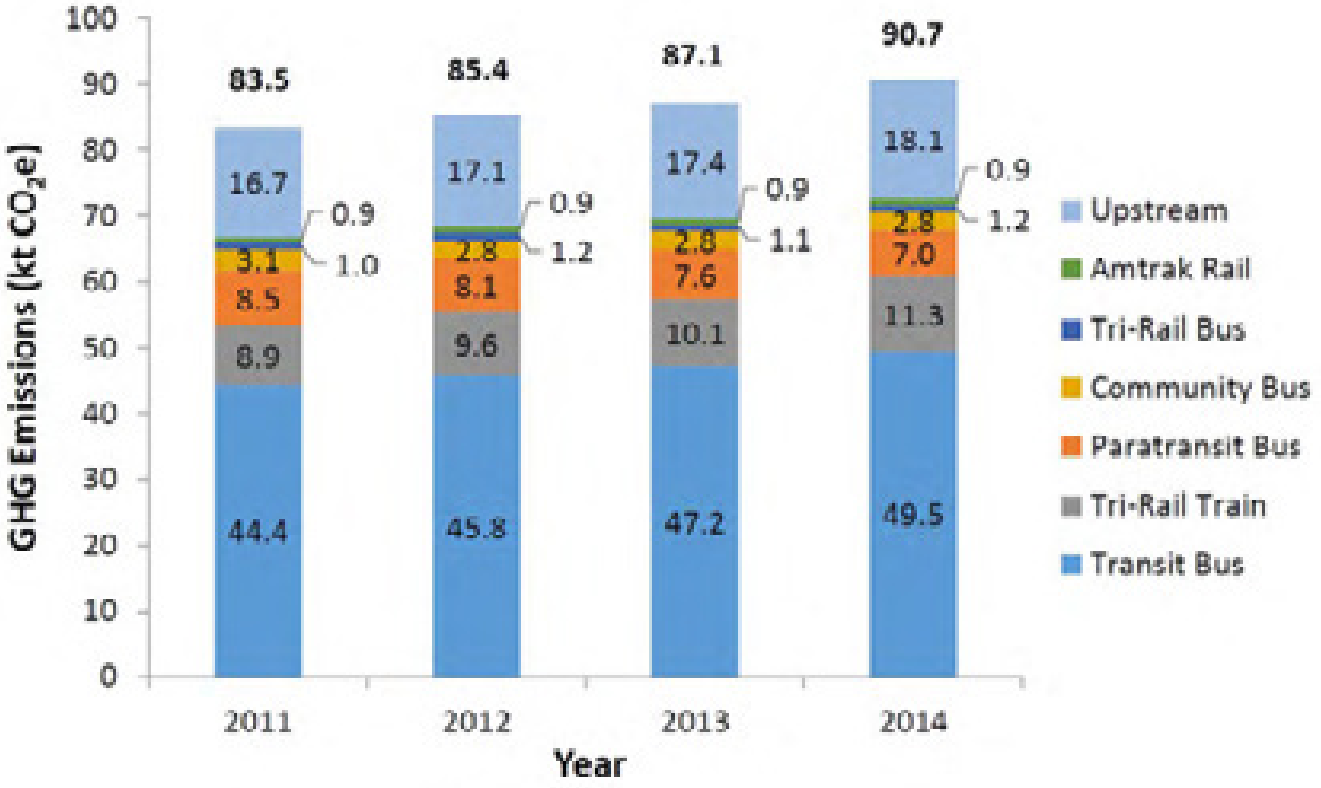
## Figure T-14: Broward County Transportation Sector GHG Emissions 2011-2014




Source: Broward County Communitywide Greenhouse Gas Emissions Inventory 2011-2014

Among public transit services, the transit bus produced the most GHGs, steadily increasing from 44.4kTCO$_2$e in 2011 to 49.5 kTCO$_2$ein 2014 (See Figure T-15). This is attributed to an increase in BCT service during this period. Tri-Rail (commuter rail) and upstream sources experienced a steady increase in emissions. The transit system produced 8.6 percent higher GHG in 2014 compared to 2011. Tri-Rail services showed the largest percentage increase in GHG emissions between 2011 and 2014 (See Table T-23).

## Figure T-15: Broward County Public Transit GHG Emissions (ktCO$_2$e) 2011-2014




Source: Broward County Communitywide Greenhouse Gas Emissions Inventory, 2011-2014

## Table T-23: Broward County Public Transit GHG Emissions ($ktCO_2e$) Percentage Change 2011-2014

| SERVICE | 2011 | 2014 | % CHANGE |
|---|---|---|---|
| Transit Bus | 44.4 | 49.5 | 11.5 |
| Tri-Rail Train | 8.9 | 11.3 | 27.0 |
| Paratransit Bus | 8.5 | 7 | -17.7 |
| Community ~~Bus~~ Shuttle | 3.1 | 2.8 | -9.7 |
| Tri-Rail Bus | 1 | 1.2 | 20.0 |
| Amtrak Rail | 0.9 | 0.9 | 0.0 |
| Upstream | 16.7 | 18.1 | 8.4 |
| Total | 83.5 | 90.7 | 8.6 |

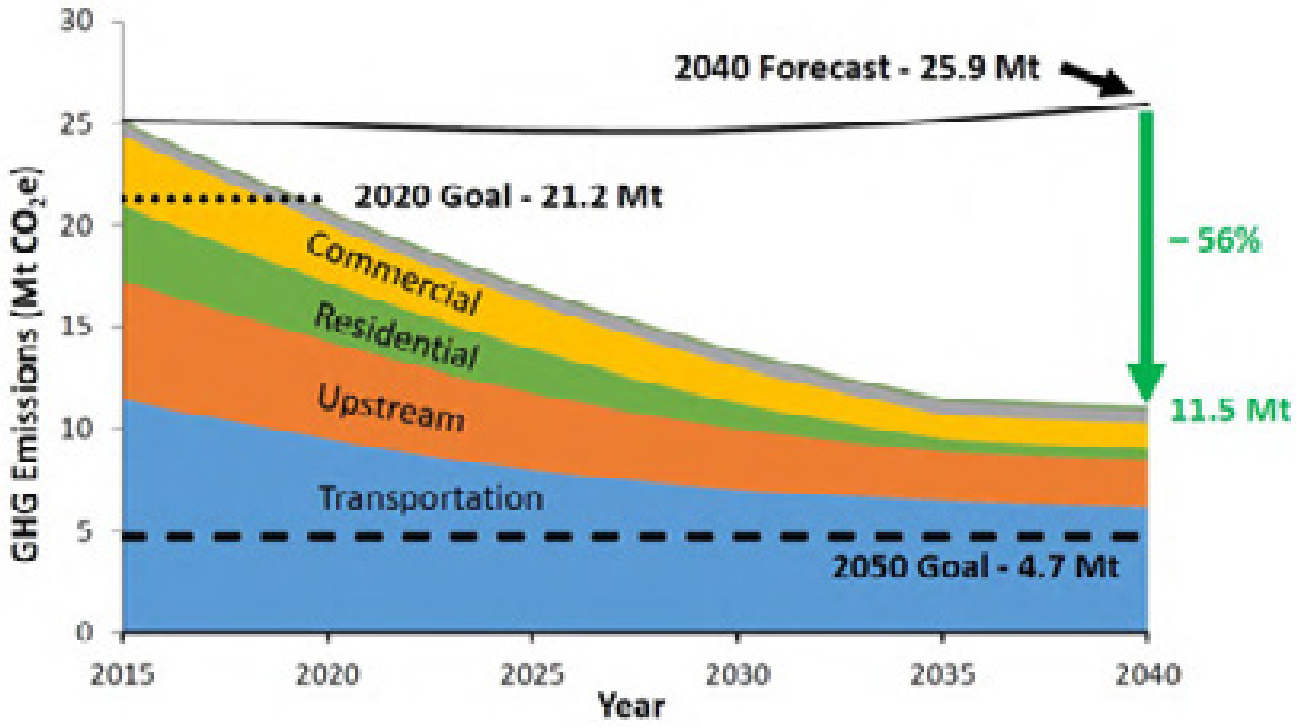
Source: Broward County Communitywide Greenhouse Gas Emissions Inventory, 2011-2014

Figure T-16 illustrates GHG emission levels of the various sectors following the aggressive and complete implementation of three transportation- and five building- related GHG reduction strategies. The transportation GHG reduction strategies are:

- Transition to Electric Vehicles – Electricity used to charge electric vehicles has a significantly lower carbon intensity than gasoline or diesel fuel.
- Improved Bicycle Infrastructure- To facilitate more bicycling: the most energy efficient transportation mode available, emitting no GHG's during use.
- Land Use Development Changes – More mixed-use communities with greater accessibility to destinations by walking, bicycling a transit instead of driving.

The forecast line illustrates the trajectory of total GHG emissions if no new measures are taken to reduce the County's carbon footprint (see Figure T-16)

Figure T-16: Broward County 2015-2040 Aggressive GHG Reduction Scenario




Source: Broward County Communitywide Greenhouse Gas Emissions Inventory, 2011-2014

## Public Health and Equity

Broward County collaborates with and supports many programs which prioritize the equitable distribution of transportation services and facilities for the improvement of public health for County residents and visitors.

Table T-24 depicts the overwhelming evidence which supports that improved walkability, and increased transportation options (facilitated by urban investment in transportation infrastructure) enables and encourages improved public health. FDOT reports that one third of regular transit users met the minimum daily requirement for physical activity during their commute, and residents are 65% more likely to walk in a neighborhood with sidewalks (FDOT, 2015). A key strategy of improving public health is to increase mobility through convenient transportation options. Broward County and the Broward MPO has collaborated with the Broward Regional Health Planning Council and Florida Department of Health to create linkages between public health and transportation professionals.

One practice that shows promise as a way to bridge the gap and better convey projects impacts is to perform a Health Impact Assessment (HIA).Similar to cost-benefit analysis, an HIA uses quantitative and qualitative data to permit decision makers to make choices about alternatuives to prevent disease/injury and actively promote health and wellbeing across all sectors.

## Table T-24: Health Impacts from Transportation Investments

| CHANGES IN INFRASTRRUCTURE FOR DIFFERENT TRAVEL MODES | POSITIVE HEALTH IMPACTS | NEGATIVE HEALTH IMPACTS |
|---|---|---|
| More infrastructure facilitating walking (including general assessments of "walkability" of neighborhoods as well as presence of specific features e.g. pavements) | • Increased walking, cycling or active transport<br>• Increased physical activity<br>• Reduced BMI or obesity<br>• Reduced air pollution-related effects<br>• Improve reported health status<br>• Reductions in specific health problems<br>• Lower mortality /higher life expectancy | Less active transport |
| More infrastructure facilitating cycling | • Increased walking, cycling or active transport<br>• Increased physical activity | |
| More infrastructure facilitating public transport use | • Increased walking, cycling or active transport<br>• Increased physical activity<br>• Reduced BMI or obesity<br>• Reduced air pollution-related effects | Less walking, cycling or active transport |
| Less infrastructure facilitating car travel (including parking, motorways) | • Increased walking, cycling or active transport<br>• Reduced BMI or obesity | |

Source: World Health Organization: Health & Equity in a Green Economy, 2011

## Transportation Disadvantaged (TD) Services

Persons who are unable to transport themselves or purchase transportation due to physical or mental disability, income status, or age are considered transportation disadvantaged. These members of the community are dependent on others to obtain access to health care, social services, shopping and other life sustaining activities. Florida's TD program aims to ensure the availability of efficient, cost-effective, and quality transportation services for the transportation disadvantaged. Under Florida's TD program, the Broward MPO, BCT and the Community Transportation Coordinator (CTC) work together to develop the Transportation Disadvantaged Service Plan. You can view the Broward County Transportation Disadvantaged Service Plan Update here.

Broward County's TOPS program provides door-to-door paratransit service to transportation disadvantaged individuals in accordance with the Americans with Disabilities Act of 1990 (ADA), and

the Commission for the Transportation Disadvantaged (TD) guidelines. Table T-25 identifies the percentage change in paratransit ridership between 2011 and 2017. BCT's paratransit ridership increased by 13.39% from 2011 to 2017.

## Table T-25: BCT Paratransit Ridership 2011-2017

| FISCAL YEAR | RIDERSHIP | % CHANGE SINCE 2011 |
|---|---|---|
| 2011 | 167,764 | - |
| 2012 | 170,675 | 1.72% |
| 2013 | 167,769 | 0.00% |
| 2014 | 162,545 | -3.11% |
| 2015 | 151,655 | -9.60% |
| 2016 | 179,686 | 7.10% |
| 2017 | 190,229 | 13.39% |

Source: BCT December Ridership Report, 2011 -2017

Table T-26 illustrates the total answered calls for BCT's Paratransit as a performance measure, between 2015 and 2017. BCT recorded a substantial increase in calls for paratransit service between 2015 and 2017 (43.3 percent increase). As the Baby Boomer generation ages it is expected that there will be increased demand for Paratransit services in Broward County.

## Table T-26: Answered Calls for Paratransit 2015-2017

| FISCAL YEAR | ANSWERED CALLS | % CHANGE SINCE 2015 |
|---|---|---|
| 2015 | 329,005 | - |
| 2016 | 384,493 | 16.9% |
| 2017 | 471,310 | 43.3% |

Source: BCT Transit Development Plan, 2015-2017 updates

Additional information on Broward County's TOPS program can be accessed here.

## Partnerships Transforming Our Community's Health (TOUCH) Initiative

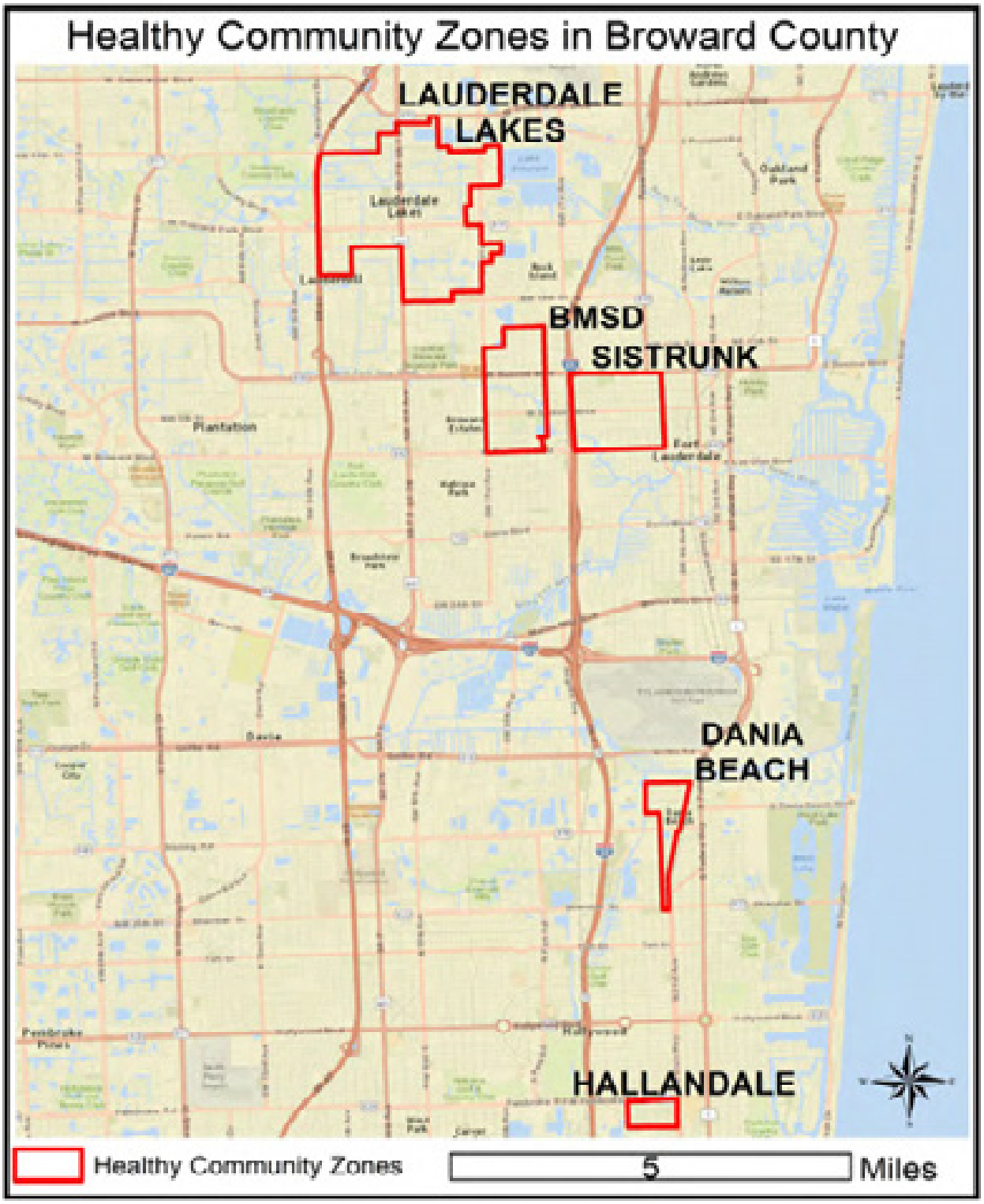
The Miami-Fort Lauderdale-West Palm Beach metropolitan area was ranked 4th worst in the country on the Pedestrian Danger Index with cars injuring over 1,500 pedestrians and bicyclists. The TOUCH Initiative was launched by Broward Regional Health Planning Council's (BRHPC) to tackle this among several other critical health issues (such as food deserts) facing Broward County. TOUCH partners work together to implement policy and capital projects to improve the health of Broward County residents. Projects include implementing roadway and neighborhood designs that make it easier and safer for Broward Residents to travel using all modes of transportation including walking, biking, driving, and public transit. TOUCH Initiative's built environment goal aims to create healthy and safe places for Broward residents, especially those that are supportive of an active lifestyle, by establishing "Complete Streets" community design standards to make streets safe for all users.

## Healthy Community Zones Initiative

As part of the TOUCH initiative, Healthy Community Zones (HCZ) were established in several Broward County neighborhoods, including one in the Broward Municipal Services District. HCZs were selected by TOUCH and an independent panel to form partnerships with existing organizations, resources, and local residents in order to develop a shared vision of health, economic development, and education for their neighborhoods. The initiative encourages the development and enhancement of community efforts to improve the well-being and health of the residents in each HCZ. Figure T-17 identifies designated HCZ zones in Broward County.

The BMSD Healthy Community Zone initiative is managed by the BMSD Community Liaison and is largely supported by the BMSD Neighborhood Parks. Together, the BMSD liaison and Parks staff collaborate to maintain relationships with faith-based, health and wellness, family strengthening, self-sufficiency, capacity building community partners and stakeholders to offer diverse programs and services to the community. Additionally, partnerships with non-profit organizations in support of the BMSD Healthy Community Zone delivered new community assets that include a fully-equipped outdoor gym and bike-fix-it stations to promote physical activity and bicycling. Another HCZ project included forming a "walking school bus" for help children have a safe route to walk to school. These projects demonstrate the value of leveraging community partnerships and breaking down silos to deliver innovative programs to improve community health and wellbeing.

Figure T- 17: Healthy Community Zones in Broward County designated by TOUCH




Source: Partnerships Transforming Our Community's Health

# PROJECTED GROWTH AND TRAVEL PATTERNS

## A. Population Growth

In order to identify our transportation needs in the future, it is critical to analyze technological trends (driverless vehicles, Uber, etc.), shifting land use patterns and development densities, and project population growth. According to 2015 BEBR estimates Broward County was home to approximately 1.8 million people. The 2017 Broward County Land Use Plan predicts the addition of approximately 273,000 new residents by the year 2040; however, more recent update from BEBR suggests more aggressive growth of 373,000 by 2045. Table T-27 identifies the projected population growth within Broward County.

### Table T-27: Projected Population Growth 2015-2045

| Year | Population | Increase from Base Year | % from Base Year |
|---|---|---|---|
| 2015 | 1,827,367 | - | - |
| 2020 | 1,914,498 | 87,131 | 4.8% |
| 2025 | 1,989,753 | 162,386 | 8.9% |
| 2030 | 2,052,432 | 225,065 | 12.3% |
| 2035 | 2,111,652 | 284,285 | 15.6% |
| 2040 | 2,158,080 | 330,713 | 18.1% |
| 2045 | 2,200,492 | 373,125 | 20.4% |

Source: Broward County BBTN Traffic Analysis Zones & Municipal Forecasts Update, 2017

## B. Transit Growth Projections

Meeting the changing transportation demands shaped by a growing population and socioeconomic factors is especially essential for transit. The passage of the Transportation Surtax by the Broward County electorate in November 2018, will permit BCT to implement its TDP Vision Plan service plan. The latest major ridership forecasts prepared by BCT in ~~2013~~ 2018 predicted that by 2048 the transit system network total would have undergone a 78% growth ~~rate~~ in ~~average~~ annual weekday ridership from ~~2014~~ 2019. ~~Express routes~~ Local Service and new Rapid Service are expected to be the largest contributors to ~~the have the highest percentage~~ ridership growth by ~~2023~~ 2048 while ~~fixed routes~~ Express Service and Community Shuttles are also predicted ~~to show the highest~~ to grow in ridership. ~~totals between 2014 and 2023~~ "Breeze" routes are expected to decline as they are converted into Rapid Service routes (see Table T-28).

## Table T-28: Projected Growth in ~~Average~~ Weekday Ridership 2019~~4~~-2023~~48~~

| ~~Route~~ Service Type | ~~Average~~ Annual Weekday ~~Daily~~ Ridership (2014~~9~~) | ~~Average~~ Annual Weekday ~~Daily~~ Ridership (2023~~8~~) | ~~Absolute Change~~ Annual Weekday Ridership (~~2014-~~2048~~23~~) | Growth Rate ~~(2014-2023)~~ (2019-2048) |
|---|---|---|---|---|
| Fixed Route Local ~~Subtotal~~ | ~~119,276~~ 19,094,342 | ~~128,126~~ 24,298,219 | ~~8,850~~ 33,052,536 | ~~7.40%~~ 73.1% |
| Express ~~Routes Subtotal~~ | ~~1,941~~ 498,598 | ~~2,237~~ 578,280 | ~~296~~ 702,000 | ~~15.2%~~ 40.8% |
| Breeze ~~Routes Subtotal~~ | ~~4,323~~ 1,807,707 | ~~4,812~~ 832,987 | ~~489~~ 621,074 | ~~11.3%~~ -65.6% |
| Rapid | ~~-~~ | 1,607,110 | 3,872,195 | N/A |
| Community ~~Bus~~ Shuttle ~~Subtotal~~ | ~~8,472~~ 2,161,751 | ~~9,098~~ 2,643,429 | ~~626~~ 3,700,315 | ~~7.4%~~ 71.2% |
| System Total | ~~134,012~~ 23,562,398 | ~~144,273~~ 29,960,025 | ~~10,261~~ 41,948,120 | ~~7.7%~~ 78.0% |

Source: BCT Transit Development Plan 2014-2023, TBEST Results Appendix M

Following the projected trend, ridership for the Express service layer has increased by 160,506 between July 2012 and June 2016. Although express route ridership increased each year between 2012 and 2016, there is a leveling of ridership growth rate over time (See Table T-29). Express Bus is the newest mode for BCT and is expected to continue to play an important role for mobility of Broward residents that commute to Miami, Civic Center, and Brickell.

## Table T-29: Express Routes Ridership Totals 2012-2016

| YEAR | RIDERSHIP TOTALS | % CHANGE SINCE 2012 |
|---|---|---|
| July 2012-June 2013 | 458,347 | - |
| July 2013-June 2014 | 560,577 | 22.30% |
| July 2014-June 2015 | 602,841 | 32.52% |
| July 2015-June 2016 | 618,853 | 35.02% |

Source: BCT Transit Development Plan, 2013 -2017 annual updates

BCT ~~is currently (2018) updating the~~ developed an updated Transit Development Plan in 2018 that will outlined new ridership and service projections. It is notable that despite success in the Express Route program, overall ridership has recently declined ~~and is not on target to meet 2023 projections~~. FY 17 average weekday ridership for fixed route was 20 percent less than 2014 average weekday ridership. Further analysis is needed to determine the cause of the ridership decline, which

is not unique to Broward County. Possible reasons for recent ridership decline include improving economy, stable gasoline prices, ridershare services, and emerging technology.

## C. Emerging Technologies

Transportation trends in the U.S are shifting in response to emerging technologies, and this is particularly evident in urban areas. In recent years rideshare has emerged as a competitive mode of transportation in Broward County, with newly developed technologies by companies such as Lyft, Uber, Zipcar, Hop Stop, ZabCab, and more. The accessibility, user-friendly interface, and often reduced cost are only a few reasons for the growing popularity of rideshare applications, and their likelihood to influence a decline in taxi ridership in years to come.

New micromobility transportation solutions aimed to make short ships convenient such as bike share, e-bikes, e-scooters is quickly becoming more prevalent in our communities. Broward County Transportation Department took the first step by implementing with Broward County's first bike sharing system. Since its inception in 2012, BCT's bike sharing program dubbed "B-Cycle" has experienced significant growth in ridership with protentional for expansion of the bicycle system and number of stations. The program allows people to check out bicycles from various bikeshare locations located within the County and provides an additional mobility choice as well as connections to BCT, Tri-Rail, water taxi and Community ~~bus~~ shuttle routes. In 2016, B-Cycle maintained its status as a popular mobility option in Broward county with a 275- bicycle system, 25 stations, and over 45,830 trips taken, a 5.9% increase over 2015, and 20.2% increase over 2014 (See Table T-30). Broward County expects increasing competition in the bike share and micromobility markets as new dockless technologies make implementation easier and less costly. As these technologies expand, Broward County will need to ensure that ADA accessibility is not hindered by the bicycles, scooters, or other vehicles.

### Table T-30: B-Cycle Trips 2012-2017

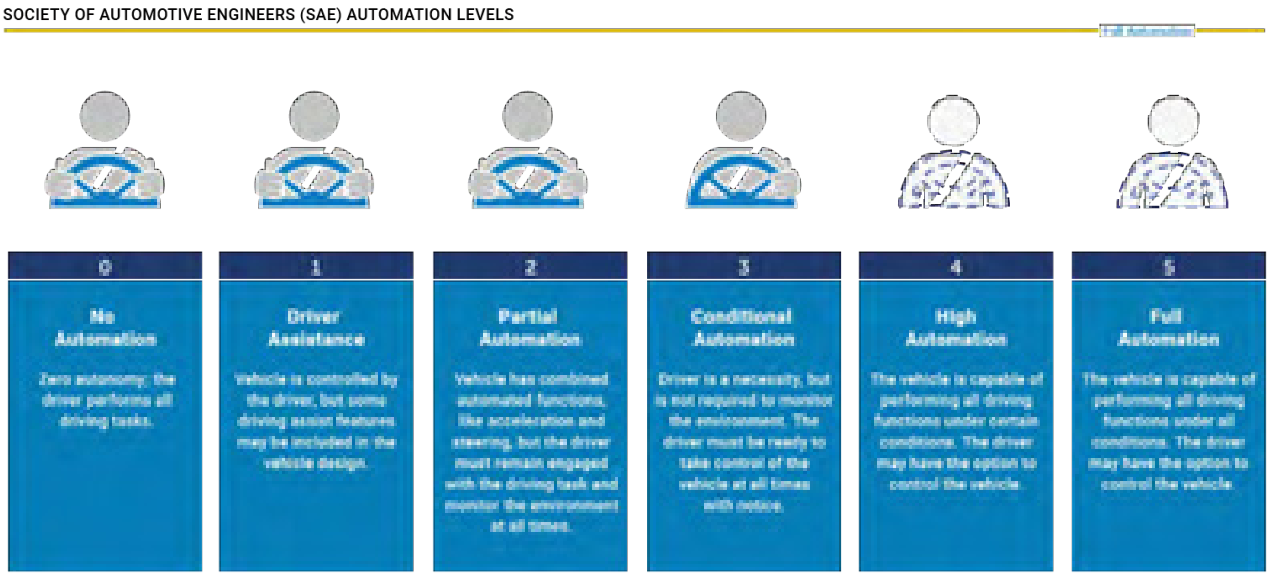
| YEAR | NUMBER OF TRIPS | % CHANGE SINCE 2012 |
|---|---|---|
| 2012 | 24,190 | - |
| 2013 | 30,124 | 24.53% |
| 2014 | 41,665 | 72.24% |
| 2015 | 45,520 | 88.18% |
| 2016 | 42,073 | 73.93% |
| 2017 | 42,421 | 75.37% |

Source: Broward B-cycle December Report 2017

As regions around the country push to invest more in alternative transportation systems that include bus rapid transit, personal rapid transit, streetcars, light rail and high-speed rail, the automobile and tech industries are quickly advancing autonomous vehicle technology. The Florida Automated Vehicles (FAV) program, led by the Florida Department of Transportation (FDOT), collaborates with auto

manufacturers to pilot research initiatives to further the understanding of driverless and connected vehicles and their capabilities to improve road safety and potentially reduce traffic congestion. The Society of Automotive Engineers and National Highway Traffic Safety Administration recognize five (5) level of vehicle automation (Figure T-18). Today, manufactures already sell vehicles that come equipped with technology that has reached level two (2) and are piloting vehicles with level three (3) capability. Further research and development is needed in this sector to assess the impact of autonomous technology on long term transportation/land use planning and capital project development.

### Figure T-18: Vehicle Automation Levels




Source: National Highway Traffic Safety Administration, 2018

## PLANS TO MEET TRANSPORTATION NETWORK NEEDS

Broward County has developed a number of transportation plans and implementation mechanisms to meet future transportation needs. While the County's Transportation Element of the Comprehensive Plan serves as a foundation for policy and implementation, there are also a number of transportation-related plans in place. Below is a highlight of major transportation plans guiding future investments and strategies.

### BCT Transit Development Plan (TDP)

BCT Connected, the 2019–2028 Transit Development Plan (TDP) ~~Annual Update~~, serves as the strategic guide for public transportation in Broward County for the next 10 years to 30 years. This document

serves as a ~~as the fourth annual progress report to~~ major update to TDP ~~*BCT Connected*~~, which was adopted in December 2018. The ~~update~~ plan provides a comprehensive documentation of BCT's capital and operating needs for the next ten years. In addition, the update identifies achievements (2018), future plans and services, and provides recommendations. ~~a ten (10) and thirty (30) year horizon for 2028~~. The Broward County Comprehensive Plan includes policies and implementation steps to implement BCT's vision and support local and regional transit options for residents and visitors.

Annual and major updates to the plan, including the associated data and analysis to support it, can be found here.

## SFRTA Transit Development Plan (TDP)

The South Florida Regional Transportation Authority Transit Development Plan documents the agency's vision, goals and strategies over a ten-year planning horizon, and contains achievements for the State Fiscal Year. Every five years a major update to the TDP is published documenting the investments that SFRTA is committed to making over the next five years as well as priorities and improvements over a ten-year horizon. The plan provides an opportunity to addresses the mobility needs of a growing and dynamic region, and to continue building partnerships to advance transportation projects in the South Florida region and beyond. Annual reports as well as major 5-year updates of the SFRTA Transit Development Plan can be found here.

## Broward MPO Long Range Transportation Plan (LRTP)

The Broward MPO is a critical transportation agency partner to realize the transportation goals. The MPO's current LRTP, Commitment 2040, is an investment plan for the Miami Urbanized Area within Broward County (the MPO's planning area). The plan allocates Federal, state and local funds to both maintain the existing system and develop needed improvements to meet the population and employment growth needs. Under Federal law, the plan must be "financially feasible," meaning only revenues that can be reasonably expected can be considered in funding the recommendations documented within Commitment 2040. Broward MPO is currently working on the 2045 LRTP, now referred to as the Metropolitan Transportation Plan, that will be adopted in 2019.

The plan, including the associated data and analysis to support it, can be found here.

## Southeast Florida Transportation Council (SEFTC) Regional LRTP

In addition to the Broward MPO's LRTP, Southeast Florida regional transportation investments are guided by SEFTC's 2040 Regional LRTP. The plan identifies the most significant transportation investments needed to meet travel demand needs throughout the Southeast Florida region (Broward, Miami-Dade, Palm Beach Counties). The horizon year of 2040 is chosen to provide time for agencies to assemble funds and complete the technical work required to design and construct the selected

improvements and is consistent which each of the County-level MPO's LRTPs. Major components of the plan include:

- Projected growth in the region through 2040, including population and employment;
- Prioritizing how to accommodate/meet the needs of the project growth;
- Creating a vision for a seamless regional transit system and also improving the safety and access of the bicycle and pedestrian system
- Actively engaging the public
- Prioritizing projects that best meet the goals for the plan
- Financial plan that identifies funding sources and mechanisms to implement strategies
- A Plan that matches investments to where we are growing

The 2040 Regional LRTP, including the associated data and analysis to support it, can be found here.

## Transportation Surtax Plan

On November 6, 2018, the Broward County electorate approved a one-cent Charter County and Regional Transportation System Surtax "Transportation Surtax" for a period of 30 years. Estimated to raise over $15 billion to funding transportation projects, the overarching goals of the Transportation Surtax projects are: to create connectivity; to relieve traffic congestion; to improve transit service, and to expand the availability of multimodal transportation. A minimum of 10 percent of the Transportation Surtax annual revenues is reserved to fund municipal projects as prioritized by the Broward MPO. The Broward County Transportation Surtax Ordinance located in Article V, Section 31½-75 will guide the implementation of the Transportation Surtax, including the formation of an independent Oversight Board. Transportation Surtax projects will be added to the FY2020 budget and CIP.

The plan, projected budgets, and state audit on the Transportation Surtax, can be found here.

## South Florida Express Lanes Network Project

The 95 Express, 595 Express, 75 Express, and Palmetto Express are part of a larger network of existing and planned congestion-priced managed lanes in southeast Florida. The proposed improvements for the express lane developments are needed to address existing congestion, enhance transit services, accommodate future regional growth and development, enhance hurricane and other emergency evacuation, and improve system connectivity between key Southeast Florida limited access facilities. A map of the Express Lane Network Project can be viewed here.

## Port Everglades 20-Year Master/Vision Plan

The cruise business at Port Everglades is forecasted to reach 5.6 million passenger moves in 2033. Port Everglades is expected to continue as Florida's leading containerized cargo port, reaching 1.7 million TEUs (the industry standard measurement of 20-foot equivalent units) in 2033. The Port

Everglades 20-Year Master Vision Plan provides a roadmap for the port's future development and capital investments to meet its growing needs as it continues to expand towards the year 2033. The plan addresses future transportation development needs and projects within and around the Port Everglades jurisdictional area, including but (not limited to); infrastructure improvements, enhancement of multimodal capacity, increased freight mobility and network connectivity, reduced congestion, seaport-airport connectivity and more. The plan identifies conducting traffic studies for projects in the 10-year timeframe. An overview of the Port Everglades 20-year Master/Vision plan can be found here.

## Fort Lauderdale-Hollywood International Airport Master Plan

Broward County Aviation Department is currently updating a master plan for Fort Lauderdale-Hollywood International Airport to meet the future needs of the county through to 2040. You can find an overview and the goals of the plan here.

## Florida Department of Transportation Florida Transportation (FTP) Plan/Strategic Intermodal System (SIS) Plan

The Strategic Intermodal System (SIS) Policy Plan establishes the policy framework for planning and managing Florida's Strategic Intermodal System, the high priority network of transportation facilities important to the state's economic competitiveness. The SIS Policy Plan is a primary emphasis of FTP implementation and aligns with the current FTP Policy Element. The SIS Policy Plan includes three objectives to guide future SIS plans and investments. You can find the 2016 FTP/SIS Plan here.

## Broward County Greenways Master Plan

In 1999, the Broward County Board of County Commissioners identified the need for a county-wide system of greenways and trails, for the improvement of the quality of life in the urban environment. By 2002, the Broward County Commission approved an amendment to the Broward County Comprehensive Plan to incorporate the conceptual greenways system plan. Today, planning is in progress to achieve the vision of a fully funded, countywide network of safe, clean, bicycle and equestrian paths, nature trails and waterways.

You can view a map showing the Potential Greenways System in Broward County here.

## Florida Department of Transportation Complete Streets Guidelines

September 2014, the Florida Department of Transportation (FDOT) adopted the Statewide Complete Streets Policy (Topic No. 000-625-017-a). Complete Streets serve the transportation needs of transportation system users of all ages and abilities, including pedestrians, bicyclists, transit riders, motorists, and freight handlers. A transportation system based on Complete Streets principles can help to promote safety, quality of life, and economic development.

All FDOT Complete Streets resources can be found here.

## Broward Complete Streets Initiative

Broward County's efforts to promote and implement Complete Streets began in earnest when County staff presented the concept of Complete Streets to the Broward County Board of County Commissioners in 2009. Since that time, a number of County agencies, the Broward MPO, municipalities and other partners have worked to develop Complete Streets design guidelines, to update codes and the Comprehensive Plan, and to identify and allocate funding and ultimately construct projects. In July 2012, Broward Complete Streets Guidelines were approved by the MPO Board. A Complete Streets Team was developed and has been working with its partners to continue the implementation of Complete Streets projects. Most recently, on June 10, 2014, the Broward County Board of County Commissioners adopted Complete Streets policies into the Broward County Comprehensive Plan. A number of municipalities have adopted resolutions in support of the concept and are working toward adopting policies into their comprehensive plans.

## Broward Complete Streets Guidelines

The Broward Complete Streets Guidelines manual is based on complete streets principles that aim to design streets for people of all ages and physical abilities and accommodate all travel modes. The Broward Complete Streets Guidelines manual offers another way to design streets and provides guidance for those municipalities that decide to adopt these principles. The result will be more livable neighborhoods with healthier residents due to opportunities for increasing social capital (by interacting more regularly with neighbors) and for active transportation (walking, bicycling, and accessing public transportation).

You can find Broward Complete Streets Guidelines here.

## Broward MPO Bicycle and Pedestrian Safety Action Plan

The Broward Metropolitan Planning Organization's (MPO) Bicycle and Pedestrian Safety Action Plan aims to create a safer walking and bicycling environment in Broward County. The plan aims to do this by identifying "Calls for Action" that focus on areas where institutional changes should be explored. Beyond the "Calls for Action" the plan also includes preliminary strategies and ideas for how change can be accomplished. The Action Plan identifies key action items, partner organizations, and time frames to guide the work of the MPO and its partners in improving walking and bicycling safety. The Action Plan serves as a foundation to improve safety for all roadway users in Broward County by shifting the transportation focus from moving cars to moving people utilizing four calls to action outline in Figure T-19. You can find the Bicycle and Pedestrian Safety Action Plan here.

Figure T-19: Bicycle and Pedestrian Safety Action Plan Calls to Action


Source: Broward MPO Bicycle and Pedestrian Safety Action Plan

# IMPLEMENTATION

Transportation planning and implementation in Broward County is the joint responsibility of several state, county, and municipal agencies. Table T-31 lists these agencies and their responsibilities concerning all phases of transportation planning and improvements.

Planning for the County jurisdictional roadway network is the responsibility of the Broward County in partnership with the Broward MPO. The MPO is a policy board of local, elected officials, established under the federal requirements of 23 U.S.C. 34 for the utilization of federal transportation funds in the urbanized area of Broward County. The duties of the BMPO include the development of a comprehensive transportation plan which includes consideration of long range goals and transportation system management measures, an annual unified planning work program, and an annually updated, five-year transportation improvement program pursuant to Section 339.175 Florida Statutes. The State recognizes the MPO as the forum for cooperative decision making in these matters.

The Planning and Development Management Division provides administrative support to the Bicycling and Pedestrian Advisory Committee (BPAC) which was created in 1981 by resolution of the Broward County Board of County Commissioners. The purpose of the BPAC is to study and advise the Broward County Board of County Commissioners on all matters related to bikeways including: review Broward County road construction projects at their planning and design stages for the possible inclusion and/or placement of bikeway systems; recommend prospective locations of future bikeways; study, pursue, solicit, and encourage public and private funding for bikeway projects; compile and provide educational and informational

material; seek public input to determine community desires and priorities regarding bikeways; develop programs to encourage the increased use of bicycles throughout Broward County; and submit to the County Commission an annual report and proposed budget.

## Table T-31: Transportation Planning Legislation & Responsible Local Agencies

| | | |
|---|---|---|
| | | |
| Broward County Transit Division | Broward County Administrative Code, Ch 15.11 | Administering the Transit Program; coordinate the administration, management, operation, and maintenance of a countywide transit and paratransit system. |
| | | |
| South Florida Regional Transportation Authority | Florida Statutes, Chapter 343 | Operates the commuter rail system in Dade, Broward, and Palm Beach County |
| | | |
| Planning and Development Management Division | Broward County Administrative Code, Ch. 8.27<br>Broward County Land Development Code, Ch. 5 | Issuance of development permits and concurrency certificates in Broward County |
| | | |
| Highway Construction and Engineering Division | Broward County Administrative Code, Ch. 6.48 | Primarily responsible for the engineering design and construction of County jurisdictional roads |
| | | |

# Appendix A:

## Existing Roadway Capacity and Level of Service

Broward MPO is responsible for regularly updating Level of Service for roads classified as collector and above. The most recent Roadway Capacity and Level of Service Analysis was updated in 2017. Additional traffic data is available at http://www.browardmpo.org/index.php/data .

## Appendix B:

## Transportation Concurrency Management Area Level of Service Comparison Matrix

| TCMA | New LOS Standard | Old LOS Standard | FY 19 Status | Funded | Notes |
|---|---|---|---|---|---|
| Overall | Increase Ridership 10% | Ridership standard varied by TCMA | Deficient | Yes | Overall ridership goal is aligned to TDP and CIP which accounts for ridership increase Countywide. |
| | Provide 1.4 million annual fixed-route revenue service hours | New | Deficient | Yes | New LOS aligned to TDP service plan |
| | Construct bus shelters at 1/3 of stop locations | Increase number of bus shelters 25% from FY 2009 to FY2013 | Deficient | Yes | New LOS is aligned with TDP and CIP |
| | Expand network of Adaptive Traffic Signal Control Technology | Reduce traffic signal communication failures by 50% | Deficient | Yes | New LOS is aligned with Traffic Engineering Division goals and CIP |
| | Maximum vehicular traffic volume 75% above LOS standard | Maximum vehicular traffic volume 75% above LOS standard | Maintenance | Yes | No Change |
| | Ensure adequate transit maintenance infrastructure to accommodate fleet demand | New | Deficient | Yes | New LOS that aligned with TDP and CIP to ensure adequate vehicle capacity for service expansion |
| | Study and develop two additional intermodal transit centers | New | Deficient | Yes | New LOS goal is aligned with the TDP to support service expansion |

| TCMA | New LOS Standard | Old LOS Standard | FY 19 Status | Funded | Notes |
|---|---|---|---|---|---|
| Overall | Increase fixed-route fleet by up to 15 vehicles to support new and expanded service | New | Deficient | Yes | New LOS goal is aligned with the TDP to support service expansion |
| | Procure up to 40 vehicles to support Community ~~Bus~~ Shuttle operations | Increase or maintain community ~~bus~~ shuttle routes. Varied by TCMA. | Deficient | Yes | Overall community ~~bus~~ shuttle capital equipment LOS to support overall operations, increase capacity, and reduce mechanical breakdowns |
| Northeast | 30 minute peak hour headways on 70% of bus routes | 30 minute headways on 90% of bus routes | Deficient | Yes | Updated LOS is aligned with TDP and CIP and based on peak headway |
| | Maintain and enhance Northeast Transit Center | Establish one of more neighborhood transit centers | Maintenance | Yes | Updated to reflect completion of the Northeast Transit Center |
| North Central | 30 minute peak hour headways on 70% of bus routes | 30 minute headways on 90% of bus routes | Deficient | Yes | Updated LOS is aligned with TDP and CIP and based on peak headway |
| Central | 30 minute peak hour service on 60% of bus routes | 30 minute headways on 80% of bus routes | Maintenance | Yes | Updated LOS is aligned with TDP and CIP and based on peak headway |
| | Maintain and enhance Lauderhill Transit Center and West Regional Terminal | New | Maintenance | Yes | New LOS to support capacity enhancements at Lauderhill Transit Center and West Regional Terminal. Aligned with TDP and CIP |
| TCMA | New LOS Standard | Old LOS Standard | FY 19 Status | Funded | Notes |

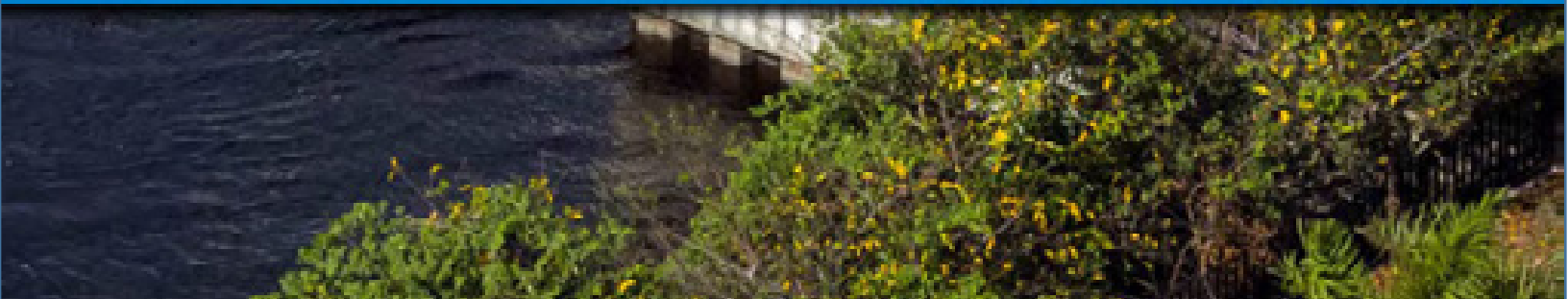
| | | | | | |
|---|---|---|---|---|---|
| Port/Airport | Maintain at least one fixed-route with direct service to FLL | New | Maintenance | Yes | New LOS is aligned with TDP and CIP and ensures direct service to FLL |
| | Continue studies to examine intermodal connections between Port Everglades, FLL, and Broward County Convention Center | Study options for the direct movement of freight and passengers between Port Everglades and FLL. | Maintenance | Yes | Updated LOS acknowledges existing studies that have taken place since the creation of the goal |
| Eastern Core | 30 minute peak hour headways on 60% of bus routes | 30 minute headways on 90% of bus routes and 20 minute headway on 40% of routes | Maintenance | Yes | Updated LOS is aligned with TDP and CIP and based on peak headway |
| | Maintain and enhance Broward Central Terminal | Establish and maintain service at one of more neighborhood transit centers | Maintenance | Yes | Updated LOS acknowledges Broward Central Terminal as the primary facility in this TCMA and would support facility modernization. Aligned with TDP/CIP |
| Sawgrass | 30 minute peak hour headways on 70% of bus routes | 20 minute headways on 80% of bus routes | Maintenance | Yes | Updated LOS is aligned with TDP and CIP and based on peak headway |
| | Maintain operations at BB&T Center Park and Ride Lot | Establish and maintain service at one of more neighborhood transit centers | Maintenance | Yes | Updated LOS acknowledges BB&T Center as the primary facility in this TCMA and would support facility modernization. Aligned with TDP/CIP |
| TCMA | New LOS Standard | Old LOS Standard | FY 19 Status | Funded | Notes |

| | | | | | |
|---|---|---|---|---|---|
| Southeast | 30 minute peak hour headways on 60% of bus routes | 30 minute headways on 80% of bus routes | Maintenance | Yes | Updated LOS is aligned with TDP and CIP and based on peak headway |
| | Enhance transfer facility at Young Circle | Establish and maintain service at one of more neighborhood transit centers | Deficient | Yes | Updated LOS acknowledges Young Circle as the primary facility in this TCMA and would support facility modernization and capacity enhancement. Aligned with TDP/CIP and US-1 Transit Study |
| South Central | 30 minute peak hour headways on 60% of bus routes | 30 minute headways on 80% of bus routes | Maintenance | Yes | Updated LOS is aligned with TDP and CIP and based on peak headway |
| | Implement new I-75 Express Bus service | New | Deficient | Yes | New LOS to require implementation of I-75 Express to reduce peak hour commute trips on the SIS |
| | Maintain operations at new park and ride lots | Establish and maintain service at one of more neighborhood transit centers | Maintenance | Yes | Updated LOS acknowledges that Miramar Transit Center and associated express eservice park and ride lots are primary facilities in this TCMA. Aligned with TDP/CIP |

Source: Planning and Development Management Division, 2018

BROWARD COUNTY
FLORIDA

# Water Management Element Support Document



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Aquifer - A stratum or formation of permeable material that will yield groundwater in useful quantities (U.S. EPA). Also defined as a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield useful quantities of ground water to wells, springs or surface water.

Average Daily Flow - Total flow for a one-year period averaged over a 365-day basis.

Best Management Practices - The most effective methods and devices to reduce or prevent non-point source pollution of groundwater or surface water.

Borrow Canal - In most cases the material for construction of a levee is obtained by excavation immediately adjacent to the levee. The excavation is termed a borrow. When the borrow paralleling the levee is continuous and allows for conveyance of water, it is referred to as a borrow canal. (SFWMD)

Canal - A trench, the bottom of which is normally covered by water, with the upper edges of its two sides normally above water. A channel, usually open, that conveys water by gravity (FAC 01-04, Bureau of Reclamation).

Channel - A trench, the bottom of which is normally covered entirely by water, with the upper edges of its sides normally below water.

Collection System - Piping that receives sewage from customers and delivers it to the transmission system. By definition, collection system piping is 12 inches in diameter and smaller.

Control Structures - Devices (e.g., culverts, spillways and weirs) placed in the canals to control water surface elevations (stage divide), amount of flow (stage divide or water supply structure), or direction of flow (divide structure) in the canals. In general, a stage divide controls water surface elevation upstream of the structure, and it controls water flow (or discharge) downstream of the structure. A divide structure is usually located at or near a basin boundary. It prevents water in one basin from entering the other basin. A water supply structure is also usually located near a basin boundary. It is used to pass water from one canal to another.

Culvert - A drain, ditch, or conduit, not incorporated in a closed system that carries drainage water under a driveway, roadway, railroad, pedestrian walk, or public way.

Design Storm - The most severe storm for which the canals and structures in the basin will accommodate that storm's runoff without flooding occurring in the basin.

Distribution System - Piping that receives water from the transmission system and delivers it to customers. By definition, distribution system piping is 12 inches in diameter and smaller.

Drainage Basin or Stormwater Basin - The subdivision of a watershed, further described as the area defined by topographic boundaries which contributes stormwater to a watershed, drainage system, estuarine waters, or oceanic waters, including all areas artificially added to the basin

Drainage Detention Structure - Structure which collects and temporarily stores stormwater for the purpose of treatment through physical, chemical, or biological processes with subsequent gradual release of the stormwater.

Drainage District - A local unit of government with the specific purpose of providing drainage within a limited boundary. Drainage districts may be classified as dependent or independent. A dependent drainage district is one where the membership of its governing body is identical to that of the governing body of a single county or municipality. An independent drainage district is one that is not dependent.

Drainage Ditch or Irrigation Ditch - A man-made trench dug for the purpose of draining water from the land or for transporting water for use on the land and is not built for navigational purposes.

Drainage Facilities - Structures designed to collect, convey, hold, divert, or discharge stormwater; includes stormwater sewers, canals, detention structures, and retention structures.

Drainage Retention Structure - Structure designed to collect and prevent the release of a given volume of stormwater by complete on-site storage.

Dredging - The excavation, by any means, in waters of the state. It is also the excavation (or creation) of a water body which is, or is to be, connected to any of the waters listed in Section 62-312.030(2), FAC., directly or via an excavated water body or series of excavated water bodies (Chapter 62-312, FAC.).

Filling - The deposition, by any means, of materials in the waters of the state.

Flood Control - Structural and non-structural measures designed to mitigate flood damage to developed areas.

Flood Plains or Floodprone Areas - Areas inundated during a 100-year flood event or areas identified by the National Flood Insurance Program as an A zone on Flood Insurance Rate Maps of Flood Hazard Boundary Maps.

High Recharge Areas or Prime Recharge Areas - Areas so designated by the South Florida Water Management District governing body.

Impound - Collecting and confining water as if in a reservoir.

Maximum Daily Flow - The total flow for the one highest flow day of the year averaged over a 24-hour basis.

Nanofiltration - A water treatment process utilizing membranes that retain solute molecules ranging from 100 to 1,000 molecular weight.

Natural Drainage Features - The naturally occurring features of an area which accommodate the flow of significant amounts of stormwater, such as streams, rivers, lakes, sloughs, floodplains and wetlands.

Natural Drainage Flow - The pattern of surface and stormwater drainage through or from a particular site before the construction or installation of improvements or prior to regrading.

Natural Groundwater Aquifer Recharge Areas or Natural Groundwater Recharge Areas or Groundwater Recharge Areas - Areas contributing to or providing volumes of water which contribute to the storage or regional flow of an aquifer.

Natural Systems - An ecological system supporting aquatic and wetland-dependent natural resources, including fish and aquatic and wetland-dependent wildlife habitat.

Navigable Waters - The waters of the United States, including territorial seas (Federal Water Pollution Control Act, U.S.C. 13627).

Peak Hour Flow - The total flow for the one highest flow hour of the year averaged over a 60-minute basis.

Percolation - Downward flow or filtering of water through pores or spaces in rock or soil (U.S. EPA).

Pumping Station - A building or structure containing the necessary equipment to pump a fluid to a higher level.

Recharge - The addition of water to the groundwater system by natural or artificial processes (U.S. EPA).

Runoff - That portion of rainfall not absorbed by soil, evaporated, or transpired by plants, which finds its way into canals or other surface waterbodies.

Seepage - The flow of water through the sides or bottom of a canal or levee caused by a hydraulic gradient.

Service Area - The combination of the geographic area currently served by a utility and the geographic area the utility intends provide service to potential customers.

Spillway - A passage for surplus water to run over or around an obstruction.

Standard Project Storm - A rain fall event yielding amounts of precipitation equivalent to the 100 year storm increased by 25%. (SFWMD)

Standard Project Flood - The stormwater runoff which occurs during the standard project storm. (SFWMD)

Stormwater - The flow of water which results from a rainfall event.

Stormwater Management System - A system which is designed and constructed or implemented to control discharges which are necessitated by rainfall events, incorporating methods to collect, convey, store, absorb, inhibit, treat, use, or reuse water to prevent or reduce flooding, over drainage, environmental degradation, and water pollution or otherwise affect the quantity and quality of discharges from the system. (Ch. 373.403(10), F.S. and Ch. 403.031(16), F.S.)

System Uses - The difference between the amounts of water pumped into the transmission/distribution system and the sum of all customer meters. System use includes differences in calibration of meters, water lost to leaky pipes, water used in construction and water used in maintenance of the transmission/ distribution system.

Tailwater - Water below a dam. (Webster's Collegiate Dictionary)

Transmission System - Piping that moves large volumes of water from one point in the potable water piping system. By definition, transmission system piping is larger than 12 inches in diameter. Usually customers are not permitted to connect directly to the transmission system.

Watershed - the land area which contributes to the flow of water into a receiving body of water.

Water Surface Elevations - The distance from the water's surface in a canal to some referenced elevation or "datum," typically, the National Geodetic Vertical Datum (NGVD). Water surface elevations may be measured in feet or stages.

Weir - A dam in a stream to raise the water level or divert its flow.

Wetlands - Those areas that are inundated or saturated 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 hydrophytic 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.

# LIST OF ABBREVIATIONS

| | |
|---|---|
| AADF | Annual Average Daily Flows |
| ACOE | Army Corps of Engineers |
| BCPHU | Broward County Public Health Unit |
| BCWWS | Broward County Water and Wastewater Services |
| BMSD | Broward Municipal Services District |
| cfs | Cubic feet per Second |
| CUP | Consumptive Use Permit (SFWMD) |
| EEPD | Environmental Engineering and Permitting Division (Broward County) |
| EPA | Environmental Protection Act or Environmental Protection Agency |

| | |
|---|---|
| EPCRD | Environmental Planning and Community Resilience Division (Broward County) |
| EPGMD | Environmental Planning and Growth Management Department (Broward County) |
| FAC | Florida Administrative Code |
| FDEP | Florida Department of Environmental Protection |
| FS, F.S. | Florida Statutes |
| gpcd | gallons per capita per day |
| GPM | Gallons per Minute |
| MFL | Minimum flows and levels |
| MGD, mgd | Million Gallons per Day |
| NGVD | National Geodetic Vertical Datum |
| NPDES | National Pollutant Discharge Elimination System (US EPA) |
| NRW | North Regional Wellfield |
| SFWMD | South Florida Water Management District |
| SAS | Surficial Aquifer System |
| US EPA | United States Environmental Protection Agency |
| WSFWP | Water Supply Facilities Work Plan |
| WTP | Water Treatment Plant |

BROWARD COUNTY COMPREHENSIVE PLAN

# Support Document

# Water Management

## INTRODUCTION

### A. General

The purpose of the Water Management Element (WME) is to assure that necessary public drainage and aquifer recharge facilities, potable water facilities, and sanitary sewer facilities and services correlate to future land use projections. The Water Management Support Document provides the data and analysis used as the basis for the Water Management goals, objectives and policies. **The data contained in this document was last updated in 2012 during the required update of the County's 10-Year Water Supply Facilities Work Plan (WSFWP) per Chapters 163 and 373, Florida Statutes.** This document is a compilation of three former individual support documents for the Potable Water, Sanitary Sewer and Drainage and Natural Aquifer Groundwater Recharge elements. The content has been rearranged under the major titles with subtitles by topic covering each former element.

### B. Service Area

The planning service area is the watershed serving Broward County. The regulatory service area is area within the boundaries of Broward County's four dependent drainage districts and the BMSD areas not within an independent drainage district, the regional wastewater system, regional raw water system, and the municipal water utility areas.

### C. Planning Horizon

The planning horizon for the BMSD areas is five years in accordance with the County's capital improvements plan. The long-term planning horizon for the Broward County

Operated Retail Utility and Broward County Operated Regional Raw Water Supply is to the year 2040. BCWWS decided to use the year 2040 planning horizon because: a) new population projections were available to the year 2040; b) decisions regarding source of supply and treatment processes might change when a longer term is considered; and c) given the 40 to 50-year service life of distribution/transmission system piping, sizing of those facilities should be based on long term flow projections. Long-term planning horizons are updated every 5-8 years with the update of the Region's and the County's Water Supply Plans.

# DATA REQUIREMENTS

## POTABLE WATER

### A. Broward County Operated Retail Utility

#### 1. Service Area and Customer Base

The Broward County Operated Retail Utility is one of the 28 utilities that provide potable water service within the urbanized area of the County. The Retail Utility was created on January 31, 1962 with the County's purchase of a small, investor-owned water and wastewater utility. Between 1962 and 1975 the County acquired a number of investor-owned systems. Under the County Code of Ordinances, the Broward County Board of County Commissioners exercises exclusive jurisdiction, control and supervision of the Utility system. The BCWWS is the County organizational unit directly responsible for the Retail Utility.

The Retail Utility supplies potable water to retail customers in several sections of the County and to one significant bulk water user. Over the past ten years, the Utility has grown from 51,044 customers to its present retail base of 56,503 (2012) customers, representing an estimated population of 179,000 (2012). The City of Coconut Creek, the bulk water user, has approximately 54,000 customers. Including the City of Coconut Creek, the Retail Utility serves about 13 percent of the County's total population. For the year 2012, treated water sold to retail customers equaled about 22.9 million gallons per day (MGD) on an annual average basis. Metered water sales to Coconut Creek equaled an additional 4.5 MGD. Notably, finished water production has decreased in recent

years. This may be attributable to a downturn in the economy during the planning period for the water supply plan, slowdown in population growth and the County's water conservation efforts, including year-round lawn irrigation restrictions. Water conservation became increasingly important following a series of droughts over the past several years.

The Retail Utility operates three service districts know as District 1, District 2, and District 3. These service districts are shown on Figure WM-1 below, and cover about 41 square miles. The three service districts are operated as independent entities, but are managed as a single entity. The District 1 service area contains all of Lauderdale Lakes and portions of the cities of Fort Lauderdale, Lauderhill, North Lauderdale, Oakland Park, Plantation, Pompano Beach, and Tamarac. The District 2 service area contains portions of the cities of Deerfield Beach, Lighthouse Point and Pompano Beach; and provides water to portions of the City of Coconut Creek as described below. The District 3 service area contains portions of the cities of Dania Beach, Davie, Fort Lauderdale, Miramar, West Park, Pembroke Park, Pembroke Pines and Hollywood; and provides water to the Fort Lauderdale-Hollywood International Airport. All three service districts also include BMSD areas.

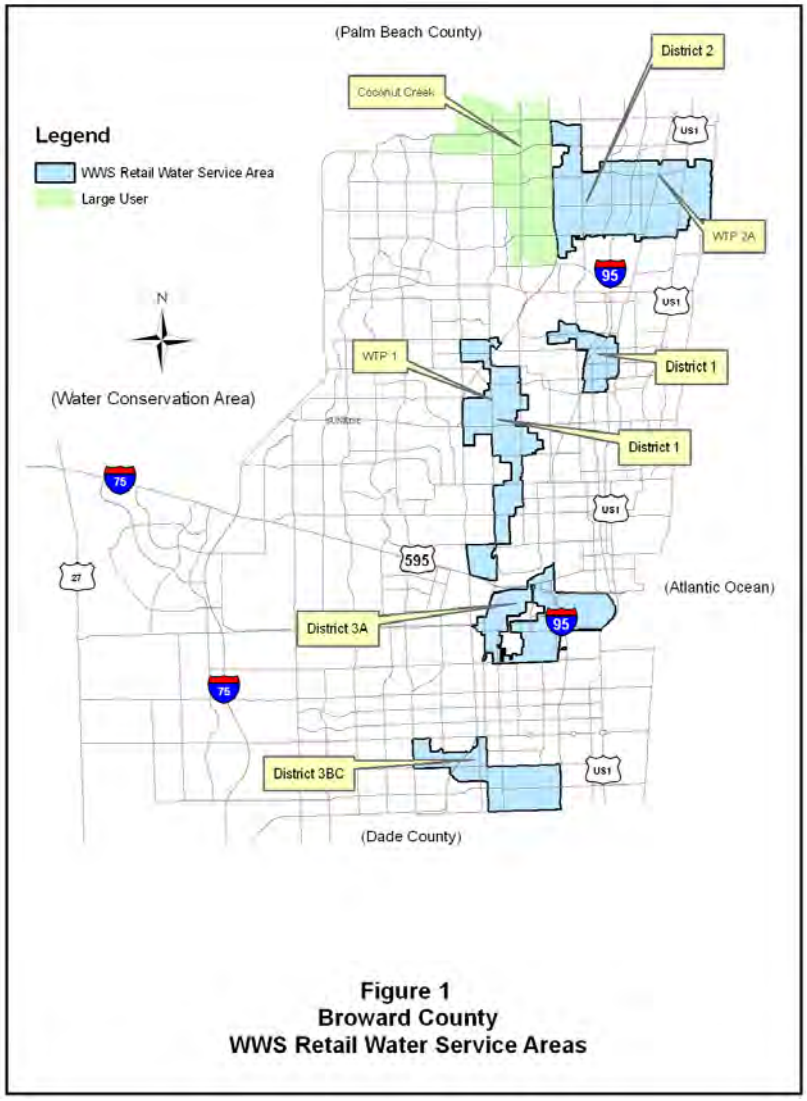



**Figure 1**
**Broward County**
**WWS Retail Water Service Areas**

Figure WM 1

The Retail Utility supplies water primarily to retail customers, but also provides water to the City of Coconut Creek under a resale agreement. Presently, there is no practical or economic incentive for the City to pursue development of its own treatment facilities. Without prior approval from the County, the City is prohibited from buying or otherwise providing water within its service area from any source other than the County.

## 2. Level of Service Standards

BCWWS has the responsibility to determine if it can adequately serve existing and potential customers. To that end, BCWWS has set potable water level of service standards as shown by Table WM-1.

Table WM-1
BCWWS Retail Potable Water Level of Service Standards

| Facility | Level of Service Standard |
|---|---|
| Raw Water Supply | Maximum Day Plus In-Plant Uses |
| Treatment Plant | Maximum Day |
| Finished Water Storage | 40% of Maximum Day demand to cover operational (10%) and emergency (30%) storage; plus fire protection storage of 630,000 gallons (3500 GPM for 3 hours) |
| Transmission/Distribution System | The most stringent of:<br>(1) Peak Hour at 45 psi residual pressure, or<br>(2) Maximum Day Plus Fire Flow at 25 psi residual pressure. |

BCWWS Land Development Standards contain the methodology currently used to determine if the level of service standard can be met. BCWWS changes the methodology administratively from time to time as new information becomes available.

## 3. Existing Raw Water Supply

Raw water for District 1 is supplied by the BCWWS District 1 Wellfield which draws raw water from the Surficial Aquifer System (SAS). Raw water is treated at the District 1 Water Treatment Plant (WTP) prior to distribution to retail customers. The wellfield is comprised of nine wells, all of which are currently in service. The total design capacity of the wellfield is approximately 23.5 MGD. The total firm

capacity of the wellfield is approximately 19.6 MGD, with the largest well out of service. Pursuant to the SFWMD Consumptive Use Permit (CUP), No. 06-00146-W issued in April 2008 for a 20 year permit duration, the maximum month and average annual daily withdrawals allowed from the District 1 SAS wellfield are 280 MG per Month (MGM) and 9.2 MGD, respectively. Two alternative water supply upper Floridan aquifer wells are under construction to provide raw brackish water for membrane treatment by 2020. The current SFWMD CUP allows for a maximum month withdrawal from the upper Floridan aquifer of 181 MGM with an associated average daily withdrawal of 4.7 MGD.

Raw water for District 2 is supplied by the BCWWS District 2 Wellfield, which draws raw water from the SAS, and the North Regional Wellfield (NRW) described in the Regional Raw Water Supply section below. Raw water is treated at the District 2 WTP prior to distribution to retail customers, and the City of Coconut Creek. The District 2 wellfield contains seven wells with a total design capacity of approximately 27.1 MGD. The total firm capacity of the wellfield is approximately 21.3 MGD, with the largest well out of service. Wells 1, 2, 3 and 5 have been plugged and abandoned. Pursuant to the SFWMD CUP No. 0601634-W for the combined District 2 and North Regional Wellfields, issued in March 2008 with a 20-year permit duration, a maximum monthly withdrawal of 585.2 MGD, and an average annual daily withdrawal of 17.5 MGD from the SAS. The District 2 CUP also allots for a Floridan aquifer allocation of 152.8 MGM on a maximum month and 4.6 MGD on an average daily basis. No alternative water supply Floridan aquifer raw water wells have yet been located or constructed at the District 2 location.

District 3 does not have raw water supply facilities. The County has entered into an agreement with the City of Hollywood whereby the City provides treated water to this district. See the "Existing Treatment Facilities" Section for more information.

## 4. Existing Treatment Facilities

Broward County operates two WTPs. The District 1 WTP was originally constructed in 1960 with a treatment capacity of 3.0 MGD and was expanded to 10.5 MGD in 1979. The plant was expanded again in 1994 to a capacity of 16.0 MGD. The facility's operating permit number is 06-58-00009. The plant uses up-

flow clarifiers and multimedia filtration to provide lime softening of the raw water supply. Per BCWWS' 2012 Annual Report, the plant is in very good condition and all equipment was operating in a satisfactory manner. The plant operates 24 hours a day and meets current water quality standards. The level of service standard for treatment plants is the maximum day. Per the 2014 Water Supply Facilities Work Plan, the projected year 2015 maximum day is 11.6 MGD or 71% of plant capacity.

The District 2 WTP was originally constructed in 1972 with a treatment capacity of 20.0 MGD and was expanded to a physical capacity of 40.0 MGD in 1994. The plant's permitted capacity is 30.0 MGD. The facility's operating permit number is 06-58-00010. The plant uses up-flow clarifiers and multimedia filtration to provide lime softening of the raw water supply. Per BCWWS' 2012 Annual Report, the plant is in good condition and all equipment was operating in a satisfactory manner. The plant operates 24 hours a day and meets current water quality standards. The level of service standard for treatment plants is the maximum day. Per the 2014 Year Water Supply Facilities Work Plan, the projected year 2015 maximum day is 17.3 MGD or 57% of permitted plant capacity and 61% of physical plant capacity.

District 3 does not have a treatment facility. The County has entered into an agreement with the City of Hollywood whereby the City provides treated water to this district. The City is responsible for ensuring adequate raw water supply and treatment facilities. The City's existing CUP (Permit No. 06-00038-W) was issued by SFWMD on April 9, 2008 and expires April 9, 2028. The permit contains sufficient allocation to meet demands through the year 2028. BCWWS coordinated closely with the City during its CUP renewal process to ensure that future demands for District 3 were adequately addressed. The 2014 Water Supply Facilities Work Plan (WSFWP) projected a year 2015 maximum day of 9.57MGD for District 3.

## 5. Existing Treated Water Storage Facilities

District 1 has water storage facilities at the treatment plant site and four at remote locations. Including the 1.0 million gallons (MG) of clearwell storage that can be pumped directly to the distribution system, total District 1 storage equals 7.1 MG. All but one of the storage facilities are ground storage tanks, meaning the

storage facilities use pumps to feed the distribution system. The level of service standard for storage is 40% of the maximum day demand to cover operational and emergency storage; plus fire protection storage of 630,000 gallons (3,500 GPM for 3 hours). Based on the projected year 2015 maximum day demand of 11.4 MGD; required storage equals 5.2 MG, or 73% of available storage.

District 2 has three above ground concrete storage facilities and two underground clearwells at the treatment plant site providing a total of 8.5 MG of storage. The level of service standard for storage is 40% of the maximum day demand to cover operational and emergency storage; plus fire protection storage of 630,000 gallons (3,500 GPM for 3 hours). Based on the projected year 2015 maximum day demand of 8.5 MGD (for BCWWS District 2 only, Coconut Creek is obligated to provide its own storage); required storage equals 4.0 MG, or 47% of available storage.

District 3A has treated water storage facility equaling 2.0 MG. The level of service standard for storage is 40% of the maximum day demand to cover operational and emergency storage; plus fire protection storage of 630,000 gallons (3500 GPM for 3 hours). Based on the projected year 2015 maximum day demand of 4.43 MGD; required storage equals 2.4 MG, or 120% of available storage. BCWWS CIP Project 9058 will provide a 2.5 MG concrete potable water storage facility.

District 3BC has two treated water storage facility equaling 4.0 MG. The level of service standard for storage is 40% of the maximum day demand to cover operational and emergency storage; plus fire protection storage of 630,000 gallons (3500 GPM for 3 hours). Based on the projected year 2015 maximum day demand of 4.95 MGD; required storage equals 2.6 MG, or 65% of available storage.

## 6. Existing Transmission/Distribution System

The District 1 transmission and distribution system contains approximately 246 miles of pipe. The capacity of the system to handle existing and projected demands was determined by BCWWS using water distribution system hydraulic modeling. To correct identified deficiencies, BCWWS implemented a major water system rebuilding effort in District 1, which included rebuilding substantial

portions of the water and wastewater systems and providing wastewater service to those on septic tanks. The projects were anticipated to be completed by the year 2011 at an estimated cost of $320 million. BCWWS maintains water system interconnections with the systems of the Cities of Fort Lauderdale, Tamarac, Plantation and Lauderhill. These interconnects are used for emergency purposes.

The District 2 transmission and distribution system contains approximately 247 miles of pipe. The capacity of the system to handle existing and projected demands was determined by BCWWS using water distribution system hydraulic modeling. To correct identified deficiencies, BCWWS is implemented a major water system rebuilding effort in District 2, which included rebuilding substantial portions of the water and wastewater systems and providing wastewater service to those on septic tanks. The projects were anticipated to be completed by the year 2012 at an estimated cost of $167 million. BCWWS maintains water system interconnections with the systems of the Cities of Pompano Beach and Deerfield Beach; the Town of Hillsboro Beach and Palm Beach County. These interconnects are used for emergency purposes.

The District 3A transmission and distribution system contains approximately 94 miles of pipe. The capacity of the system to handle existing and projected demands was determined by BCWWS using water distribution system hydraulic modeling. To correct identified deficiencies, BCWWS is implemented a major water system rebuilding effort in District 3A, which included rebuilding substantial portions of the water and wastewater systems and providing wastewater service to those on septic tanks. The projects were anticipated to be completed by the year 2013 at an estimated cost of $50 million. BCWWS maintains water system interconnections with the systems of the Cities of Fort Lauderdale, Hollywood and Dania Beach. These interconnects are used for emergency purposes.

The District 3BC transmission and distribution system contains approximately 118 miles of pipe. The capacity of the system to handle existing and projected demands was determined by BCWWS using water distribution system hydraulic modeling. The District 3BC Service area is provided treated water for distribution by the City of Hollywood. BCWWS maintains water system interconnections with

the systems of the Cities of Hollywood and Miramar. These interconnects are used for emergency purposes.

All transmission system/distribution system facilities have been inventoried using Geographical Information System (GIS) software. The data is updated on a continuous basis and posted to the BCWWS network for use once or twice a month.

## 7. Regulatory Requirements

Broward County, like any potable water utility, falls under the regulation of multiple authorities. The Safe Drinking Water Act ("SDWA", 1974) and the Safe Drinking Water Act Amendments ("SDWAA", 1986) authorized the United States EPA to establish national primary and secondary drinking water regulations to regulate maximum permissible levels of contaminants in finished drinking water. These standards were incorporated into the State of Florida Water Quality Regulations in 1993.

This section discusses three of the most significant authorities, the Broward County Public Health Unit (BCPHU), Broward County EPGMD and the Florida Department of Environmental Protection (FDEP). The discussion of SFWMD under the Broward County Operated Regional Raw Water Supply Section also applies to Broward County Operated Retail Utility raw water supply.

FDEP has given to the BCPHU general supervision and control over all public and private water systems in Broward County. The BCPHU regulates WTPs, treated water storage tanks, the transmission and distribution system and wellfields. The BCPHU utilizes standards developed by the FDEP as well as other reference material such as the "Recommended Standards for Water Works"; also known as "Ten States Standards". In addition, the BCPHU monitors water quality.

In 1984, Broward County adopted a Wellfield Protection Ordinance (Ordinance Number 84-60), which was revised in 1993 (Ordinance Number 93-17). The Wellfield Protection Ordinance is administered by EPGMD and establishes criteria for the regulation of storage, handling, use or production of hazardous or toxic substances within the zone of influence of a water supply well to protect existing and identified future supply well locations from potential contamination.

### 8. Conservation

Potable water conservation is addressed in the Conservation element.

### 9. Overview of Financial Operations

All three operating Districts are managed financially as one utility; with one set of rates, fees and charges. Operating and general maintenance costs are recovered through service charges, connection charges, and miscellaneous fees and charges. Capital costs for system development, large maintenance project and renewal and replacement projects are funded through net revenues, bond proceeds, developer contributions, contributions from other municipalities and capital recovery charges.

User charges and fees are established by BCWWS and approved by the Board of County Commissioners (Board). The Board has specific legal authority to fix charges and collect rates, fees and charges from its customers and to acquire, construct, finance and operate the Utility.

## B. Broward County Operated Regional Raw Water Supply

### 1. Service Area and Customer Base

The Broward County Operated Regional Water Supply consists of two independently operated systems; known as the "North System" and "South System"; that are managed as a single entity.

The concept of "service area" does not apply to the regional water supply. Many of its customers use regional raw water to supplement their own raw water supplies.

The North Regional Wellfield (NRW) System has two customers, the City of Deerfield Beach and Broward County Retail District 2. The South Regional Wellfield (SRW) System has four customers, the City of Dania Beach, the City of Hallandale, the City of Hollywood and the Florida Power and Light Corporation. The contractual agreements with each customer are substantially similar and run for an indefinite period of time. The exception is the City of Hollywood agreement that has a four-year term with an automatic renewal for four years unless otherwise terminated.

## 2. Level of Service Standard

The level of service standard for the regional water supply is the obligations of the County as described in the contractual agreements with its customers and is limited by the Regional Water Availability Rule "Base Condition Use" for each regional wellfield.

## 3. Existing Raw Water Supply

The NRW is located in Quiet Waters Park and along Hillsboro Boulevard, just west of Powerline Road. The NRW is comprised of ten wells, each with a capacity of 2 MGD, providing a total design capacity for the wellfield of 20.2 MGD, with a firm capacity of 18.1 MGD with the largest well out of service. The NRW is operated in concert with the District 2 Wellfield to supply water to its customers. The SFWMD CUP (Permit No. 06-01634-W) provides a combined allocation for both the NRW and District 2 wellfield as stated under the corresponding section above. The County's CUP for District 2 was re-issued in April 2008 with a 20-year permit duration. Pursuant to the CUP staff report, the withdrawal allowance for the NRW is 7.4 MGD average annual daily and 271 MGM on a maximum month based on the results of groundwater modeling.

The South Regional Well (SRW) System is located in the southern central portion of the County. The majority of the wells are located in Brian Piccolo Park to the east of Palm Avenue and north of Sheridan Street. The SRW includes eight, 4 MGD wells that are currently in operation providing a total design capacity for the wellfield of approximately 32.3 MGD and 28.2 MGD with the largest well out of service. The CUP (Permit No. 06-01474-W) was due for renewal in 2007 and, due to the need to determine Large User requirements, is still in the process of being renewed. Pursuant to the Regional Water Availability Rule adopted by the SFWMD in February 2007, the "base use condition" for the SRW is 11.84 MGD average daily withdrawal. The existing CUP allows for an average day withdrawal of 14.2 MGD and a maximum monthly withdrawal of 672.0 MGM. The County is currently working with the SFWMD to resolve large user water demands.

## 4. Existing Treatment Facilities

Treatment of the raw water to render it in compliance with water quality standards is the responsibility of the entity receiving the raw water.

## 5. Existing Transmission/Distribution System

The NRW raw water transmission system consists of about 5 miles of pipeline ranging in size from 12 inches to 48 inches in diameter.

The SRW raw water transmission system consists of about 15 miles of pipeline ranging in size from 20 inches to 42 inches in diameter.

## 6. Regulatory Requirements

BCWWS is a potable water utility that falls under the regulation of multiple authorities. The FDEP, BCPHU and EPGMD facility regulation was briefly described above. The NRW and SRW are protected by the Wellhead Protection ordinance.

The SAS which contains the Biscayne aquifer is one of the most productive aquifers in the world and is the primary source of fresh water to residents of Broward County, Miami-Dade County, and southeastern Palm Beach County. In 1979 it was designated a sole source aquifer by U.S. Environmental Protection Agency (EPA), under the Safe Drinking Water Act (1974). The SFWMD is the state agency responsible for water supply planning in the LEC Planning Area, which includes all of Broward County. Withdrawals (both volume and rate) from the SAS are managed by the SFWMD through the issuance of CUPs for irrigation, industrial processes, agriculture, diversion and impoundment, dewatering and public water supply. In order to secure and maintain a CUP, applicants must meet the criteria of the "three-prong test". This test requires that the proposed water use is: 1) a reasonable and beneficial use of the resource; 2) will not interfere with any existing legal use of water and 3) is consistent with public interest, including compliance with the minimum flows and levels (MFLs) established for surface water and groundwater sources (Chapter 373, FS).

The MFLs outlined in the Florida State Statutes are defined as the "limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042(1), FS). They serve to protect the SAS from saltwater intrusion, ensure adequate groundwater levels for maintenance of natural systems, and prevent excessive groundwater seepage or surface water flows out of the regional water system (Everglades) as required under Chapter 40E-8, FAC.

The SFWMD's adoption of the Regional Water Availability Rule in February, 2007 set in place a "base condition water use" that limits the withdrawals for public water supply to those allocations of water that were permitted as of April 1, 2006. The Water Availability Rule is a subset of Chapter 40E-8, FAC. the MFL rule. According to the rule, additional water supply demands over and above the base condition water use will come from alternative water supplies or other demand offset mechanism.

CUPs are typically issued for five to twenty-year durations with updates to projected water demands every 10 years for the longer duration permits. Broward County takes an integrated approach to raw water supply, drainage and aquifer recharge working closely with the SFWMD and County municipalities to coordinate water use. See the Drainage and Natural Aquifer Groundwater Recharge element for more information.

### 7. Conservation

Water conservation is addressed in the Conservation Element.

### 8. Overview of Financial Operations

The wellfields were constructed using general County revenues and the assets were contributed to the Utility. Service is provided pursuant to individual, contractual agreements between the County and each large user. The agreements provide for a method to set fees, rates and charges, bill for use of the system, collect for improvements, repairs and replacements and adjust charges at year end to reflect the actual number of gallons used and actual operation and maintenance expense.

## C. City of Fort Lauderdale

### 1. Service Area and Customer Base

The municipal utility owned and operated by the City of Fort Lauderdale is the single largest purveyor of potable water in Broward County, in terms of total water delivery, providing service to approximately 250,000 Broward County customers in 2013. This includes approximately 6,127 retail customers residing in the Roosevelt Gardens, Franklin Park, Washington Park, and Boulevard Gardens

communities of BMSD. The utility's service area encompasses a total area of 43 square miles, approximately one-tenth the total area of urban Broward County. Other retail customers include residential, commercial, and industrial properties within the City of Fort Lauderdale, Lazy Lake, and a portion of Lauderdale-by-the-Sea. The utility also maintains wholesale agreements for potable water supply with the Cities of Oakland Park, Wilton Manors, Tamarac (east of 34th Avenue), the Town of Davie and Port Everglades. Emergency potable water interconnections are maintained with the Cities of Dania Beach, Pompano Beach, and Plantation, and BCWWS service area.

## 2. Level of Service Standard

Fort Lauderdale has adopted their level of service for potable finished water at 197 gallons per capita per day (gpcd). In 2013, the average demand throughout their service area was 206 gpcd.

## 3. Existing Raw Water Supply

Raw water for the City of Fort Lauderdale is supplied by the Peele-Dixie and Prospect wellfields, which draw from the SAS. The raw water is treated at two lime softening water treatment facilities, the Peele-Dixie and the Fiveash WTPs. There is a total of 29 active wells between the two well fields and 18 wells in operation at a given time. The Peele-Dixie and Prospect Wellfields have a combined pumping capacity of approximately 107 MGD. Wholesale customers receive finished water from the Fiveash WTP.

The City of Fort Lauderdale's CUP (Permit No. 06-00123-W) issued on September 11, 2008 for 20 years allows the City to pump a combined average daily allocation for the two wellfields of 50.6 MGD, and a maximum daily allocation of 67.3 MGD. In 2013, the combined pumpage from the Peele-Dixie and Prospect Wellfields averaged 46.76 MGD (3.8 MGD below the permitted allocation).

## 4. Existing Treatment Facilities

In 1926, the 6 MGD capacity Peele-Dixie lime softening WTP was opened in western Fort Lauderdale. The lime softening plant was converted to a state-of-the-art nanofiltration membrane facility in 2008 which has a treatment capacity of

12 MGD (Table WM-2). Built in 1954, the Fiveash lime softening WTP was designed to treat 8 MGD. Through a series of expansions, the plant has been able to keep pace with the rapid growth experienced in Fort Lauderdale and today has a capacity of 70 MGD (Table WM-2). The Fiveash WTP is supplied raw groundwater for treatment from the Prospect wellfield.

Although the Peele-Dixie and Fiveash WTPs have a combined design capacity of 82.0 MGD, hydraulic constraints at the Fiveash WTP are suspected to limit its operating capacity to between 55.0 and 60.0 MGD.

## 5. Existing Treated Water Storage Facilities

The Peele-Dixie WTP storage facilities include a 2.3 MG. Two additional 4.0 MG ground storage tanks will be available when the new facility begins operation. The Fiveash WTP has onsite storage of 21.8 MG, provided by two 5.0 MG tanks, one 4.0 MG tank, one 7.0 MG tank, and seven clearwells totaling 0.8 MG. The City also has two distribution system storage sites providing an additional 3.0 MG of storage.

Table WM-2
Summary of Statistics for the City of Fort Lauderdale WTPs

| Water Treatment Plant (WTP) | Treatment Type | Treatment Capacity (MGD) | Storage Capacity (MG) | Source Water |
|---|---|---|---|---|
| Peele-Dixie | Nanofiltration Membrane | 12.0 | 10.3[1] | Peele-Dixie Wellfield |
| Fiveash | Lime Softening | 70.0 | 21.8 | Prospect Wellfield |

[1] Includes 8.0 MG for Peele-Dixie scheduled to come on-line in mid-2008.

## 6. Existing Transmission/Distribution System

The City of Fort Lauderdale's transmission and distribution system contains approximately 750 miles of pipe. Ongoing infrastructure improvements under the current Waterworks 2011 program are anticipated to significantly improve water delivery flows and system pressures in many areas served by the City. The City most recently updated their Water and Wastewater Master Plan in 2006. The Master Plan is updated every five years. The City of Fort Lauderdale

maintains a total of 10 water system interconnections with BCWWS District 1 (3 connections), the Cities of Plantation (1 connection), Dania Beach (1 connection), Tamarac (3 connections), Pompano Beach (1 connection) and Town of Davie (1 connection).

#### 7. Conservation

The City of Fort Lauderdale has an active water conservation program. The policies and practices of the City of Fort Lauderdale's conservation program are discussed in the Broward County 2014 Water Supply Facilities Work Plan (WSFWP) (Appendix B). The WSFWP will be updated in 2021.

## SANITARY SEWER

### A. Broward County Operated Retail Utility

#### 1. Service Area and Customer Base

The Broward County Operated Retail Utility is one of the many utilities that provide sanitary sewer service within the urbanized area of the County. The Retail Utility was created on January 31, 1962 with the County's purchase of a small, investor-owned water and wastewater utility. Between 1962 and 1975 the County acquired a number of investor-owned systems. Under the County Code of Ordinances, the Board exercises exclusive jurisdiction, control and supervision of the Utility system. The BCWWS is the County organizational unit directly responsible for the Retail Utility.

The retail wastewater system provides wastewater collection service to approximately 77 percent of the County's retail water customers and sewer only customers. The County's wastewater retail customer base has grown from 35,704 customers (connections) in 2003 to its present base of 47,799 customers in the past ten years and will continue to grow through the County's extension of sanitary sewers into currently unsewered areas. Additional Retail Wastewater System Information is shown in Table WM-3. Collection, treatment and effluent disposal management is provided by the County-operated NRW System and by the SRW System operated by the City of Hollywood.

Table WM-3
Summary of Retail Water System and Retail Wastewater System

| SYSTEM COMPONENTS | UNITS | FISCAL YEAR 2003 | FISCAL YEAR 2012 | CHANGE | PERCENT CHANGE |
|---|---|---|---|---|---|
| Customer Base | Customers | 35,704 | 47,799 | 11,207 | 31.39% |
| Wastewater Service Area | Square miles | 39.70 | 40.70 | 1.00 | 2.52% |

Source: Broward County Water and Wastewater Services

The Retail Utility operates three (3) non-contiguous service districts – District 1, District 2, District 3 – which collectively cover 41 square miles, shown on Figure WM-2. The districts are operated as independent entities but managed as a single entity. District 1 service area contains portions of the cities of Fort Lauderdale, Lauderdale Lakes, Lauderhill, North Lauderdale, Oakland Park, Plantation, Pompano Beach, and Tamarac. District 2 service area contains portions of the cities of Deerfield Beach, Lighthouse Point and Pompano Beach. District 3 service area contains portions of the cities of Dania Beach, Davie, Fort Lauderdale, Miramar, Pembroke Park, West Park, Pembroke Pines, and Hollywood; and provides sanitary sewer service to part of the Fort Lauderdale-Hollywood International Airport. All three service districts also include BMSD areas.

The sanitary sewer service area is different than the potable water service area for all Districts.

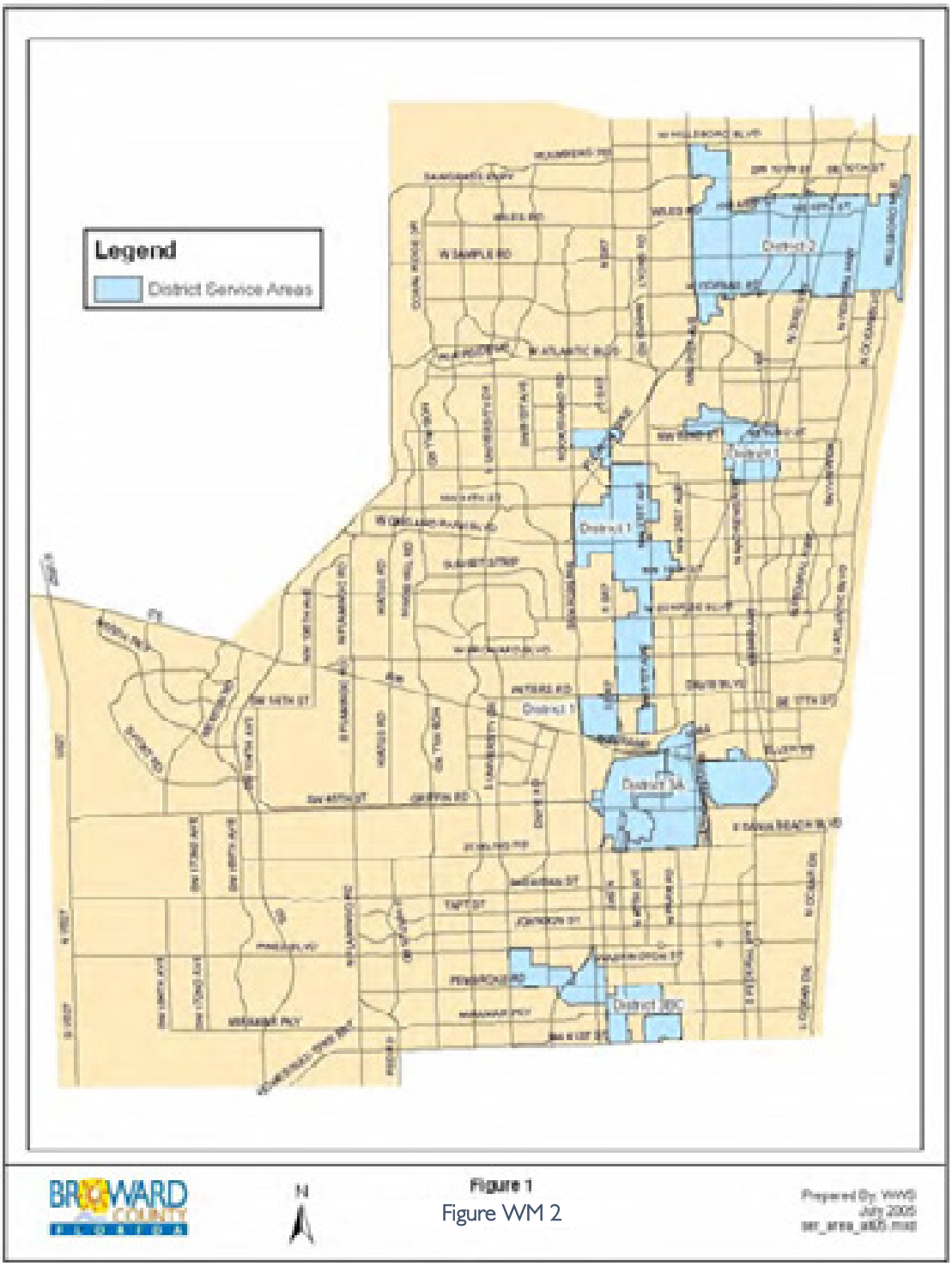



Figure 1
Figure WM 2

## 2. Level of Service (LOS) Standard

BCWWS has the responsibility to determine if it can adequately serve existing and potential customers. BCWWS has set sanitary sewer LOS standards as shown by Table WM-4.

Table WM-4
BCWWS Facility LOS Standards

| FACILITY | LEVEL OF SERVICE STANDARD |
|---|---|
| Treatment Plant and Effluent Disposal | Average Day |
| Collection/Transmission System | Peak |

BCWWS Land Development Standards contain the methodology currently used to determine if the LOS standard can be met. BCWWS changes the methodology administratively from time to time as new information becomes available.

## 3. Existing Treatment and Effluent Disposal Facilities

Sewage treatment and effluent disposal for Districts 1 and 2 is via the Broward County Operated Regional Wastewater System. See that portion of this document for more information.

Sewage treatment and effluent disposal for District 3 is via agreement with the City of Hollywood. The agreement acknowledges the City's affirmative, continuing obligation to provide wastewater services for District 3.

## 4. Existing Transmission/Collection System

The District 1 transmission and collection system contains approximately 180.4 miles of gravity sewer pipe, 41.6 miles of force main pipe and 74 lift stations. District 1 connects to the Broward County Operated Regional Wastewater System at six locations. The capacity of the system to handle existing and projected demands was determined by BCWWS using hydraulic modeling. To correct identified deficiencies, BCWWS is implementing a major rebuilding

effort in District 1, which includes rebuilding substantial portions of the water and wastewater systems and providing wastewater service to those on septic tanks.

The District 2 transmission and collection system contains approximately 158 miles of gravity sewer pipe, 34 miles of force main pipe and 95 lift stations. District 2 connects to the Broward County Operated North Regional Wastewater System at two locations. The capacity of the system to handle existing and projected demands was determined by BCWWS using hydraulic modeling. To correct identified deficiencies, BCWWS is implementing a major rebuilding effort in District 2, which includes rebuilding substantial portions of the water and wastewater systems and providing wastewater service to those on septic tanks.

The District 3 transmission and collection system contains approximately 82 miles of gravity sewer pipe, 34 miles of force main pipe and 60 lift stations. District 3A and District 3BC each connect to the City of Hollywood at one location. The capacity of the system to handle existing and projected demands will be determined by BCWWS using hydraulic modeling: Once identified, BCWWS will implement an effort to correct deficiencies.

All transmission system/collection system facilities have been inventoried using Geographical Information System (GIS) software. The data is updated on a continuous basis and posted to the BCWWS network for use once or twice a month. In addition, paper maps of the entire transmission/ distribution system are produced twice a year from the GIS database.

## 5. Regulatory Requirements

Broward County, like any sanitary sewer utility, falls under the regulation of multiple authorities. These include the United States Environmental Protection Agency (USEPA), the Florida Department of Environmental Protection (FDEP), the Broward County EPGMD and the Broward County Public Health Unit (BCPHU).

The BCPHU has regulatory responsibility for issuing septic tank permits under Chapter 10D-6 of the Florida Administrative Code and Broward County Ordinance 78-50.

Connecting new sanitary sewers to the BCWWS collection system is the regulatory responsibility of EPGMD. This includes verifying that the treatment facility has adequate capacity.

Capacity, Management, Operation and Maintenance (CMOM) will be a federally mandated program that when implemented will have significant effect on all Utilities throughout the United States. CMOM is intended to eliminate or drastically reduce Sanitary Sewer Overflows (SSO). When CMOM is implemented into law, utilities will be required develop and follow very detailed Operating Standard Operating Procedures (SOP's), Maintenance SOP's, Design Standards, Modeling Requirements, Emergency Response Planning/SOP's and other additional standards throughout the utility. Utility plans will be submitted for authorization and assessment will constantly be monitored.

### 6. Overview of Financial Operations

All four operating Districts are managed financially as one utility; with one set of rates, fees and charges. Operating and general maintenance costs are recovered through service charges, connection charges, and miscellaneous fees and charges. Capital costs for system development, large maintenance project and renewal and replacement projects are funded through net revenues, bond proceeds, developer contributions, contributions from other municipalities and capital recovery charges.

User charges and fees are established by BCWWS and approved by the Board. The Board has specific legal authority to fix charges and collect rates, fees and charges from its customers and to acquire, construct, finance and operate the Utility.

## B. Broward County Operated Regional Wastewater System

### 1. Service Area and Customer Base

The concept of "service area" does not apply to the Regional Wastewater System. The Regional Wastewater System has 12 customers, termed "Large Users". Large Users include the Cities of Coconut Creek, Coral Springs, Deerfield Beach, Lauderhill, North Lauderdale, Oakland Park, Parkland, Pompano Beach and Tamarac, the North Springs Improvement District, Royal Utilities (a private

utility), and the Broward County Operated Retail Utility (Districts 1 and 2) Altogether, the Large Users account for service to about 40% of the County's population.

Service is provided pursuant to individual contractual agreements between the County and each Large User. Generally, the agreements specify the large user's reserve capacity in the plant and provisions for billing and payment of service. All Large Users, except Oakland Park, are required to deliver all wastewater flows collected by it to the Regional Wastewater System. Oakland Park sends a portion of their flow to the Fort Lauderdale wastewater treatment facility.

## 2. Level of Service (LOS) Standard

The LOS standard for the regional wastewater system is the obligation of the County as described in the contractual agreements with its customers. The Agreements specify that the Regional Wastewater System will treat and dispose of all wastewater delivered to it. Large Users are responsible for maintaining their individual systems and to deliver wastewater to the Regional Wastewater System at the required elevation or pressure. They are responsible for the prevention of excessive peak flow rates. Large Users must submit annual updates of flow estimates. The County is required to use these estimates to plan future treatment capacity. System annual average flows and reserve capacities are shown in Table WM-5.

The County's obligation to provide service is limited to the capacities reserved by the Larger Users, which may be changed by amendment to the Agreement. The Agreement allows a Large User to lease or sell excess capacity to another Large User, subject to County approval. The agreements provide that the County will extend and expand the Regional Wastewater System to provide for the Large User's scheduled flow.

## Table WM-5
## Regional Wastewater System Annual Flow and Reserve Capacity (as of Sept. 2012)

| Customer | Annual Average Flow (MGD)[2] | Reserve Capacity (MGD)[2] |
|---|---|---|
| WWS Districts 1 & 2 | 14.01 | 16.71 |
| Coconut Creek | 4.48 | 6.04 |
| Coral Springs | 7.90 | 9.79 |
| Deerfield Beach | 6.67 | 7.00 |
| Lauderhill | 5.77 | 7.10 |
| North Lauderdale | 3.54 | 3.80 |
| North Springs | 2.33 | 3.53 |
| Oakland Park | 1.13 | 1.52 |
| Parkland | 0.25 | 0.31 |
| Pompano Beach | 16.12 | 15.71 |
| Royal Utilities | 0.24 | 0.45 |
| Tamarac | 7.39 | 8.04 |
| Not Allocated | ---- | 4.00 |

Notes for Table WM-5:

[1] All of Pompano Beach and portions of Coconut Creek do not use the North Regional Wastewater System transmission facilities.

[2] All values rounded to the nearest hundredth of an MGD. The County (BCWWS) does not have a contract with itself; therefore, there is no contractual reserve capacity for BCWWS.

### 3. Existing Treatment and Effluent

The North Regional Wastewater Treatment Plant (NRWWTP) is located at 2555 West Copans Road, Pompano Beach. The facility was originally constructed in 1974 with a treatment capacity of 20 MGD. The plant has since been expanded to its current permitted capacity of 95 MGD ADF. The facility's operating permit number with FDEP is FL0031771. The NRWWTP utilizes an activated sludge treatment process for liquid treatment and an anaerobic digestion system for handling the sludge produced from the liquid treatment process. About 75% of the 80,000 tons of biosolids (sludge) generated annually by the treatment process are recycled via landspreading; the remainder is landfilled.

Effluent from the liquid treatment process is chlorinated and either pumped through about 6 miles of 54-inch diameter outfall piping into the Atlantic Ocean, disposed of in on-site deep injection wells, or filtered via the County's 10 MGD reclaimed water system. Permitted effluent disposal capacity is 95 MGD ADF.

The County's effluent management program includes a 10 MGD system provides highly treated water for industrial and landscape irrigation purposes. Currently reclaimed water is used for irrigation, industrial process water at the North Resource Recovery Plant (a solid waste incinerator), and at the NRWWTP. Due to state law, the County will be required to reduce discharges to the ocean outfall and increase utilization of reclaimed water by 2025. The County and nearby municipalities have been actively pursuing state and local funding for further development of the reclaimed water system.

## 4. Existing Transmission System

The regional wastewater transmission system consists of about 66 miles of force main pipeline ranging in size from 12 inches to 54 inches in diameter and 11 master pump stations.

## 5. Regulatory Requirements

Operation of the Regional Wastewater System is regulated by the USEPA, FDEP, and EPGMD. Regulatory requirements are focused on effluent management, sludge disposal, reclaimed water and an industrial pretreatment program. Broward County submitted an application to FDEP on August 2, 2007 for the renewal of the National Pollutant Discharge Elimination System (NPDES)/ Facility permit for the Regional Wastewater System. The new Regional Wastewater System permit was issued on January 25, 2013 and became fully enforceable in March 2013.

The FDEP continues to promote a reduction of nutrients in the face of opposition to ocean discharges from interested groups, but they have worked with the wastewater utilities with ocean outfalls (including Broward County) to reduce the economic impact of the Leah Schad Memorial Ocean Outfall Program, which became the law effective July 1, 2008. Subsequent legislation

has been proposed each year to amend the law. In 2013, the Florida Legislation passed the following changes to the current law:

- Allows peak flow backup discharges not exceeding 5% of the facility's cumulative baseline flow, measured on a 5-year rolling average and requires that such discharges meet the FDEP's applicable secondary waste treatment and water-quality-based effluent limitations.
- Requires the detailed plan that an outfall utility must submit to FDEP to identify technically, environmentally and economically feasible reuse options, and to include an analysis of the costs associated with meeting state and local water quality requirements, and comparative costs for reuse using outfall flows and other domestic wastewater flows.
- Requires the detailed plan to evaluate reuse demand in context with several factors considered in the South Florida Water Management District's (SFWMD) Lower East Coast Regional Water Supply Plan.
- Requires FDEP, SFWMD and the outfall utilities to consider the above information for the purpose of adjusting, as needed, the reuse requirements, and requires FDEP to report to the Legislature any changes that may be necessary in the reuse requirements by February 15, 2015.

In order to meet the advanced wastewater treatment requirements of the rule, the County has implemented cumulative nutrient reduction strategies including modifying the existing treatment process to augment biological nutrient removal and reducing outfall discharges via diversion to the existing deep injection well system.

As noted, the effluent management system also includes Class I injection wells. The Operation Permit 0051336-502-UO for Injection Wells 1 through 6 was issued on July 2, 2010 and is valid for five (5) years. This permit requires the installation of a new monitoring well (number 5) to replace monitoring well number 4. Work began in January 2012 for monitoring well 5 and was completed in early September 2012.

In August 2010, revisions to the state regulations governing the treatment and disposal of biosolids, Chapter 62-640 F.A.C., went into effect. The Regional

Wastewater System became subject to the new regulations upon renewal of the facility's operating permit in January, 2013. New land application sites were permitted under these new regulations. The County has secured alternate disposal capacity at a nearby Class I landfill and continues to investigate cost-effective long-term biosolids management alternatives. Disposal at the landfill meets all current federal, state and local regulations and since the landfill cogenerates electricity from its methane gas production, this disposal option is currently the most carbon neutral.

In fiscal year 2012, the Regional Wastewater System had no violations. The System was in full compliance with effluent quality standards.

### 6. Overview of Financial Operations

Large User agreements extend for a term that is one year past the last payment of any debt obligation applicable to the Regional Wastewater System. Each agreement designates a Large User's reserve capacity and provides a method to charge each Large User for the availability and provision of service. On a monthly basis, each user is billed a fixed charge depending upon the user's reserve capacity. This fixed charge is designed to recover each large user's equitable share of debt service. Operation and maintenance costs are also billed on a monthly basis, and are based on the Large User's pro rata usage of the Regional Wastewater System. Changes to the rates, fees and charges must be approved by the Board of County Commissioners at a public hearing.

## C. Broward Municipal Services District (BMSD) Areas

Currently very little of the BMSD areas of Broward County are provided water service by BCWWS. However, a significant County boundary change took place in 2009 with approval of House Bill 1315 that approved the transfer from Palm Beach County to Broward County of a 1,949-acre wedge-shaped property located between County Line Road and Loxahatchee Road. Currently the area of BMSD land is 11.4 sq. miles with a population of less than 16,000, which includes the recently annexed 'Wedge' south of the Hillsboro Canal.

The land use and zoning for many of the BMSD areas of significant size, such as Hillsboro Pines near Parkland, support large lot residential development. Public sanitary

sewer service is not available for many of these areas, and sanitary service is currently accomplished by on-site treatment and disposal facilities such as septic systems.

Discussions were held with representatives of the utility and/or planning departments of the Cities of Cooper City, Fort Lauderdale, Hollywood, Plantation, and Sunrise. Comprehensive Plan data and other information from the municipalities and from the Broward County EPGMD were utilized to prepare the following sections for the BMSD area.

## 1. City of Cooper City

The City of Cooper City provided sanitary sewer service for two homes in the BMSD area as reported in the 1997 version of this support document. Discussions with City growth management and utility staff were not conclusive as to whether or not these two homes are still in the BMSD area. The planning service area stated in the February 2003 revision of the City of Cooper City Comprehensive Plan, Chapter 4, Infrastructure Element; this includes BMSD areas that either have since become incorporated or contain large lot residential areas that utilize septic systems.

## 2. City of Fort Lauderdale

The City of Fort Lauderdale provides sanitary sewer service for three areas (e.g., Roosevelt Gardens, Franklin Park, and Washington Park) of BMSD Broward County, as noted in the Sanitary Sewer, Solid Waste, Drainage, Potable Water and Natural Groundwater Aquifer Recharge Element support document amendments of 2014.

## 3. City of Hollywood

City of Hollywood utility representatives indicated that there may be a small amount of the BMSD area near State Route 7 for which sanitary sewer service is provided by the City of Hollywood. They also reported that a large portion, if not all, of what was BMSD area was annexed into the City of Dania Beach. The City of Hollywood also provides wastewater treatment and disposal service for two regional county facilities that remain in the BMSD area: Fort Lauderdale-Hollywood International Airport and the resource recovery plant and ash landfill east of State Route 7 and south of Interstate 595.

### 4. City of Plantation

Broward County Water and Wastewater Services has completed installation of sanitary sewers in the BMSD area. Sewage from Broadview Park is transmitted to the North Regional Wastewater Treatment Plant.

### 5. City of Sunrise

The City of Sunrise provides sanitary sewer collection/transmission, treatment, and disposal services for Pine Island Ridge, which was annexed into the Town of Davie effective September 15, 2006.

### 6. Wastewater Demands, Treatment Plants and Disposal Methods

Wastewater demands, treatment plant information, and disposal information for the three municipal systems that provide significant service to the BMSD areas are shown in the following Table WM-6.

Table WM-6
Population, Sewage Flow, Capacity, Treatment, and Disposal Information for Municipalities Serving the BMSD Area

| | Fort Lauderdale | Hollywood | Sunrise |
|---|---|---|---|
| 2000 Census city population as annexed through October 2005 | 170,823 | 139,545 | 85,787 |
| Annual average daily flow (MGD-2005) | 37.52 | 41.78 | 22.85 |
| Licensed design capacity (MGD-AADF) | 48.00 | 48.75 | 30.45 |
| Treatment type | Secondary | Secondary | Secondary |
| Disposal method | Deep well injection | Reuse, ocean outfall, and deep injection well | Deep well injection and percolation ponds |

# DRAINAGE AND NATURAL GROUNDWATER RECHARGE

## A. Drainage Systems

Water flowing overland during and immediately following a storm event is called stormwater drainage or stormwater runoff. Under the effects of gravity, the drainage flows toward sea level through depressions and channels which comprise the drainage system of an area. Stormwater runoff can be witnessed in any parking lot, driveway, or street during practically all rainstorms, except during the lightest mist. The drainage system may consist of natural features, man-made features, or a combination of both.

Natural drainage systems are defined by the topography of an area. The largest feature of a natural drainage system is the drainage basin, or watershed. The watershed consists of a network of streams, rivers and tributaries which collectively convey all the surface water from a geographic region to one particular place. This place is called the major drainage feature or receiving body and it may be a river, lake or bay. The boundary of a basin is called the basin divide. This is the point where elevation differentials delineate receiving bodies. In South Florida, the natural elevation differentials are not as easily discernable as they are in hilly or mountainous terrain.

Man-made drainage facilities are artificial constructs, designed to store or convey stormwater runoff. Swales, ditches, canals and stormsewers are typical conveyance structures, collecting stormwater runoff and directing it toward downstream receiving waters. Stormwater storage structures are generally classified as either detention or retention facilities. Detention facilities are designed to temporarily impound runoff and release it gradually to downstream portions of the drainage system through an outlet structure. Retention facilities are impoundments which release stormwater by evaporation and by percolation into the ground, with no direct discharge to surface waters. There are two types of on-site detention/retention systems. Wet detention/retention uses a water storage area with a bottom elevation less than one foot above the average wet season water table to provide storage and recharge the aquifer. Dry detention/retention uses open areas with a bottom elevation at least one foot above the average wet season water table to store the storm water runoff. Both of these techniques will provide aquifer recharge, however, dry detention is preferred from a water quality standpoint since the soils and ground cover provide a natural filtering process.

Drainage systems were used in the past to reclaim land from the Everglades for agricultural development and human settlement. Contemporary thought during the time period was that all wetlands, including the Everglades, were useless wastelands which should be drained for more useful purposes.

Today, drainage systems are used to reverse some of the impacts to the Everglades through the creation of the Water Conservation Areas, which provide protection of the remaining Everglades. Drainage systems are also used as a means of recharging groundwater and preventing saline intrusion, in addition to the original purpose of protecting life and property from floods.

Drainage systems can be structured into three tiers: primary, secondary and tertiary. Each tier is designed to accommodate a certain quantity of storm water runoff. Water flow is managed and controlled throughout the system by devices which include spillways, culverts, weirs, canals, and pumping stations.

Tertiary drainage systems provide the initial localized control, collection and treatment of stormwater runoff. In the BMSD areas and its dependent districts, these drainage systems are permitted by the Broward County EPGMD under county-wide rules and regulations. Tertiary water flow consists of runoff from streets, parking lots, driveways, lawns and other saturated surfaces. Typical tertiary drainage structures include retention and detention ponds, ditches, culverts, and storm sewers. Tertiary drainage systems serve a spectrum of development types including residences, shopping malls, industrial parks and planned communities.

The secondary drainage system consists of canals and other structures which operate as intermediate mechanisms to deliver storm water from the tertiary drainage system to the primary drainage system. The conveyance structures include canals, pumping stations, spillways, culverts and weirs. The secondary drainage system is operated by dependent and independent local water control districts and municipalities. Dependent drainage districts are managed by the county or municipal governments, while independent drainage districts operate autonomously by a special grant of authority. As illustrated in Map WM-5, there are a total of twenty-three drainage districts: nine are dependent drainage districts and fourteen are independent drainage districts. Local water control districts are divided into sub-basins which empty into the primary drainage system.

Some districts contain only one sub-basin and others may contain several. Sub-basins empty into a primary drainage canal. Secondary canals often flow north or south towards a primary canal which often flows from the west to the east. Every sub-basin contains at least one secondary canal. A typical sub-basin usually drains a narrow strip of land, approximately one mile wide, separated by major roadways. County canals, and canals maintained by the County under contract, are periodically inspected by the Water Management Division (WMD) to insure debris removal, aquatic weed control, and proper operation of flood control gates. All complaints are investigated and, if necessary, the responsible party is notified to correct deficiencies. An inventory of the dependent and independent drainage districts, their enabling authority, and their permitting programs are included as Appendix WM-A.

The primary drainage system collects and conveys storm water from the secondary drainage system to the Atlantic Ocean, Intracoastal Waterway and Dade County water bodies, and in a limited number of cases, to the Everglades. Primary drainage canals, rivers, and levees in Broward County are components of a regional water management system which is controlled by the South Florida Water Management District (SFWMD) and the US Army Corps of Engineers (COE). It consists of 14 drainage basins ranging in size from less than 5 square miles to over 500 square miles. The SFWMD and the COE operate and maintain the primary canal system within the basins and establish discharge limits for releases from the secondary canal system. Limitations on discharge are determined by the capacity of the receiving primary canal to accept and safely remove storm water. Discharge is measured in cubic feet per second per square mile.

## B. Major Drainage Features

There are fourteen (14) major drainage features or basins within Broward County: four drainage basins are situated in the undeveloped (western) area and ten drainage basins are within Broward County's developable (eastern) area. Appendix WM-B provides information on the functions and the level of service standard for each of the fourteen basins. Appendix WM-C provides information on the design criteria for the structures within each drainage basin. The descriptions of the drainage basins summarized herein and the information in Appendices WM-B and WM-C are based upon technical memoranda prepared by the South Florida Water Management District SFWMD.

The following abbreviations are used to describe the structures located within each drainage basin:

C - Canal

G - non-Federal structure used to supplement the Federal Central and South Florida Flood Control Project (C&SF)

L - Levee designation in the C&SF Project

S - Structure in the sub-basin.

## 1. Water Conservation Area 2A

The Water Conservation Area 2A (WCA 2A) basin has an average area of 164.7 square miles and is located in south-central Palm Beach County (65.5 square miles) and in north-central Broward County (99.2 square miles). The WCA 2A is connected to Lake Okeechobee by way of the North New River Canal (NNRC). Regulatory releases from the lake, made to the canal by way of the S-351, are passed through the S-2 and the S-7 basins in the Everglades North New River and Miami Area, and are discharged by gravity flow or pumping from the canal into the WCA by way of the S-7. Regulatory releases from the lake to the WCA 2A are rare events and are only a small part of the water discharged to the WCA by way of the S-7.

In addition to regulatory releases from the lake, the NNRC may be used to supply water from Lake Okeechobee to the C-13, C-14 and the NNRC basins for irrigation and municipal water supply. These water supply releases are passed through the WCA 2A by way of the NNRC and the L-35B borrow canal.

There are two C&SF Project canals affecting water management in WCA 2A: the NNRC and the L-35B borrow canal. The NNRC connects Lake Okeechobee to WCAs 2A and 3A. The connection to Lake Okeechobee is by way of the S-2 and the S-351 at the north end of the canal at South Bay west of Belle Glade. The connection with WCA 2A is by way of the S-7 at the intersection of the L-5 and the L-6, just east of U.S. Highway 27 on the Palm Beach/Broward County line. The connection with WCA 3A is by way of the S-150 just west of the S-7. From the S-7, the NNRC passes on through the WCA and provides a means of conveying water from Lake Okeechobee to eastern Broward County.

The L-35B borrow canal connects the NNRC to the C-13 and the C-14. The canal runs west-east just north of the L-35B making an open channel connection to the NNRC at its west end and connecting to the C-14 at its east end by way of the S-38.

The WCA 2 also is impounded by six levees: L-6, L-35B, L-36, L-38E, L-38W, and L-39. These levees were designed to hold water in WCA 2A at stages estimated to occur during the Standard Project Flood.

## 2. Water Conservation Area 2B

The WCA 2B basin, located in central Broward County, has an area of 43.8 square miles. WCA 2B is an area of significant recharge to the Biscayne Aquifer. Water supplied to the aquifer by way of WCA 2B is important to maintaining groundwater levels in coastal areas. Adequate groundwater levels are essential to proper management of municipal wellfields and to restrict saltwater intrusion to groundwater. The borrow canals of the levees impounding the WCA on the east cut into the Biscayne Aquifer and intercept some of the groundwater flow to the east. The intercepted groundwater and seepage through the levees are an important source of water to adjacent basins in Broward County: to the C-13 and C-14 basins by seepage to the L-35A and L-36 borrow canals and to the NNRC basin by seepage through L-35 to the NNRC. The rates of seepage through L-35, L-35A, and L-36 are not regulated by specific operation of Project structures, although the rates are probably affected by the stages held in the NNRC and the L-35A and L-36 borrow canals.

WCA 2B is impounded by five levees: L-35, L-35A, L-35B, L-36, and L-38E. The L-35, L-35A, and L-36 intercept seepage from the WCA and conveys this water to adjacent basins for maintenance of groundwater levels for municipal water supply.

## 3. Water Conservation Area 3A

The WCA 3A basin has an area of 767.3 square miles and is located in western Broward County (568.4 square miles) and northwestern Dade County (198.9 square miles). WCA 3A is connected to Lake Okeechobee by way of the North New River and Miami Canals. Regulatory releases from the lake are made to the NNRC by way of the S-351, are passed through the S-2 and S-7 basins in the

Everglades Agricultural Area (EAA), and are discharged into the WCA by way of the S-150. Regulatory releases from the lake to the Miami Canal are made by way of the S-354, are passed through the S-3 and S-8 basins in the EAA, and are pumped to WCA 3A by way of S-8. Regulatory releases from the lake to WCA 3A are rare events and are only a small part of the water discharged to the WCA by way of S-8 and S-150.

The four C&SF Project canals primarily affecting water management in WCA 3A are the Miami Canal, the L-37A borrow canal, the NNRC, and the C-60. The Miami Canal and the NNRC connect WCA 3A to Lake Okeechobee.

The Miami Canal connects to Lake Okeechobee by way of S-3 at the north end of the canal at the town of Lake harbor. The connection to WCA 3A is by way of the S-8, 15 miles west of U.S. Highway 27 on the Broward/Palm Beach County line. The Miami Canal crosses WCA 3A from northwest to southeast leaving WCA 3A and entering WCA 3B at the S-151. The canal continues to the southeast entering tidewater at Biscayne Bay. Most of the Miami Canal within WCA 3A has been re-dug parallel to its original channel and is known by its Project name, the C-123.

The L-67A borrow canal is on the WCA 3A side of the L-67A and connects the Miami Canal to S-333 and the S-12 structures. There are no structures directly controlling flow into or out of this canal. Flow in the canal is indirectly affected by the operation of the S-12 structures, S-333 and S-151.

The NNRC connects to Lake Okeechobee by way of the S-2 at the north end of the canal at South Bay west of belle Glade. The connection with WCA 3A is by way of the S-150 just west of the S-7. It also makes a connection with WCA 2A by way of the S-7 at the intersection of L-5 and L-6, just east of U.S. Highway 27 on the Palm Beach/Broward County line.

The C-60 conveys discharge from the S-140 to a bridge on I-75 about 4.3 miles east of the L-28. It was constructed to facilitate the movement of water away from the S-140 so that the tailwater level at the pump remains within design conditions. The canal is aligned from the S-140 due east for 2.7 miles. It then extends to the southeast connecting to the north borrow of I-75. A bridge on I-75 at that point allows conveyance to the south. This alignment was chosen to

make use of an existing bridge on what was then the Everglades Parkway (SR 838), and to form an impoundment for research studies between the canal levee and the Everglades Parkway (now I-75). The impoundment area was to be used for studies in wildlife management and evaporation and seepage control experiments. Water levels in the impoundment are controlled by two 48-inch culverts.

WCA 3A is impounded by seven levees: L-4, L-5, L-28, L-29, L-38W, L-67A, and L-68A. These levees were designed to hold water in WCA 3A at stages estimated to occur during the Standard Project Flood.

## 4. Water Conservation Area 3B

The WCA 3B basin has an area of 153.6 square miles and is located in south-central Broward County (30.5 square miles) and north-central Dade County (123.1 square miles). WCA 3B is an area of significant recharge to the Biscayne Aquifer. Water supplied to the aquifer by way of WCA 3B is important to maintaining groundwater levels in coastal areas. Adequate groundwater levels are essential to proper management of municipal wellfields and to restrict saltwater intrusion to groundwater. The borrow canals of the levees impounding WCA 3B cut into the Biscayne Aquifer and intercept some of the groundwater flow to the east. The intercepted groundwater and seepage through the levees is an important source of water to adjacent basins in Dade County.

The Miami Canal is the C&SF Flood Control Project canal primarily affecting water management in WCA 3B. The C-304 is that section of the Miami Canal from the S-151 to the S-31. It crosses the upper quarter of the WCA from northwest to southeast. It is used primarily to convey water across the WCA from either Lake Okeechobee or WCA 3A to eastern Dade County and southeastern ENP. The reaches of the Miami Canal west of WCA 3B convey water to WCA 3B from Lake Okeechobee and WCA 3A.

WCA 3B is impounded by four levees: L-29, L-30, L-33, and L-67A.

## 5. Hillsboro Canal Basin

The Hillsboro Canal basin has an area of approximately 102 square miles and is located in northeastern Broward County (40 square miles) and southeastern

Palm Beach County (62 square miles). The two Project canals in the basin are the Hillsboro Canal and the section of the L-36 borrow canal between the Hillsboro Canal and the S-38B control structure.

The Hillsboro Canal connects Lake Okeechobee to the Atlantic Ocean. It enters the basin through the S-39 control structure at the intersection of L-36 and L-40. Within the Hillsboro Canal basin, the Hillsboro Canal is aligned to and just north of SR 827 west of SR 7 and parallel to and one-half mile north of SR 810 east of SR 7. Direction of flow in the canal is normally to the east with discharge to the Intracoastal Waterway just west of the intersection of A1A and SR 810.

The L-36 borrow canal is aligned north-south along the western boundary of the basin and south of the Hillsboro Canal. The canal intercepts seepage from WCA 2A and is tributary to the Hillsboro Canal. Direction of flow in the canal is to the north to the Hillsboro Canal.

## 6. Cypress Creek (C-14) Canal Basin

The C-14 basin has an area of 59 square miles and is located in northeastern Broward County. The C-14 basin is divided into an eastern basin (34 square miles) and a western basin (25 square miles). There are two Project canals in the C-14 basin: C-14 and the section of the L-36 burrow canal between the C-14 and control structure S-38B.

The C-14 is aligned east-west in the alignment of the old Pompano Canal from the L-36 burrow canal to a point approximately one-half mile east of Florida's Turnpike. East of that point, the canal alignment follows the old channel of Cypress Creek. Direction of flow in the canal is to the east with a discharge to the Intracoastal Waterway about threequarters of a mile south of SR 814. A short reach of canal connects C-14 to the Pompano Canal. This interconnecting canal makes an open channel connection with C-14 one-half mile east of Florida's Turnpike, and it connects to the Pompano Canal by way of G-65 at 21st Avenue, one-quarter mile west of Powerline Road. Since G-65 is normally closed, flow in this canal is usually to the west to C-14. When G-65 is open to supply water to the Pompano Canal basin, flow in the canal is reversed.

The L-36 borrow canal is aligned north-south along the western boundary of the basin. Only that part of the canal north of C-14 is in the C-14 basin. Direction

of flow in the northern part of the L-36 borrow canal is to C-14. The part of the L-36 borrow canal south of C-14 conveys water from C-14 to the C-13 basin. It does not contribute flow to the C-14 basin.

## 7. Pompano Canal Basin

The Pompano Canal basin has an area of approximately 7.2 square miles and is located in northeastern Broward County. The Pompano Canal is the only C&SF Project canal in the basin and is aligned east-west, south of and approximately parallel to Atlantic Avenue from 21st Avenue (one-quarter mile west of Powerline Road) to Cypress Road. East of Cypress Road, the canal is aligned northwest-southeast and extends from Cypress Road to the Intracoastal Waterway. At its west end at 21st Avenue, the canal connects to the C-14 by way of G-65. At its east end the canal makes an open channel connection with the Intracoastal Waterway about three-quarters of a mile south of SR 814. Direction of flow is to the east with discharge to the Intracoastal Waterway.

## 8. Middle River (C-13) Canal Basin

The C-13 basin has an area of approximately 39 square miles and is located in eastern Broward County. The C-13 is divided into an eastern basin (9 square miles) and a western basin (30 square miles). The boundary between the basins runs approximately north-south through S-36. A five square mile area north of the eastern C-13 drains to the North Fork of the Middle River and is known as the North Fork of the Middle River basin. This basin includes no canals or control structures.

There are three C&SF Project canals in the C-13 basin: C-13, the section of the L-36 borrow canal between C-14 and L-35A, and the section of C-42 between S-125 and L-35A. The C-13 is aligned east-west extending from C-42 on the west to the Intracoastal Waterway on the east. C-13 makes an open channel connection with C-42, 1.8 miles south of the intersection of L-35A and L-36. At the I-95 crossing the canal bifurcates, one channel extending to the east to connect to the North Fork of the Middle River and the other channel extending to the southeast to connect to the South Fork of the Middle River. The North Fork is the main channel for flows from C-13 to be discharged to the Intracoastal Waterway. The North Fork has been channelized while the South Fork remains

in its natural state. The design criteria calls for 300 cfs to be discharged to the South Fork. Flow in the C-13 is to the east.

The L-36 borrow canal and C-42 form a continuous canal aligned north-south along the western side of the basin. The juncture of the two canals is at the intersection of L-36 and L-35A. Flow in these canals is to the south to C-13.

There is one other Project canal, the L-35A borrow canal, associated with the C-13 basin. The land drained by the L-35A borrow canal is in the North New River Canal (NNRC) basin, however, under non-flood conditions, runoff and seepage to the L-35A borrow canal are drained to the C-13 basin by way of C-42. Under flooding conditions the L-35A borrow canal discharges to the NNRC by way of S-124. The operation of S-124 determines whether the L-35A borrow canal drains to the C-13 basin or to the NNRC basin. The L-35A borrow canal is aligned northeast-southwest along the northwest border of the NNRC basin. At its north end the L-35A borrow canal makes an open channel connection to C-42 at C-42's juncture with the L-36 borrow canal. At its south end the L-35A borrow canal connects to the NRC by way of S-124.

## 9. North Fork Middle River Basin

The North Fork Middle River Basin has an area of approximately 5 square miles and is located in eastern Broward County. The area drains into the North Fork of the Middle River and does not contain any canals or any other control structures.

## 10. Plantation (C-12) Canal Basin

The C-12 basin has an area of approximately 19 square miles and is located in eastern Broward County. The C-12 is the only Project canal in the C-12 basin. It is aligned east-west parallel to and one-mile north of Broward Boulevard from University Drive on the west to S-33 on the east. East of S-33, C-12 follows the old channel of the North Fork of the New River. Flow in the canal is to the east with discharge to the New River.

## 11. North New River Canal Basin

The North New River Canal (NNRC) basin has an area of approximately 30 square miles and is located in eastern Broward County. The NNRC basin is divided into an eastern basin (7 square miles) and a western basin (23 square miles). The boundary between the basins is approximately SR 817. There are three Project canals in the NNRC basin: the NNRC, the L-35A borrow canal, and the C-42.

The NNRC connects Lake Okeechobee to the Atlantic Ocean. It enters the NNRC basin at S-34 near the intersection of SR 84 and US 27. Within the NNRC basin, the canal is aligned parallel to and just to the north of SR 84. Flow in the canal is to the southeast with discharge to the South Fork of the New River about four miles east of Sewell Lock.

The L-35A borrow canal is aligned northeast-southwest along the northwestern border of the basin. The land drained by the L-35A borrow canal is in the NNRC basin, however, under non-flood conditions, runoff and seepage to the L-35A borrow canal are drained to the C-13 basin by way of C-42. Under flooding conditions the L-35A borrow canal discharges to the NNRC. The operation of S-124 determines whether the L-35A borrow canal drains to the C-13 basin or discharges to the NNRC basin.

The C-42 is aligned north-south parallel to and just east of Hiatus Road and is the continuation of the L-36 borrow canal south of L-35A. The canal enters the NNRC basin at S-125 just south of C-13. The C-42 makes an uncontrolled open-channel connection with the NNRC one mile east of the intersection of SR 84 and SR 823. Flow in the canal is to the south to the NNRC.

## 12. South New River Canal (C-11) Basin

The C-11 basin has an area of approximately 104 square miles and is located in south central Broward County. The C-11 basin is divided into an eastern basin (23 square miles) and a western basin (81 square miles).There are four C&SF Project canals in the C-11 basin: the C-11, the C-11S, the section of the L-33 borrow canal between the C-11 and Hollywood Boulevard, and the L-37 borrow canal. The C-11 is aligned east-west parallel to and north of Griffin Road from the L-37 borrow canal on the west to S-13 at US 441. Direction of flow in the reach of the canal in the eastern basin is to the east with discharge to the South

Fork of the New River. Direction of flow in the reach of C-13 in the western basin depends on the operation of the control structures S-13A and S-9 located at either end of the reach.

The C-11S is aligned north-south parallel to and three-tenths of a mile east of Flamingo Road from G-87 at Sheridan Street on the south to C-11 on the north. The canal is tributary to and makes an open channel connection with the C-11. Direction of flow in the C-11S is to the north.

The L-33 and L-37 borrow canals make up a continuous canal aligned north-south along the western boundary of the basin. The L-33 borrow canal is south of the C-11 and extends to and makes a connection with the C-9. The L-37 borrow canal is north of the C-11 and extends to but does not make a connection with the North New River Canal. Direction of flow in the L-33 borrow canal depends on the operation of the S-9XS, S-30, and the S-32 and may be either to the north to C-11 or to the south to the C-9. Flow in the L-37 borrow canal is to the south to the C-11.

## 13. Hollywood (C-10) Canal Basin

The C-10 basin has an area of approximately 15 square miles and is located in southeast Broward County. There are two C&SF Project canals in the C-10 basin: The C-10 and the C-10 Spur Canal.

The C-10 begins at Johnson Road one-quarter mile west of I-95. It extends to the north connecting to the Dania Cut-off Canal 2.6 miles west of the Intracoastal Waterway. Flow in the canal is to the north.

The C-10 Spur Canal begins one-quarter mile north of Sheridan Street and 1.6 miles west of I-95. It extends to the east connecting to the C-10 six-tenths of a mile north of Sheridan Street. Flow in the canal is to the east. There C-10 basin was constructed without a control structure in order to maintain the water surface elevation in the canal high enough to prevent salt water intrusion into local groundwater. Since there is no water supply to the C-10 from outside the basin, it would be impossible to maintain the required water surface elevation in the canal during periods of low flow even if a structure was in place.

### 14. Snake Creek (C-9) Canal Basin

The C-9 basin has an area of approximately 98 square miles and is located in southeastern Broward County (59 square miles) and northeastern Dade County (39 square miles). The basin is divided into an eastern basin (45 square miles) and a western basin (53 square miles). There are two C&SF Project canals in the C-9 basin: the C-9 canal and the L-33 borrow canal.

The C-9 is aligned east-west extending from the L-33 on the west to Dumfoundling Bay on the east. The C-9 makes an open channel connection with the L-33 borrow canal one mile north of the intersection of L-30 and L-33 and one-half mile west of US 27. Flow in the C-9 is to the east with discharge by way of S-29 to Dumfoundling Bay.

The L-33 borrow canal is aligned north-south along the western boundary of the C-9 basin. It makes an open channel connection to the west end of the C-9 and is connected to the C-6 by way of S-32. Flow in the borrow canal depends upon the operation of S-30, S-32, and S-9XS, and may be either to the C-9 or the C-11.

There is one small non-Project canal of interest. The Flamingo Road Canal is aligned north-south, west of and parallel to Flamingo Road. It makes an open channel connection with the C-9. Normal flows in this canal are to the south to the C-9. Flows of 110 to 140 cfs are pumped to this canal from a portion of the C-11 basin in the Pembroke Pines area. Without pumping, the runoff from the Pembroke Pines area would flow north to the C-11S. Of the flow entering the C-9 from the Flamingo Canal, 40 - 50 cfs may subsequently be diverted to the C-8 by way of the west borrow canal of NW 67$^{th}$ Avenue.

## C. Major Aquifers

Broward County is underlain by two major aquifers: the Biscayne aquifer and the Floridan aquifer. The Biscayne aquifer is currently the principle source of potable water in the County. It is one of the most productive unconfined aquifers in the United States and one of the most permeable aquifers in the world. It underlies all of Broward County except the most westerly sections. The Biscayne aquifer is wedge-shaped being more than 300 feet thick in eastern Broward County and thinning to an edge in the Florida Everglades. The Floridan aquifer is located below the Biscayne aquifer at a depth of

1,200 feet. It is composed of a system of limestones of variable permeability and is approximately 1,000 feet thick. The upper part of the Floridan aquifer is brackish and can be treated to potable standards through membrane treatment, however the lower Floridan water is hard, sulfurous, corrosive, and too saline for potable water use with standard treatment methods, thereby requiring the use of reverse osmosis membrane technology to meet drinking water standards.

The top of the Floridan aquifer system in Broward County is about 950 to 1000 feet below sea level and is considered to be a relatively confined surface overlain by a 550 to 800-foot-thick sequence of clay, silt, limestone and sand referred to as the intermediate confining unit. Unlike the Biscayne Aquifer, which receives recharge through surface water seepage, there is no direct recharge to the Floridan aquifer system in Broward County. Consequently, wells drilled into the Floridan aquifer system in Broward County yield highly mineralized water which is not suitable for most purposes without undergoing advanced water treatment.

Overlying the intermediate confining unit is the surficial aquifer system (of which the Biscayne aquifer is the only formally named unit in Broward County). Although there are significant differences in the water-bearing characteristics and transmissivity of the surficial aquifer system throughout the County, the entire remaining pervious surface of Broward County is the recharge area. Included as part of the pervious surface in Broward County are the water conservation areas (2A, 2B, and 3A). These areas include highly regulated and protected areas of levees, canals, dikes and berms used for storing and recharging water, and they cover approximately the western two-thirds of the county. Because the upper surface of the surficial aquifer system is so close to land surface, and recharge readily occurs on any pervious surface, the few remaining and aerially-limited natural recharge areas are not particularly significant in the overall protection of the surficial aquifer system.

The top of the surficial aquifer system may be considered to be land surface because virtually all of Broward County formerly was seasonally or perennially flooded, although drainage by canals has reduced the occurrence of flooding in east and south-central Broward County. The oolitic limestone and sand that form the upper surface of the surficial aquifer readily absorb rainfall; their porosity provides the principal recharge mechanism to the aquifer. Observation wells generally show rapid response to rainfall and the same phenomenon occurs wherever there are thin, sandy or slightly organic soils overlying the upper surface of the aquifer.

## D. Major Natural Groundwater Aquifer Recharge Areas

The SFWMD has not designated any area within Broward County as a "prime groundwater recharge area." Nonetheless, rainfall within the urban portion of Broward County represents a significant source of groundwater recharge to the superficial aquifer, along with recharge from the four Water Conservation Areas (WCAs). The WCAs (2A, 2B, 3A, and 3B) within Broward County, remnants of the original Everglades, total 719 square miles and comprise approximately two-thirds of the County's area. The SFWMD measures water storage in the Conservation Areas by a network of water depth gauges. The level of water stored in the Conservation Areas is a prime consideration in the decision by SFWMD to release water from Lake Okeechobee into the canals for aquifer recharge and/or to declare a condition of water shortage.

Other major sources of recharge include the system of canals in the developable areas of the County. The land surface, itself, is also a major source of aquifer recharge. Generally, soil conditions in the County are conducive to recharge of the aquifer (See the Planning Council Natural Resource Map Series). Except for those areas in the Southwest Sector with thick muck soils, movement of water into the ground is rapid. Recharge also may be obtained through injection and spray irrigation. While the County does not currently engage in either of these two recharge methods, the County is exploring alternative water supply projects that could enhance aquifer recharge via infiltration trenches.

In addition to their drainage and aquifer recharge functions, some canals are operated so as to increase the water level of the aquifer between the wellfield and the ocean and, thereby, prevent saltwater intrusion to well fields. The County's North Regional Recharge System, constructed as part of the County's Integrated Water Resources Plan, is an example of how the canals are used not only to address saltwater intrusion, but to also provide recharge benefits for the County's wellfield system, natural areas, and potential downstream benefits for municipalities such as Pompano, Fort Lauderdale and Hallandale. The interconnectivity of northern Broward County drainage districts also allows for west-east hydrologic connectivity.

Relatively few acres of wetlands are left in the developable area of the County (See Conservation Element and the Planning Council Natural Resource Map Series). As a result, wetlands, other than the WCAs, are not a major source of recharge to the Biscayne aquifer, although there are ongoing efforts to enhance surface water deliveries

to various urban wetlands to improve natural system function. While natural system recovery is the primary objective, it is estimated that through seepage, 80% of the surface water recharge will reach the groundwater with indirect benefits for downstream wellfields.

## E. Level of Service (LOS) Standard

Broward County has expressed its drainage concurrency level of service (LOS) standard in terms of performance based criteria which recognize the discharge limitation set by the SFWMD upon its primary canals as the effective limitation upon water management systems. The level of service standard for the stormwater management basins controlled by the SFWMD is shown in Appendix WM-B.

The LOS criteria for the BMSD Area are based on adopted standards and criteria for water management works. The minimum standards shown in Table WM-1 are implemented through the development review process of the Broward County Land Development Code.

The submission of detailed drainage plans and calculations is required to show how conformance is to be achieved. The plans and calculations are reviewed for compliance. If they are found not to be in compliance additional information or revision is requested. Permits are not issued until the plans and calculations are brought into conformance. After permitting, the regulatory programs include inspection and certification to assure construction is conducted in accordance with the standards. Application of the LOS standards through the regulatory systems of the SFWMD, Broward County, and local water control districts assure that a development order shall not be issued unless the necessary drainage facilities either exist at the time of application or are provided for through an approved plan of concurrent construction with financial assurance in the form of a bond, letter of credit, cash deposit of similar mechanism. Policy WM3.1 addresses drainage concurrency LOS standards.

In terms of impervious area for developments in the BMSD Area, impervious surfaces cannot exceed seventy-five percent for an industrial development, seventy percent for commercial, and sixty percent for residential. Variations are allowed if mitigating design improvements are utilized, but under no circumstances can the percentage of impervious area exceed eighty-five percent for industrial, eighty percent for

commercial, and seventy percent for residential uses. Municipalities regulate impervious areas according to their respective municipal ordinances.

Table WM-7
Drainage Level of Service Standard

| Subject | Adopted Drainage Level of Service Standard Standards |
|---|---|
| Road Protection | Residential streets not greater than fifty feet wide rights-of-way to have crown elevations no lower than the elevation for the respective area depicted on the ten year "FEMA Flood Map."<br>Rights-of-way greater than fifty feet wide to have an ultimate edge of pavement no lower than the elevation for the respective area depicted on the ten year "FEMA Flood Map." |
| Building Elevations | To have the lowest floor elevation no lower than the elevation for the respective area depicted on the "100 Year Flood Elevation Map", the FEMA Base Flood Elevation for the area or the site-specific 100-yr, 3-day design storm stage, whichever is highest.<br>Off Site Discharge Not to exceed the inflow limit of SFWMD primary receiving canal or the local conveyance system, whichever is less. |
| Storm Sewers | Design frequency minimum to be three-year rainfall intensity of the State Department of Transportation Zone 10 rainfall curves. |
| Flood Plain Routing | Calculated flood elevations based on the ten-year and one hundred-year return frequency rainfall of three day duration shall not exceed the corresponding elevations of the ten year "FEMA Flood Map" and the "100-Year Flood Elevation Map." |
| Antecedent Water Level | The elevation depicted on the map "Average Wet Season Water Levels". |

| Subject | Adopted Drainage Level of Service Standard Standards |
|---|---|
| On Site Storage | Minimum capacity above antecedent water level and below flood plain routing elevations to be design rainfall volume minus off site discharge occurring during design rainfall, except for the 100-yr, 3-day design storm event, which is zero discharge. |
| Water Quality | Prior to discharge to surface or ground water, 80% or 95% reductions in pollutant load must be achieved based on the rebuttable presumptions of the water quality treatment criteria. |

## F. Existing Drainage Facility Needs

Drainage facility needs in the areas under the County's jurisdiction are being met through Broward County's Neighborhood Improvement Program (NIP). Originally authorized in 1993, the NIP is a set of public works projects in eight major communities, representing 25 neighborhoods in mostly BMSD Broward County. While the NIP started as drainage improvement projects designed to alleviate flooding in low-lying areas of the County, it has expanded to include a number of infrastructure improvements in the right-of-way of a number of communities. The NIP areas encompass 8,812 acres, 92,000 people, and 28,200 homes. Construction, currently estimated at $658 million, began in 1996 and is scheduled to be completed in 2011. Completion of the drainage improvements associated with the NIP will address

## G. Adequacy of Current Level of Service

The effectiveness of a drainage system is frequently measured by the extent to which it reduces damage and inconvenience from flooding. The primary canal system, operated by the SFWMD, is generally adequate to meet the Standard Project Flood. Further, the County's regulatory procedures ensure that discharges from the secondary canal system do not exceed design capacities of the primary canal system.

The secondary canal system generally provides an adequate level of service. Discharges from the secondary system to the primary system are limited to the SFWMD allowable discharge criteria by control structures placed between the two systems.

However, uncontrolled connections exist that discharge in excess of the drainage area's pro rata share of the receiving primary canal. Such conditions reduce the capacity available to a property that is served by controlled secondary canals, thus increasing the effect of rainfall on the property. In addition, canals such as the western reach of the C-9 and the C-11 have such limited capacity that agricultural uses are often precluded or severely restricted and the effects of flooding on developed land are excessive. Similar conditions but of differing extent also exist within other primary canal basins. These conditions could be reduced and water management could be enhanced if unrestricted connections were to be brought into conformance and inadequate primary canals were improved to a capacity corresponding to reasonable land use expectations.

Proposed development, in accordance with the LDC, will not receive a development order without having received approval, from the appropriate approval authority, of a water management plan that meets the LDC Requirements. Thus, the two are an inseparable part of the review mechanism with each assuring conformance to adopted standards. Policy WM2.9 addresses the ensurance of proper drainage by the EPGMD.

The drainage level of service standards is based on rainfalls with predicted return frequency but they do not define the frequency of flooding due to other effects or due to other rainfall events. The design rainfall for determining minimum road crown elevations has a ten percent annual change of occurrence. In certain areas, including southwest Broward County, other design considerations necessitated an upward adjustment to the criteria depicted on the "FEMA Flood Map". When normal groundwater levels were found to be high enough to saturate road base material the minimum road crown elevation was adjusted upward sufficiently to place the base material above the groundwater. Also, when the design flood condition did not recede below the base material within a reasonable period of time the road crown elevation was adjusted upward. Building protection is based on a design rainfall that has a one percent annual chance of occurrence. The flood elevations predicted as a result of the one percent design rainfall are depicted on Broward County's "100 Year Flood Elevation Map." Design storms have not been adopted for the protection of other areas such as parking lots and yards. In general, yards and other open space, and to a lesser extent parking lots, are allowed to be used for stormwater storage on an as-needed basis. The need has been found to be greatest in lower density residential development and in higher coverage non-residential development.

# ANALYSIS REQUIREMENTS

# POTABLE WATER

## A. Broward County Operated Retail Utility

### 1. Projected Flows

a. *Broward County Demographic Forecast Model (BCDFM) Update.* The Broward County Planning and Development Management Division (PDMD) updated their 2012 forecast model in 2013 to facilitate the upcoming Water Supply Facilities Work Plan and Comprehensive Plan update processes. BCPRD assigned the forecasted estimates from the University of Florida's Bureau of Economic and Business Research (BEBR), "Detailed Population Projections by Age, Sex, Race, and Hispanic Origin, for Florida and Its Counties, 2015-2040, with Estimates for 2012 All Races" to Broward County's municipalities' 2010 Traffic Analysis Zones (TAZ).

   BEBR forecasts were assigned to TAZ and municipalities utilizing a household-based model. BEBR's forecasts by population age are converted to countywide household forecasts using a weighted average of the years 2000 and 2010 Census householders by age group data. The converted countywide household forecasts were then assigned to TAZ based on the interaction between: (1) The change in the countywide household size distribution through forecast periods; (2) The established TAZ level distribution of households; and (3) The capacity of each the TAZ to absorb additional housing units. Since the County's population is expected to continue to grow and change, the future distribution of population and housing by municipality and TAZ is likely to be varied. Input from the local planning and service delivery entities guided the distribution process. Underlying the distribution process are land development characteristics and the Broward County Land Use Plan.

b. *Methodology Used to Determine Projected Flows.* BCWWS uses utility analysis zones (UAZ) to plan and coordinate utility activities within its service areas. The UAZ defines the boundaries of the utility's service areas

within each TAZ. BCWWS service areas encompass 150 of the 892 TAZ, which are then divided into 130 UAZ. Retail customers in each of the UAZ are categorized as "single family residential", "multi-family residential", "commercial" and "other".

Finished water usage for each of the four customer categories listed above was determined for each UAZ using BCWWS billing records. System uses and losses were calculated on a District by District basis and allocated to each UAZ to determine a total potable water demand per UAZ. The percentage of a TAZ in each UAZ was also determined. Adjustments were made to account for UAZ where BCWWS does not provide potable water service (i.e. those UAZ or portions of UAZ where BCWWS provides services for sewer only, not water) and for UAZ that contained a portion of a TAZ that did not include single or multi-family residential land use.

BCWWS projections utilized the year 2010 as a base year. The 2040 demands for "single family residential" and "multi-family residential" were estimated by multiplying the year 2010 demands by the change in population from2010 to 2040 for each UAZ. The year 2040 demands for "commercial" and "other" required a slightly different approach. Because it was not reasonable to assume that a person works or even shops in the same UAZ in which they live, the overall change in population of the County was multiplied by year 2010 "commercial" and "other" demands for each UAZ.

Residential demand was calculated by dividing the service area into sub areas, then doing a traditional per capita forecast for each sub area. Therefore, when population growth rates in relatively lower per capita usage sub areas exceeded population growth rates in relatively higher per capita usage sub areas, lower overall residential per capita demands occurred.

Table WM-8 shows the District 1 projected population and finished water demand potential to the year 2040.

## Table WM-8
## District 1 Projected Population and Finished Water Demand Potential 2010 – 2040

| Year | Projected Population[1] | Finished Water Demand Avg. Day (MGD)[2] | Finished Water Demand Max. Day (MGD)[3] |
|---|---|---|---|
| 2010 | 75,091 | 8.63 | 11.23 |
| 2015 | 75,546 | 8.69 | 11.29 |
| 2020 | 75,889 | 8.73 | 11.35 |
| 2025 | 77,950 | 8.96 | 11.65 |
| 2030 | 82,923 | 9.54 | 12.40 |
| 2035 | 84,116 | 9.67 | 12.58 |
| 2040 | 84,826 | 9.75 | 12.68 |

1. Based on 2014 BCPRD TAZ estimate translation to UAZ populations.
2. Based on 115 gallons per capita day.
3. Based on a maximum day to average day ratio of 1.30.

Tables WM-9 through 11 show the District 2 projected population and finished water demand potential to the year 2040.

## Table WM-9
## District 2 Projected Population (excluding Coconut Creek) and Finished Water Demand Potential 2010 – 2040

| Year | Projected Population[1] | Finished Water Demand Avg. Day (MGD)[2] | Finished Water Demand Max. Day (MGD)[3] |
|---|---|---|---|
| 2010 | 55,687 | 6.63 | 8.61 |
| 2015 | 56,256 | 6.69 | 8.70 |
| 2020 | 55,799 | 6.64 | 8.63 |
| 2025 | 56,185 | 6.69 | 8.69 |
| 2030 | 57,675 | 6.86 | 8.92 |
| 2035 | 57,725 | 6.87 | 8.93 |
| 2040 | 57,575 | 6.85 | 8.91 |

1 Based on 2014 BCPRD TAZ estimate translation to UAZ populations.
2 Based on 119 gallons per capita day
3 Based on a maximum day to average day ratio of 1.30

## Table WM-10
## Coconut Creek Projected Population and Finished Water Demand Potential 2010 - 2040 [1]

| Year | Projected Population[2] | Finished Water Demand Avg. Day (MGD) | Finished Water Demand Max. Day (MGD)[3] |
|---|---|---|---|
| 2010 | 53,494 | 6.37 | 8.28 |
| 2015 | 55,240 | 6.57 | 8.55 |
| 2020 | 60,473 | 7.20 | 9.36 |
| 2025 | 63,974 | 7.61 | 9.90 |
| 2030 | 66,534 | 7.92 | 10.29 |
| 2035 | 67,706 | 8.06 | 10.47 |
| 2040 | 68,347 | 8.13 | 11.57 |

1 For that portion of Coconut Creek and Parkland that use BCWWS potable water.

2 Included 0.16 MGD of BCWWS system uses/losses incurred providing water to Coconut Creek.

3 Based on 119 gallons per capita day.

4 Based on a maximum day to average day ratio of 1.30.

## Table WM-11
## District 2 and Coconut Creek Projected Population and Finished Water Demand Potential 2010 – 2040

| Year | Projected Population[1] | Finished Water Demand Avg. Day (MGD) | Finished Water Demand Max. Day (MGD)[2] |
|---|---|---|---|
| 2010 | 109,181 | 12.99 | 16.89 |
| 2015 | 111,496 | 13.27 | 17.25 |
| 2020 | 116,272 | 13.84 | 17.99 |
| 2025 | 120,159 | 14.30 | 18.59 |
| 2030 | 124,209 | 14.78 | 19.22 |
| 2035 | 125,431 | 14.93 | 19.40 |
| 2040 | 125,922 | 14.98 | 19.48 |

1 Included 0.16 MGD of BCWWS system uses/losses incurred providing water to Coconut Creek.

2 Based on 119 gallons per capita day.

3 Based on a maximum day to average day ratio of 1.30.

Table WM-12 shows the District 3A projected population and finished water demand potential to the year 2040.

Table WM-12
District 3A Projected Population and Finished Water Demand Potential 2015-2040

| Year | Projected Population[1] | Finished Water Demand Avg. Day (MGD) | Finished Water Demand Max. Day (MGD)[2] |
|---|---|---|---|
| 2010 | 15,821 | 3.12 | 4.27 |
| 2015 | 16,298 | 3.21 | 4.40 |
| 2020 | 17,014 | 3.35 | 4.59 |
| 2025 | 17,442 | 3.44 | 4.81 |
| 2030 | 17,962 | 3.54 | 4.85 |
| 2035 | 17,928 | 3.53 | 4.84 |
| 2040 | 17,827 | 3.51 | 4.81 |

1 Based on 2014 BCPRD TAZ estimate translation to UAZ populations.
2 Based on 197 gallons per capita day.
3 Based on a maximum day to average day ratio of 1.37

Table WM-13 shows the District 3BC projected population and finished water demand potential to the year 2040.

Table WM-13
District 3BC Projected Population and Finished Water Demand Potential 2015-2040

| Year | Projected Population[1] | Finished Water Demand Avg. Day (MGD) | Finished Water Demand Max. Day (MGD)[2] |
|---|---|---|---|
| 2010 | 32,480 | 3.35 | 4.88 |
| 2015 | 32,852 | 3.38 | 4.94 |
| 2020 | 33,706 | 3.47 | 5.07 |
| 2025 | 33,825 | 3.48 | 5.09 |
| 2030 | 35,763 | 3.68 | 5.38 |
| 2035 | 36,285 | 3.74 | 5.46 |
| 2040 | 36,640 | 3.77 | 5.51 |

1 Based on 2014 BCPRD TAZ estimate translation to UAZ populations.
2 Based on 103 gallons per capita day.
3 Based on a maximum day to average day ratio of 1.46.

## 2. Level of Service Standards

The Level of Service Standards, as described in Table WM-14, are not anticipated to change over the planning horizon. WWS Land Development Standards contains the methodology currently used to determine if the level of service standard can be met. BCWWS changes the methodology administratively from time to time as new information becomes available.

## 3. Raw Water Supply Needs

The level of service standard for source of supply is maximum day, meaning the system must have enough firm source of supply capacity to meet its maximum day needs. Firm capacity is the design capacity with the largest unit out of service.

The South Florida Water Management District, through its permitting process, has limited District 1's long term use of the SAS to a "base condition use" of 9.2 MGD average day flow for District 1. To meet the projected future finished water demands as indicated in Table WM-8 for District 1, the withdrawal and treatment of water from the Floridan Aquifer has been proposed.

The District 1 treatment plant currently uses approximately 4% of the SAS raw water supply in its lime softening treatment process. This means it takes 104 gallons of SAS raw water to produce 100 gallons of finished water. The amount of water used by the treatment process varies from plant to plant and by type of treatment process. The raw water flows in Table WM-14 are based on a level of service of 120 gallons per capita day with a 1.09 maximum day to average day ratio. Table WM-15 indicates that District 1 WTP has available treatment capacity but, SAS raw water capacity is likely to be limited between 2020 and 2040 by the base condition use.

Table WM-14
District 1 Comparison of SAS Raw Water Supply Facility Capacity and Permitted Capacity

| Year | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|
| Population Served[1] | 75,546 | 75,889 | 77,950 | 82,923 | 84,116 | 84,826 |
| Avg. Daily Demand (MGD)[2] | 9.07 | 9.11 | 9.35 | 9.95 | 10.09 | 10.18 |
| Max. Day Demand (MGD)[3] | 9.88 | 9.93 | 10.20 | 10.85 | 11.00 | 11.10 |
| Facility Capacity Surplus/(Deficit)(MGD)[4] | 5.42 | 5.37 | 5.10 | 4.45 | 4.30 | 4.20 |
| Permitted Raw Water Surplus/(Deficit)(MGD)[5] | 0.13 | 0.09 | (0.15) | (0.75) | (0.89) | (0.98) |

1 Population July 2013, Broward County WWS.
2 Based on 120 gallon per capita day raw water
3 Based on 1.09 maximum to average day raw water ratio
4 Calculated by subtracting Max. Day Demand from Available Facility Firm Capacity of 15.30 MGD
5 Calculated by subtracting Avg. Daily Demand from Permitted Raw Water Avg. Day of 9.20 MGD.

BCWWS is proposing to use the Floridan aquifer as an alternative source of supply to provide the additional water to meet demands at the end of the planning period. Use of this brackish water from the Floridian aquifer will require a significantly different treatment process than the type currently used for SAS raw water source. Nanofiltration, membrane and reverse osmosis treatment plants using the Floridan aquifer as the source of supply reject approximately 20% to 25% of the raw water in the treatment process. This means for every 100 gallons of finished water it takes 133 gallons of Floridian aquifer raw water, since the treatment process recovery rate is approximately 75%.

Tables WM-15 and WM-16 show the limitation of the SAS water source, the potential Floridan aquifer water source demand and the firm treatment capacity needed to treat both water sources, based on a 75% use of treatment plant capacity. A subsequent section describes the proposed Floridan aquifer source of supply project.

## Table WM-15
## District 1 SAS Source of Supply Future Needs

| Year | SAS Raw Water Avg. Day Demand Flow (MGD)[1] | Finished Water Avg. Day Demand Flow (MGD)[2] | Finished Water Max. Day Demand Flow (MGD)[2&3] | WTP Firm Capacity Required (MGD)[4] |
|---|---|---|---|---|
| 2015 | 9.07 | 8.69 | 11.29 | 14.12 |
| 2020 | 9.11 | 8.73 | 11.35 | 14.19 |
| 2025 | 9.20 | 8.85 | 11.50 | 14.38 |
| 2030 | 9.20 | 8.85 | 11.50 | 14.38 |
| 2035 | 9.20 | 8.85 | 11.50 | 14.38 |
| 2040 | 9.20 | 8.85 | 11.50 | 14.38 |

1 SAS average day demand up to SFWMD SAS baseline allocation limit for District 1 of 9.2 MGD.
2 Finished water average and maximum day based on Table WM-X for 2015 and 2020. Average daily finished water for Years 2025 through 2040 are based on raw to finished water ratio of 1.04.
3 Years 2025 through 2040 based on estimated finished water maximum to average day ratio of 1.30.
4 Based on a treatment capacity that is 25% more than the finished water maximum day demand.

## Table WM-16
## District 1 Floridan Aquifer Source of Supply Future Needs

| Year | SAS Raw Water Avg. Day Demand Flow (MGD)[2] | Finished Water Avg. Day Demand Flow (MGD)[1] | Finished Water Max. Day Demand Flow (MGD)[3] | WTP Firm Capacity Required (MGD)[4] |
|---|---|---|---|---|
| 2015 | 0 | 0 | 0 | 0 |
| 2020 | 0 | 0 | 0 | 0 |
| 2025 | 0.15 | 0.11 | 0.14 | 0.18 |
| 2030 | 0.92 | 0.69 | 0.90 | 1.12 |
| 2035 | 1.09 | 0.82 | 1.07 | 1.33 |
| 2040 | 1.20 | 0.90 | 1.17 | 1.46 |

1 Finished water average day demand flow not available from SAS water source.
2 Based on raw to finished water ratio of 1.33 reflecting 75% recovery from the treatment process.
3 Based on estimated finished water maximum to average day ratio of 1.30.
4 Based on a treatment capacity that is 25% than the finished water maximum day demand.

The SFWMD, through its permitting process, has limited the long-term use of District 2's current source of supply, the SAS, to the "base condition use" of 17.5 MGD average day flow. This base condition use includes 0.6 MGD SAS raw water for purchase by the City of Deerfield Beach Large User.

The District 2 treatment plant currently uses approximately 4% of the SAS raw water supply in its lime softening treatment process. This means it takes 104 gallons of SAS raw water to produce 100 gallons of finished water. The amount of water used by the treatment process varies from plant to plant and by type of treatment process. The raw water flows in Table WM-16 are based on a level of service of 124 gallons per capita day with a 1.10 maximum day to average day ratio. Table WM-17 indicates that District 2 WTP has available treatment capacity. The SAS raw water base condition use for District 2/NR wellfields provide enough capacity through the end of the planning period to meet project finished water demands without establishment of an alternative water source.

## Table WM-17
## North Regional/2A Wellfield Comparison of SAS Raw Water Supply, Facility Capacity Not Including Deerfield Beach

| Year | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|
| Population Served[1] | 111,496 | 116,272 | 120,159 | 124,209 | 125,431 | 125,922 |
| Avg. Daily Demand (MGD)[2] | 13.83 | 14.42 | 14.90 | 15.40 | 15.55 | 15.61 |
| Max. Day Demand (MGD)[3] | 15.21 | 15.86 | 16.39 | 16.94 | 17.11 | 17.18 |
| Facility Capacity Surplus/(Deficit) (MGD)[4] | 15.09 | 14.44 | 13.91 | 13.36 | 13.19 | 13.12 |
| Permitted Raw Water Surplus/(Deficit) (MGD)[5] | 3.67 | 3.08 | 2.60 | 2.10 | 1.95 | 1.89 |

1 Population July 2013, Broward County WWS.
2 Based on 124 gallon per capita day raw water
3 Based on 1.10 maximum to average day raw water ratio
4 Calculated by subtracting Max. Day Demand from Available Facility Firm Capacity of 30.30 MGD
5 Calculated by subtracting Avg. Daily Demand from Permitted Raw Water Avg. Day of 17.5 MGD.

Table WM-18 shows the SAS aquifer source of supply proposed to be used to meet future needs and how it relates to WTP capacity needed through the planning period.

Table WM-18
District 2 SAS Source of Supply Future Needs[1]

| Year | SAS Raw Water Avg. Day Demand Flow (MGD)1 | Finished Water Avg. Day Demand Flow (MGD)2 | Finished Water Max. Day Demand Flow (MGD)2 | WTP Firm Capacity Required (MGD)3 |
|---|---|---|---|---|
| 2015 | 13.83 | 13.27 | 17.25 | 21.56 |
| 2020 | 14.42 | 13.84 | 17.99 | 22.49 |
| 2025 | 14.90 | 14.30 | 18.59 | 23.24 |
| 2030 | 15.40 | 14.78 | 19.22 | 24.03 |
| 2035 | 15.55 | 14.86 | 19.40 | 24.25 |
| 2040 | 15.61 | 14.98 | 19.48 | 24.35 |

Notes Table WM-18:
1 SAS average day demand up to SFWMD SAS base condition use for District 2 of 17.5 MGD (SAS raw water average day shown does not include 0.6 MGD raw water allotted to Deerfield Beach).
2 Finished water average and maximum day from Table WM-17 above.
3 Based on 25% increase over finished water maximum day demand.

BCWWS is also implementing a reclaimed water irrigation project. It is anticipated that by 2015, this project will result in 0.1 MGD demand reduction, which will increase to 0.3 MGD by 2020 as more customers use reclaimed water for irrigation.

The County purchases finished water from the City of Hollywood (City) to meet the demands in the District 3 service area. The City is responsible for ensuring adequate raw water supply and treatment facilities. The City's existing CUP was issued by SFWMD on April 2008 and expires April 2028. The permit contains sufficient allocation to meet demands through the year 2028.

## 4. Treatment Facility Needs

The level of service standard for treatment is maximum day, meaning the system must have enough firm treatment capacity to meet its maximum day needs. The type of treatment is dependent on the source of supply. Since BCWWS intends to have two different sources of supply, two different treatment processes will be required. Tables WM-19 and WM-20 show the combination of Lime Softening and reverse osmosis treatment processes proposed to be used to meet District 1's future needs.

Table WM-19
District 1 Lime Softening Treatment Plant Future Needs

| Year | Finished Water Max Day Demand Flow (MGD)[1] | WTP Firm Capacity Required (MGD)[1] |
|---|---|---|
| 2015 | 11.30 | 11.33 |
| 2020 | 11.35 | 14.19 |
| 2025 | 11.50 | 14.38 |
| 2030 | 11.50 | 14.38 |
| 2035 | 11.50 | 14.38 |
| 2040 | 11.50 | 14.38 |

1 Based on Table WM-X Finished water maximum day demand and firm capacity

Table WM-20
District 1 Floridan Aquifer Treatment Plant Future Needs

| Year | Finished Water Maximum Day Demand Flow (MGD)[1] | WTP Firm Capacity Required (MGD)[1] |
|---|---|---|
| 2015 | 0 | 0 |
| 2020 | 0 | 0 |
| 2025 | 0.14 | 0.18 |
| 2030 | 0.90 | 1.12 |
| 2035 | 1.07 | 1.33 |
| 2040 | 1.17 | 1.46 |

1 Based on Table WM-X Finished water maximum day demand and firm capacity

Table WM-21 shows the SAS and proposed to be used to meet District 2's future needs.

Table WM-21
District 2 SAS Aquifer Treatment Plant Future Needs

| Year | Finished Water Maximum Day Demand Flow (MGD)[1] | WTP Firm Capacity Required (MGD)[2] |
|---|---|---|
| 2015 | 17.25 | 22.16 |
| 2020 | 17.99 | 23.09 |
| 2025 | 18.59 | 23.84 |
| 2030 | 19.22 | 24.63 |
| 2035 | 19.40 | 24.85 |
| 2040 | 19.48 | 24.95 |

1 Based on Table WM-X Finished water maximum day demand and firm capacity

## 5. Storage Facility Needs

The level of service standard for finished water storage is 40% of maximum day demand for meeting peak demands during the day and routine operational purposes, plus 0.63 million gallons (MG) for fire protection purposes.

Table WM-22 shows District 1's future storage needs. Since existing storage capacity is 7.1 MG, BCWWS will not need to increase its storage capacity during this planning period.

Table WM-22
District 1 Future Finished Water Storage Needs

| Year | Required Minimum Finished Water Storage (MG) |
|---|---|
| 2015 | 5.20 |
| 2020 | 5.25 |
| 2025 | 5.35 |
| 2030 | 5.59 |
| 2035 | 5.69 |
| 2040 | 5.77 |

Table WM-23 shows District 2's future storage needs. Since Coconut Creek is required to have its own finished water storage, the maximum day demand is the BCWWS portion of the overall maximum day demand. Since existing storage capacity is 8.5 MG, BCWWS does not need to increase its storage capacity within the foreseeable future. However, BCWWS CIP Project 9154 will replace some existing storage and will accommodate future demands.

Table WM-23
District 2 Future Finished Water Storage Needs

| Year | Required Minimum Finished Water Storage (MG) |
|---|---|
| 2015 | 4.03 |
| 2020 | 4.05 |
| 2025 | 4.07 |
| 2030 | 4.15 |
| 2035 | 4.17 |
| 2040 | 4.17 |

Table WM-24 shows District 3A's future storage needs. Since existing storage capacity is 2.0 MG, BCWWS needs to increase its storage capacity. BCWWS CIP Project 9058 will provide a 2.5 MG concrete potable water storage facility.

Table WM-24
District 3A Future Finished Water Storage Needs

| Year | Required Minimum Finished Water Storage (MG) |
|---|---|
| 2015 | 2.40 |
| 2020 | 2.46 |
| 2025 | 2.51 |
| 2030 | 2.57 |
| 2035 | 2.57 |
| 2040 | 2.57 |

Table WM-25 shows District 3BC's future storage needs. Since existing storage capacity is 4.0MG, BCWWS will not need to increase its storage capacity during this planning period.

Table WM-25
District 3BC Future Finished Water Storage Needs

| Year | Required Minimum Finished Water Storage (MG) |
|---|---|
| 2015 | 2.61 |
| 2020 | 2.66 |
| 2025 | 2.68 |
| 2030 | 2.77 |
| 2035 | 2.81 |
| 2040 | 2.85 |

## 6. Transmission/Distribution Facility Needs

In the late 1990s, BCWWS implemented a program to address drainage issues in certain areas. This program was quickly expanded by the County to include street improvements, sidewalks and neighborhood landscaping. BCWWS decided to upgrade a substantial portion of its piping system in the area covered by the program. Water and sewer system were planned to be repaired/replaced as necessary and service (mostly sewer service) extended to those that did not have it. These programs are called Neighborhood Improvement Projects (NIPS) and have grown into significant efforts requiring a substantial portion of BCWWS's retail utility resources, in terms of money and staff effort. From about 1997 to 2004, BCWWS' retail utility capital improvement program focused on the NIPS as its major component.

- District 1 and District 2 NIPS are anticipated to be completed by the year 2014.
- District 3A does not contain a NIPS.
- District 3BC NIPS have been completed.

The NIPS described above constitute a major commitment on the behalf of BCWWS to upgrade and improve its water transmission/distribution system. All totaled, they will address about 32% of the combined districts utility system (by area).

However, BCWWS realizes that the effort cannot stop with the previously identified NIPS. In 2001 BCWWS developed a Capital Projects Prioritization methodology that is described more fully in the Capital Improvements Section. This methodology provides a systematic approach to continued upgrading of the BCWWS systems.

## 7. Changing Regulatory Requirements

Please see the Section on Broward County Operated Regional Raw Water Supply Changing Regulatory Requirement for information that applied to the Broward County Operated Retail Utility and its raw water sources.

One of the most significant regulations in the past five years was the SFWMD adoption of the Regional Water Availability Rule in February 2007. This rule limits water use from the SAS to those withdrawal levels permitted prior to April 2006. Implementation of this rule has removed the SAS from consideration as a raw water source to meet future increases in water supply demand. This document explains how BCWWS intends to meet future needs through alternative water supplies.

Another significant change in the regulations was initiated with the passing of a bill in 2008 by the Florida legislature requiring all facilities that discharge domestic wastewater through ocean outfalls to meet higher treatment standards by 2018. By 2025 domestic wastewater facilities with ocean outfalls are required to achieve at least 60% reuse of the generated wastewater and cease discharge to the ocean outfalls, except in emergency situations. The Broward County North Regional Wastewater Treatment Facility has an ocean outfall and will be required to comply with the new regulations. The implementation of these requirements for wastewater reuse may have positive impact on water availability into the future.

## 8. Alternative Water Supply

BCWWS plans to meet its future source of supply and water treatment needs by obtaining raw water from the Floridan aquifer where SAS base condition limitations are outstripped by service area finished water demands. BCWWS will continue to permit and operate its District 1 SAS facilities at the base condition use for the SAS of 9.2 MGD average annual and 280 MGM maximum month flow. BCWWS also is pursuing the incorporation of 0.837 MGD average day allocation to establish a SAS base condition use of 10.04 MGD and the correction of the SAS maximum monthly allocation to 333 MGM. This modification will provide more SAS reliability into the future.

BCWWS is currently exploring construction of a reverse osmosis membrane treatment plant for the treatment of brackish water from the upper Floridan aquifer alternative water supply source. The treatment plant is planned to be located at the existing District 1 treatment site. The first phase of the treatment plant is planned to produce a minimum 4.5 MGD of finished water (maximum day basis), and will be designed so that it is expandable to a minimum of 5.5 MGD. According to demand projections, the initial Floridan treatment plant combined with the lime softening treatment plant should meet demands until after 2040.

The alternative water supply project will include enough Floridan well capacity to supply the treatment plant. Using a recovery rate of 75%, Floridan wells with an average annual day withdrawal of 6.0 MGD will be required for the first phase of the treatment plant. The plant expansion would require an additional 1.3 MGD of annual average day withdrawal. The initial phase of the Floridan wellfield will be designed for its eventual expansion. The wellfield should have enough physical capacity to insure delivery of raw water with the largest well out of service.

BCWWS plans to meet its District 2 future source of supply and water treatment needs from the existing SAS facilities. A Floridian aquifer water source will be evaluated over the planning period for eventual development. BCWWS will continue to permit and operate its SAS facilities at base condition use of 17.5 MGD average annual and 585.2 MGM maximum month flow.

BCWWS is also implementing a reclaimed water irrigation project in the District 2 service area. It is anticipated that by 2015, this project will result in 0.1 MGD less demand. Demand reduction will increase to 0.3 MGD by 2020 as more customers utilize the reclaimed water for irrigation.

BCWWS has $48.2 million for the proposed District 1 Floridan WTP in its five-year capital improvement program to provide the required Floridan Aquifer production capacity. This project received its initial funding in FY08. The anticipated schedule is:

| | |
|---|---|
| Planning and Design | 2008 – 2016 |
| Permitting and Procurement | 2010 – 2016 |
| Construction and Startup | 2011 – 2018 |

Planning and design includes any necessary Floridan test wells and final production well consumptive use permitting. BCWWS will continue to pursue demand reduction practices. This will not impact the sizing of the initial Floridan aquifer project, but may delay the need for the subsequent expansion.

### 9. Capital Improvement Program

The Board is the authority responsible for approving BCWWS capital improvement program budgets. Each year the Board approves an encumbrance budget for the next fiscal year and a five-year capital improvement plan. See the Capital Improvements Element for information on BCWWS' capital improvement program.

## B. Broward County Operated Regional Raw Water Supply

### 1. Level of Service (LOS) Standards

The level of service standards for the regional wellfields are the Regional Water Availability Rule "Base Condition Use" as defined by the SFWMD for each regional wellfield as described above. Table WM-26 summarizes the large user demands based on current SFWMD CUPs for each BCWWS regional wellfield.

Table WM-26
Regional Wellfield Base Condition Water Use and Large User's Allocations

| | NORTH REGIONAL WELLFIELD | | SOUTH REGIONAL WELLFIELD | | | |
|---|---|---|---|---|---|---|
| Description | BCWWS WTP 2 (MGD) | Deerfield Beach (MGD) | Hallandale Beach (MGD) | Hollywood (MGD) | Dania Beach (MGD) | FPL (MGD) |
| Current Permitted (Avg. Day-Max. Day) | Avg. Day 7.4 MGD<br>Max Day 8.9 MGD | | Avg. Day 14.2 MGD<br>Max. Day 22.4 MGD | | | |
| Large User Allocation (Avg. Day)[2] | 6.8 | 0.6 | 4.4 | 5.9 | 1.7 | 2.0 |
| Large User Allocation (Max. Day)[2] | 8.1 | 0.8 | 5.3 | 7.1 | 2.0 | 2.4 |
| Total for Large Users (Avg. Day-Max. Day) | Avg. Day 7.4 MGD<br>Max. Day 8.9 MGD | | Avg. Day 14.0 MGD<br>Max. Day 16.8 MGD | | | |

1 Based on current CUP allocations under permits 06-01634-W and 06-01474-W.
2 Based on current large user CUP demand projections and large user agreements.

### 2. Capital Improvement Programs

As both NRW and SRW facilities have adequate capacity to provide service to the year 2028, there is no capital improvement program associated with these facilities.

## C. Other Water Providers

### 1. City of Fort Lauderdale

Future water demands for the Fort Lauderdale water utility service areas was estimated based on per capita rates of consumption measured in 20008 and the projected increase in the number of wholesale and retail customers. Distribution losses were also taken into account. For the BMSD areas of the County supplied water by Fort Lauderdale, the 2005 water use was increased by the projected percent increase in population associated with the area served by the water supply and as presented in population forecasts.

a. *Projected Flows*. The population projections and projected water demands for the BMSD areas provided water by the City of Fort Lauderdale were estimated based on per capita rates of water consumption measured in 2008 and the projected increase in the number of retail customers. The per capita water demand in these areas was conservatively estimated to be 197 GPD. The total projected demands on the City of Fort Lauderdale water utility for all areas provided water are summarized in Table WM-27. Table WM-28 and Table WM-29 show the projected populations for the City of Fort Lauderdale Retail and Wholesale Service Areas respectively, including the BMSD populations serviced by the City of Fort Lauderdale utility.

b. *Ability to Meet Future Needs*. The City of Fort Lauderdale water utility has adequate wellfield capacity (85.2 MGD) to meet the projected water supply demands of the BMSD areas of 1.46 MGD of finished water demand in 2035. The City also has sufficient treatment capacity (82.0 MGD) to meet this projected demand, based on the current treatment technology, through 2035. While wellfield capacity might limit the utility's ability to meet peek demands of 91 MGD, on-site storage of 24.0 MG will likely mediate these deficiencies. Although the City of Fort Lauderdale appears to have sufficient wellfield and treatment capacity to meet the projected demands, the utility's current consumptive use permit limits withdrawals from the Biscayne Aquifer, the sole source of water for both the Peele-Dixie and the Fiveash WTPs, to an average of 52.55 MGD to 2028. The City has proposed that any additional demand be met by the development of the Floridan Aquifer and a reduced water demand rate. By 2035, the utility's water supply needs are projected to reach 55.50 MGD.

## Table WM-27
## Projected Population and Water Demands for the City of Fort Lauderdale Water Utility

| Year | Projected Population | Average Daily Demand (MGD)[1] |
|---|---|---|
| 2015 | 267,774 | 47.21 |
| 2020 | 285,763 | 50.48 |
| 2025 | 304,301 | 53.63 |
| 2030 | 322,901 | 56.79 |

[1] Demands are estimated from the projected water needs of retail and wholesale customers and are in MGD. Calculation of the average daily demand was based on per capita water demands and population projections for each of the service areas in the 2008 CUP.

## Table WM-28
## City of Fort Lauderdale Wholesale Population Projections 2010-2035

| Municipality | 2015[1] | 2020[1] | 2025[1] | 2030[1] | 2035[1] |
|---|---|---|---|---|---|
| Davie[2] | 528 | 530 | 527 | 534 | 585 |
| Lauderdale Lakes | 381 | 383 | 378 | 386 | 386 |
| Lauderhill | 2,890 | 2,881 | 2,840 | 2,927 | 2,969 |
| Lazy Lake[3] | 26 | 26 | 26 | 26 | 26 |
| North Lauderdale | 349 | 352 | 1,060 | 1,291 | 1,403 |
| Oakland Park | 27,122 | 28,097 | 28,682 | 29,818 | 30,176 |
| Oakland Forest Subdivision (within Oakland Park)[4] | 3,584 | 3,621 | 3,575 | 3,659 | 3,649 |
| Tamarac | 2,152 | 2,162 | 2,137 | 2,179 | 2,188 |
| Wilton Manors | 11,611 | 11,740 | 11,693 | 11,931 | 11,929 |
| Total | 48,643 | 49,792 | 50,918 | 52,751 | 53,311 |

(City of Fort Lauderdale Department of Sustainable Development, Urban Design & Planning Division, June 12, 2014)

[1] The 2015 to 2030 population projections are based on the 2014 Traffic Analysis Zones and Municipal Forecasts Update prepared by the Broward County Planning and Development Management Division (PDMD). The update assigns the forecasted estimates from the University of Florida's Bureau of Economic and Business Research (BEBR), "Detailed Population Projections by Age, Sex, Race, and Hispanic Origin, for Florida and Its Counties, 2015-2040, With Estimates for 2012 All Races" to Broward County's 2010 Traffic Analysis Zones (TAZ) and municipalities.

[2] Area includes a portion of the Hacienda Village neighborhood, which comprises TAZ 651

[3] The Village of Lazy Lake is built-out

[4] Oakland Forest is a subdivision of the City of Oakland Park and comprises all of TAZ 414. Potable water from the City of Fort Lauderdale is supplied through a master meter. Water demand by the residents in this subdivision was forecast separately from the water demand of the City of Oakland Park.

Table WM-29
City of Fort Lauderdale Retail Population Projections 2010-2035

| Municipality | 2015[1] | 2020[1] | 2025[1] | 2030[1] | 2035[1] |
|---|---|---|---|---|---|
| Fort Lauderdale | 169,094 | 174,316 | 189,166 | 198,394 | 201,880 |
| Lauderdale-by-the-Sea | 3,841 | 4,009 | 3,960 | 3,922 | 3,894 |
| Sea Ranch Lakes | 703 | 720 | 709 | 704 | 697 |
| BMSD Broward County | 6,265 | 6,652 | 7,005 | 7,297 | 7,414 |
| Total | 179,903 | 185,697 | 200,840 | 210,317 | 213,885 |

Notes for Table WM-25: (City of Fort Lauderdale Department of Sustainable Development, Urban Design & Planning Division, June 12, 2014) [1] Source: The 2015 to 2030 population projections are based on the 2014 Traffic Analysis Zones and Municipal Forecasts Update prepared by the Broward County Planning and Development Management Division (PDMD). The update assigns the forecasted estimates from the University of Florida's Bureau of Economic and Business Research (BEBR), "Detailed Population Projections by Age, Sex, Race, and Hispanic Origin, for Florida and Its Counties, 2015-2040, With Estimates for 2012 All Races" to Broward County's 2010 Traffic Analysis Zones (TAZ) and municipalities. (City of Fort Lauderdale Department of Sustainable Development, Urban Design & Planning Division, June 12, 2014)

c. *Capital Improvement Projects.* The City of Fort Lauderdale plans to develop a Floridan wellfield and treatment facility in order to meet the projected water supply needs of approximately 62 MGD in 2025. Major capital improvement projects currently underway include the construction of new wells at the Peele-Dixie wellfield to replace 19 wells that are being abandoned due to wellfield contamination issues and transitioning from lime softening to nanofiltration at the Peele-Dixie WTP. While nanofiltration will enhance the quality of finished water by removing discoloration associated with high levels of dissolved organics, the replacement of lime softening processes with membrane treatment will also increase the total raw water demand. Since membrane treatment has a finished water recovery equal to 80% of raw water treated, compared to 96% with lime softening, the utility will need to increase pumpage and treatment to provide the same amount of finished water.

d. *Upgrade of the Peele-Dixie WTP 2018.* Planned upgrade of the Peele-Dixie WTP will provide finished water via nanofiltration. Continued use of the Fiveash WTP for treatment by lime softening will, in conjunction with the Peele-Dixie facility, provide water for the City's wholesale and retail customers. There will be continued system

improvements through the WaterWorks 2011 program and additional transmission system infrastructure improvements will be required.

# SANITARY SEWER

## A. Broward County Operated Retail Utility

### 1. Projected Flows

a. *Broward County Demographic Forecast Model (BCDFM) Update*. The Broward County Planning and Development Management Division (PDMD) periodically updates their forecast model. The update assigns the forecasted estimates from the University of Florida's Bureau of Economic and Business Research (BEBR), "Detailed Population Projections by Age, Sex, Race, and Hispanic Origin, for Florida and Its Counties, 2015-2040, with Estimates for 2012 All Races" to Broward County's 2010 traffic analysis zones (TAZ) and municipalities.

BEBR forecasts were assigned to TAZ and municipalities utilizing a household-based model. BEBR's forecasts by population age are converted to countywide household forecasts using a weighted average of the years 2000 and 2010 Census householders by age group data. The converted countywide household forecasts were then assigned to TAZ based on the interaction between: (1) The change in the countywide household size distribution through forecast periods; (2) The established TAZ level distribution of households; and (3) The capacity of each the TAZ to absorb additional housing units. Since the County's population is expected to continue to grow and change, the future distribution of population and housing by municipality and TAZ is likely to be varied. Input from the local planning and service delivery entities guided the distribution process. Underlying the distribution process are land development characteristics and the Broward County Land Use Plan.

b. *Methodology Used to Determine Projected Flows*. BCWWS estimated future potable water flows, and will determine future sanitary sewer flows based on the potable water estimates by 2016. BCWWS' potable water

and sanitary sewer service areas cover geographically different areas. Each district has locations where BCWWS provides water service but not sanitary sewer service, and/or vice versa. These differences were accounted for when estimating future Sewered population.

BCWWS uses utility analysis zones (UAZ) to plan and coordinate utility activities within its service areas. The UAZ defines the boundaries of the utility's service areas within each TAZ. BCWWS service areas encompass 150 of the 892 TAZs, which are then divided into 130 UAZs. Retail customers in each UAZ are categorized as "single family residential", "multi-family residential", "commercial" and "other".

In 1995, as part of a master planning effort, water usage for each of the four customer categories listed above was determined for each UAZ using current BCWWS billing records. System uses were calculated on a District by District basis and allocated to each UAZ to determine a total potable water demand per UAZ. The percentage of a TAZ in each UAZ was also determined. Adjustments were made to account for UAZs where BCWWS does not provide potable water service (i.e. those UAZs or portions of UAZs where BCWWS provides services for sewer only, not water) and for UAZs that contained a portion of a TAZ that did not include single or multi-family residential land use. The adjustment consisted of a deduction in the TAZ percentage based on land area.

In February 2012, EPGMD provided BCWWS with projected population changes prepared by PRD in five year increments from 2010 to 2030 for each TAZ that is totally or partially within the BCWWS' retail service areas. EPGMD also provided PRD estimates of dwelling unit changes through the year 2030. Based upon the numbers provided and subsequent briefings by EPGMD staff, BCWWS service areas are expected to be impacted by two phenomena in the future: (1) A redevelopment corridor loosely defined as bordering and to the east of State Road 7; and (2) An increase in the number of people living in each dwelling unit, both new and existing.

BCWWS population projections utilize the year 2010 as a base year. Following the methodology used in the BCWWS Master Plan, the year

2010 population was determined for each UAZ based on the 2010 Census data and for the year 2040 based on projections provided by EPGMD.

Currently not all BCWWS water customers are on sanitary sewer. It is assumed that by the year 2040 all BCWWS water customers will be on sanitary sewer. The 2002 Master Plan established two infiltration/inflow criteria: one for new sewer systems and the other for rehabbed sewer systems.

Interim year demands will be determined by doing the same detailed population projection as was done for the year 2040, then calculating change in demand as a percentage of change in population. Tables 30 through 33 contain those projected demands.

Table WM-30
BCWWS 2002 Master Plan Retail District 1 Projected Sewered Population and Sanitary Sewer Demands

| Year | Projected Sewered Population | Average Day Sanitary Sewer Flow (MGD) |
|---|---|---|
| 2015 | 86,465 | 12.0 |
| 2020 | 87,634 | 12.3 |

Note: All flows are annual average flows, rounded to the nearest tenth of an MGD

Table WM-31
BCWWS 2002 Master Plan Retail District 2 Projected Sewered Population and Sanitary Sewer Demands

| Year | Projected Sewered Population | Average Day Sanitary Sewer Flow (MGD) |
|---|---|---|
| 2015 | 61,391 | 9.7 |
| 2020 | 62,110 | 10.2 |

Note: All flows are annual average flows, rounded to the nearest tenth of an MGD.

Table WM-32
BCWWS Retail District 3A Projected Sewered Population and Sanitary Sewer Demands

| Year | Projected Sewered Population | Average Day Sanitary Sewer Flow (MGD) |
|---|---|---|
| 2015 | 16,068 | 3.4 |
| 2020 | 16,702 | 3.6 |

Note: All flows are annual average flows, rounded to the nearest tenth of an MGD.

Table WM-33
BCWWS 2002 Master Plan Retail District 3BC Projected Sewered Population and Sanitary Sewer Demands

| Year | Projected Sewered Population | Average Day Sanitary Sewer Flow (MGD) |
|---|---|---|
| 2015 | 34,228 | 2.1 |
| 2020 | 34,619 | 2.3 |

Note: All flows are annual average flows, rounded to the nearest tenth of an MGD.

## 2. Level of Service Standards

The LOS Standards as described in Table WM-XX are not anticipated to change over the planning horizon. BCWWS has linked its level of service analysis to its developer coordination process as described in Appendix - Determining BCWWS' Ability to Serve.

## 3. Treatment of Effluent Disposal Facilities' Needs

District 1 and District 2 treatment and effluent disposal facilities needs will be met by the Regional Wastewater System. See that Section for more information. District 3A and District 3BC treatment and effluent disposal facilities needs are

met by the City of Hollywood's facilities. BCWWS has 5.88 MGD of reserve capacity at the Hollywood WWTP, which should be sufficient until about the year 2018. This provides sufficient time for BCWWS and Hollywood to make arrangements for Hollywood to handle the additional capacity required to meet year 2040 needs.

## 4. Transmission/Collection System Needs

The 2002 Master Plan did not contain significant transmission system recommended improvements. Collection system recommended improvements were identified to increase the capacity of a few force mains and lift stations as growth occurs. Piping that might reach the end of its useful life during the planning period was not addressed as BCWWS had started implementation of its Neighborhood Improvement Program (NIP) as described below. An updated master plan is scheduled to be completed in 2016.

Simultaneous with Master Plan development in the late 1990s, BCWWS implemented a program to address drainage issues in certain areas. This program was quickly expanded by the County to include street improvements, sidewalks and neighborhood landscaping. BCWWS decided to upgrade a substantial portion of its piping system in the area covered by the program. Water and sewer system were planned to be repaired/ replaced as necessary and service (mostly sewer service) extended to those that did not have it. The NIP which consists of a set of projects (Project) in eight major communities representing 25 neighborhoods have grown into a significant effort requiring a substantial portion of BCWWS' retail utility resources, in terms of money and staff effort. From about 1997 to 2014, BCWWS' retail utility capital improvement program focused on the NIP as its major component.

The NIP was initiated by the County in 1993 to upgrade the infrastructure in what were BMSD neighborhoods. The improvements include upgrades to the existing water and sewer system, installation of drainage, new pavement, swales and landscaping. The total estimated cost of the program is approximately $752 million dollars. Approximately $388 million, or 53 percent of total cost, is for water and sewer upgrades. The remaining 47 percent of total cost associated with sidewalk, drainage and landscaping improvements is being funded by the County's general fund.

The NIP encompasses an area the size of a medium city with 9,335 acres, 92,500 people and 28,555 homes. The planned improvements include 295 miles of roadways, 428 miles of sidewalk and 623 miles of pipeline which will enable the elimination of 10,607 septic tanks. Construction started in 1996 and is currently scheduled to be completed in 2018. Of the 66 planned bid packages, 59 have been completed and 6 are in construction. The final bid pack, Hillsboro Pines is expected to begin construction in 2015.

In mid-2004, Broward County acquired the Broadview Park private utility. The Broadview Park service area contains about 715 acres and is located by State Road 7 to the east, Peters Road to the north, and Florida's Turnpike to the west and Interstate I595 to the south. The area contains about 6,500 people. Projected future sewer demand is 0.6 MGD ADF. BCWWS completed construction of the updated water system and install sanitary sewers in the area.

### 5. Changing Regulatory Requirements

Changing regulatory requirements are not expected to significantly affect the BCWWS retail utility.

### 6. Capital Improvement Program

The Broward County Board of County Commissioners is the authority responsible for approving BCWWS capital improvement program budgets. Each year the Board of County Commissioners approves an encumbrance budget for the next fiscal year and a five-year capital improvement plan. See the Capital Improvements Element for information on BCWWS' capital improvement program.

## B. Broward County Operated Regional Wastewater System

### 1. Projected Flows

Each year users of the Regional Wastewater System are requested to submit flow projections. Tables 34A and 34B provide the 2013/2014 projections. Data not available are indicated by "n/a," and BCWWS data are from the 2002 wastewater master plan.

Table WM-34A
Regional Wastewater System Projected Demands

| Year | BCWWS Districts 1 & 2 | Coconut Creek | Coral Springs | Deerfield Beach | Lauderhill | North Lauderdale |
|---|---|---|---|---|---|---|
| 2015 | 21.7 | 4.5 | 8.61 | 6.7 | 6.59 | 3.66 |
| 2020 | 22.6 | 6.54 | 9.20 | 7.4 | 6.94 | 3.66 |
| 2025 | n/a | 6.54 | 9.35 | 7.7 | 7.09 | 4.01 |
| 2030 | n/a | 6.54 | 9.50 | 8.0 | 7.10 | 4.14 |

Note: All flows are annual average flows, rounded to the nearest tenth of an MGD. (1) Current projected demands not available; used current plant allocation.

Table WM-34B
Regional Wastewater System Projected Demands (continued)

| Year | North Springs | Oakland Park | Parkland (1) | Pompano Beach | Royal Utilities (1) | Tamarac |
|---|---|---|---|---|---|---|
| 2015 | 3.32 | 1.51 | 0.27 | 13.91 | n/a | 7.88 |
| 2020 | 3.36 | 1.51 | 0.27 | 15.11 | n/a | 8.15 |
| 2025 | 3.37 | 1.52 | 0.27 | 16.24 | n/a | 8.25 |
| 2030 | 3.37 | 1.52 | 0.27 | 17.45 | n/a | 8.50 |

Note: All flows are annual average flows, rounded to the nearest tenth of an MGD.

## 2. LOS Standards

The LOS standard for the regional water supply is not anticipated to change from the current level of service standard, which is to provide the customer with a "reserve capacity".

## 3. Treatment/Effluent Disposal Needs

Treatment and effluent disposal facilities have been expanded to 95 MGD ADF. This expansion was completed in 2007 and should meet the needs of the Large Users through the year 2040.

## 4. Transmission System Needs

The transmission system was most recently modeled the year 2002. The Approved FY14 Capital Budget includes the following projects in Table WM-35:

Table WM-35
Regional Wastewater System FY14-18 Projects

| Pump Station Project | Total Cost Estimate ($M) | Completion Year |
|---|---|---|
| PS 456 Improvements | 4.0 | 2016 |
| PS 450 Improvements | 2.9 | 2016 |
| C-14 Canal Force Main | 2.2 | 2014 |
| Master PS 454 Rehabilitation | 1.5 | 2017 |
| Master PS 462 Emergency Generator | 0.5 | 2014 |
| Master PS Controls Upgrade | 3.0 | 2017 |
| Retail Wastewater Meter M-471 Rehabilitation | 0.6 | 2014 |
| Misc. Master PS improvements | 2.5 | 2018 |
| Regional System Master Plan | 3.0 | 2016 |

All other pump stations and the transmission piping were adequately sized through the year 2030. BCWWS should re-examine the transmission system's capacity after each Large User has completed its 10-Year Water Supply Facilities Work Plan update for 2014 and adjust the wastewater projections accordingly.

## 5. Changing Regulatory Requirements

Management of effluent and biosolids will likely continue to challenge BCWWS. Three potential concerns that could have significant financial impacts to the regional system are:

- EPA rule-making with regards to the practice of disposing treated wastewater in deep wells. Rule changes that would necessitate higher treatment levels would have a significant financial impact on BCWWS operations.

- The growing concern over the potential impact that prescription and other drug residuals that reach wastewater effluent may have on both the natural system and humans. Research is under-way that will attempt to measure these impacts and at what dosages they may cause harm. These studies, the results and subsequent potential rule-making will probably occur in the next ten years. New treatment methods will need to be developed and implemented to comply with any rule making.

- The FDEP's continued promotion of nutrient reduction related to ocean discharges under the Leah Schad Memorial Ocean Outfall Program (effective date July 1, 2008) and the EPA mandate for closure of the County's outfall by 2025 has increased the County's focus on reuse system expansion and alternative disposal methods.

### 6. Capital Improvement Program

The regional wastewater treatment plant has been expansion to 95 MGD. Several projects are presented in the FY2014-FY2018 CIP to develop cogeneration facilities, improve septage facilities, make electrical upgrades, improve aeration, increase deep injection well capacity, and other improvements.

## C. Broward Municipal Services District Areas

Currently very little of the BMSD areas of Broward County are provided water service by BCWWS. However, a significant County boundary change took place in 2009 with approval of House Bill 1315 that approved the transfer from Palm Beach County to Broward County of a 1,949-acre wedge-shaped property located between County Line Road and Loxahatchee Road. Currently the area of BMSD land is 12.4 sq. miles with a population of less than 16,000, which includes the recently annexed 'Wedge' south of the Hillsboro Canal.

The future needs of the municipal wastewater treatment facilities and their respective collection/transmission systems will not be greatly impacted by the annexation or continued BMSD area status of the remaining BMSD areas. Most of the areas are already developed, and either are already connected to a municipal system or utilize septic systems. Table WM-36 illustrates that the municipal facilities have sufficient

capacity to support the development of the undeveloped properties in the projected remaining BMSD area outside of the 5.8 acres of already developed regional facilities such as landfills and airports.

Table WM-36
Wastewater Treatment Plant Committed and Available Capacities for Plants Serving the BMSD Area

| | Fort Lauderdale | Hollywood | Sunrise |
|---|---|---|---|
| Licensed design capacity (MGD-AADF) | 48.00 | 50.00 | 30.45 |
| Annual average daily flow (mgd-2012) | 42.69 | 40.41 | 24.20 |
| Committed flows per building permits (MGD) | 1.53 | 1.39 | 0.40 |
| Total capacity utilized (MGD) | 44.22 | 41.78 | 24.60 |
| Total capacity utilized (%) | 92 | 84 | 79 |
| Available capacity (MGD) | 3.78 | 8.22 | 5.85 |
| Available capacity (%) | 8 | 16 | 21 |

## DRAINAGE AND NATURAL GROUNDWATER RECHARGE

### A. Facility Capacity Analysis

The primary and secondary drainage systems should continue to be able to meet future demands in accordance with the design storm criteria established by the SFWMD and the WMD. The systems within the western three sectors, however, may need to be expanded to accommodate drainage needs as development occurs.

The regulatory process working in concert with the development review process of the LDC will reduce the probability of future development that does not conform to the adopted level of service standards for drainage.

### B. Expected Life of Drainage Facilities

Since the expected life of drainage facilities varies, depending upon such factors as the type of facility, the amount of use, and the age of the facility, it is often difficult to

estimate the expected life of the facilities. Consequently, the approach used by both the SFWMD and the WMD is to allocate funds for other drainage improvements. This approach allows for the gradual replacement of drainage facilities as the facilities start to deteriorate.

## C. Impact of Drainage Facilities on Adjacent Natural Resources

The landscape has been dramatically altered from its original state. Installation of the elaborate system of canals, levees, and other water control structures drained eastern portions of the Everglades, opening the land for development. Nearly all of the developable land in Broward County is attributable to drainage. Impacts upon surface water, groundwater, fisheries and wetlands have occurred as a result.

Nonpoint source pollution is one of the major causes of water quality degradation. One of the primary ways nonpoint source pollution reaches surface water and groundwater is through the flow of stormwater runoff. Pollutants are often dissolved in the water or absorbed to sediments suspended in the water. There are many types of nonpoint source pollutants which result from different types of land uses. Common types of contaminants include pesticides, sediments, heavy metals, bacteria and nitrates. These contaminates can originate from residential lawns, construction sites, urban streets and parking lots, and agricultural activities.

The few natural rivers which exist in the county have been incorporated into the primary drainage system. Concurrently, the water carrying capacities in these rivers has been increased to accommodate greater quantities of stormwater runoff received from the secondary and tertiary drainage systems. Several negative effects on rivers include dredging, channel alterations, and nonpoint source pollution.

Alterations in the natural drainage system, increasing demands on the aquifer system, and threats to coastal wellfields from saltwater intrusion have prompted changes in the way water is managed in the County. Improved operation of the canal system and efforts to enhance recharge through these improved operations have helped to maintain groundwater levels and protect wellfields against saltwater intrusion, particularly during dry periods and times of drought when increasing demands are placed on wells for irrigation.

The drainage system has also had negative effects upon fisheries. The introduction of nutrients into the marine environment stimulates the growth of algae and other aquatic

vegetation at inflated rates. As the plant life dies and decays, it consumes oxygen dissolved in the water. Occurrences of low dissolved oxygen or no dissolved oxygen result in kills of fin fish and shell fish. The input of toxics into the aquatic eco-system also poses risks to aquatic animals. Some toxins can bio-accumulate, which is the process whereby the concentration of a toxin increases at higher levels in the food chain, with associated harmful effects. Marine life may also become diseased by pathogens found in stormwater runoff.

Wetlands dominated the landscape prior to drainage and provided habitat for flora and fauna. Drainage has significantly reduced the quality and quantity of wetland habitat. Most remaining wetlands in the developable area are severely degraded from nonpoint source pollution and physical alterations and simply do not serve the same functions they did at one time. Programs are effectuating the protection of high quality wetlands which still exist (See Conservation Element).

Policy WM1.13 addresses the impacts of stormwater management facilities on adjacent natural resources.

## D. Problems and Opportunities for Drainage Facilities Replacement, Expansion and New Facility Siting

There are several problems which have been identified regarding the replacement and expansion of existing drainage facilities and the siting of new facilities. Some developed areas are maintaining exiting LOS standards rather than using adopted LOS standards. The purpose behind the policy is for accommodation of desirable infill development, which could be financially feasible if compliance with adopted level of service standards was compulsory. Expansion and siting of facilities in these developed areas is difficult because a predominance of the land has been consumed. Existing uncontrolled connections from older stormwater systems input an unquantifiable amount of storm water into the drainage system. These uncontrolled connections from older stormwater systems reduce the amount of input allowable for permitted connections. Capital facilities planning is difficult as well because it is difficult to estimate the longevity of drainage facilities and structures.

Opportunities for replacing and expanding drainage facilities do exist. Priority expenditures for capital improvements which are necessary to ensure facilities are adequate have been identified through the year 2012. Deficiencies in areas complying with existing LOS standards are expected to have facilities upgraded to meet adopted

LOS over the next thirteen years. Spending projections allow for the difficulty in estimating facility longevity by including a category of spending called 'other' in the capital facilities plan. Growth in the undeveloped areas of the county is being closely scrutinized during the permitting process to ensure adopted LOS standards will be met. Concurrency is more easily achieved in the undeveloped areas of the county because land is more readily available for facility siting.

### E. Assessment of Regulations and Programs

Providing good drainage while, at the same time, promoting aquifer recharge with water of desirable quality, requires careful design and placement of drainage systems. Section 5-182(d) of The Broward County Land Development Code (LDC), requires adequacy of water management works prior to the issuance of any development permit in the BMSD area. Section 5-198(d) of the LDC requires adequacy of water management works for developments within municipalities which are required to plat. Adequacy of water management is based upon compliance with applicable provisions of the Broward County Code of Ordinances, Broward County Administrative Code, Water Resource Management Regulations, and Drainage Design Criteria and the "Minimum Standards Applicable to Public Right-of-Way Under Broward County Jurisdiction" of the Broward County Engineering Division in conjunction with the adopted drainage or Water Resources Management Master Plans of the County, and of any other governmental agency having jurisdiction over the area.

# IMPLEMENTATION

## POTABLE WATER

### A. Authority

~~The BCHD is responsible for licensing and monitoring WTP operation; and issuing approvals for private wells. BCHD issues permits for the operation of water plants subject to compliance with state water quality standards.~~

All water wells 12-inches in diameter or smaller, including irrigation wells and monitoring wells, located in Broward County shall require a permit from Florida Department of Health in Broward County prior to well construction, abandonment, repair, or modification. This does not include AC drainage, air sparging or vapor extraction wells that are processed by the Florida Department of Environmental Protection (FDEP). Wells

larger than 12-inches in diameter shall continue to be permitted by the South Florida Water Management District (SFWMD).

While the EPGMD does not implement adequacy or concurrency for potable water nor regulate potable WTPs, it is responsible for ensuring continuing availability of adequate water supplies for competing uses, while maintaining the functions of natural systems.

SFWMD regulates withdrawals from surface and groundwater systems. The SFWMD issues general and individual water use permits for any use, diversion, or withdrawal from surface or groundwater within the SFWMD boundaries and works with other water management districts to resolve jurisdictional water use boundary impacts.

BCWWS is concerned with the groundwater withdrawal, treatment and distribution of treated finished water to retail customers, and through agreements with large users and other municipal systems.

Planning and Development Management Division (PDMD) administers the Land Development Code (LDC). All development permits issued in Broward County, whether incorporated area or the BMSD areas must be in compliance with the Land Development Code. The Broward County LDC states that potable water service for new developments must be available before a certificate of occupancy is issued regardless whether BCWWS is the service provider or the service provider to the development is another municipality.

Broward County LDC Section 5-182(e) regulates the potable water requirements and level of service standards. This process conditions the issuance of a development permit on the availability of adequate potable water service prior to occupancy in accordance with Chapter 5, Article IX, "Board County LDC," Section 5-182(f) for the BMSD Area and Section 5-198(e) for municipalities.

The BCHD assesses availability of facilities by applying a “gallons per day” design flow demand rate to the proposed development and then determining whether the proposed development's demand will exceed the licensed capacity of the treatment plant considering the existing utilized and "committed" capacity.

BCWWS will use the WWS Land Development Standards to assess concurrency at the time of application for site plan approval or building permit for properties within the BCWWS utility district service areas. BCWWS retains the authority to require appropriate information to be submitted to settle any dispute. BCWWS utilizes Equivalent Residential Units (ERUs) to monitor committed and reserve capacities of its facilities as part of the ongoing permitting process.

BCHD will use the following potable water design flow rates in Table WM-37 which were adopted by the Board of County Commissioners to assess adequacy of service at the time of plat approval for all properties that are required to be platted and for those properties within the BMSD Area that are not required to be platted, at the time of site plan approval. In the case where the type of connection is not listed, then the most suitable one is to be used.

Table WM-37: Potable Water Demand Rates

| Facility Type | Water Use in Gallons per Day |
|---|---|
| Residential<br>per capita per day<br>per single family unit | <br>100<br>350 |
| Retail per square foot | 0.1 |
| Office per square | 0.2 |
| Other non-residential per capita | 20 |

BCHD uses the development review process of the LDC to assure adequate potable water services are available prior to occupancy consistent with the potable water design flow rates adopted by the Board. Applicants for development permits are required to utilize existing potable water facilities if lines are "available" as defined by Rules 62-550, 62-555, and 62-560, FAC. Chapter 10D-6, "Standards for Onsite Sewage Disposal Systems," Section 10D-6.041 (2), FAC, states that "It is the policy of the State of Florida to require all buildings served by onsite sewage disposal systems to connect to a publicly owned or investor-owned permitted sewerage system within 365 days after notification that such a system is available."

Wellfield Protection Ordinance, No. 93-17, establishes criteria for the regulation of storage, handling, use or production of hazardous or toxic substances within the zones of influence of water supply wells. EPGMD continues to implement this ordinance.

BCHD will reduce potential groundwater pollution sources by continuing to implement Chapter 34 "Water and Sewers," Article II "Water and Sewer Connection Ordinance,"

Broward County Code of Ordinances. The Board adopted Ordinance 71-5 creating this chapter which states that all premises used for human habitation or occupancy shall be connected to a sanitary sewer main within 180 days of the availability of said sewer main for use. This applies to premises within an area served by a public or private sanitary sewer treatment and disposal utility system and which abuts a sanitary sewer main owned by the utility system.

BCHD will continue to protect the groundwater supply from potential sources of contamination pursuant to Chapter 34, "Water and Sewers," Article II ½, "Water and Septic Tank Ordinance," Broward County Code of Ordinances. The Board adopted Ordinance 78-50 creating this article which requires proposed subdivisions of three or more homes to connect to a public water supply which is located within 1/4 mile of the subdivision. This regulation also prohibits the installation of a septic tank discharging greater than 1,500 gallons of wastewater per day per acre where there exists an approved public water distribution system. In instances where there is no approved public water distribution system, no septic tank shall be permitted which discharges over 750 gallons of wastewater a day per acre.

EPGMD protects groundwater quality by implementing Chapter 27, Water Pollution Control "Wellfield Protection Ordinance," Broward County Code of Ordinances, which regulates the storage, handling, usage or production of regulated or toxic substances within designated zones of influence as identified in the Code.

Broward County continues to implement Chapter 36, "Water Resources and Management," Article II, "Water Emergencies," Section 36-55, "Restrictions on landscape irrigation," Broward County Code of Ordinances, which imposes year-round, county-wide landscape irrigation restrictions. The Board adopted Ordinance 91-8 on February 19, 1991, creating this section which restricts landscape irrigation for new and existing installations to the hours of 5:00 p.m. to 9:00 a.m. seven days per week; low-volume irrigation systems or low-volume hand watering using a self-canceling nozzle shall not be restricted. This section also provides that in the event the SFWMD imposes restrictions on landscape irrigation for new and existing installations which are more restrictive than those imposed by this section, such more restrictive regulations shall apply. In 2010, the County amended Chapter 36, Broward County Code of Ordinances, to provide for further restrictions on landscape irrigation that mirror the SFMWD district-wide, year-round water conservation measures adopted in 2008.

Broward County Permitting, Licensing, and Consumer Protection Division enforces Chapter 39, "Zoning," Article VIII "Landscaping for Protection of Water Quality and Quantity" Broward County Code of Ordinances, which addresses landscaping and incorporates the guidelines of the SFWMD. Broward County adopted the SFWMD Model Landscape Code for South Florida as a guide in the development of requirements applicable in the BMSD Area. The Landscaping for Protection of Water Quality and Quantity Code complies with Section 125.568, "Conservation of Water; ~~Xeriscape~~Florida-Friendly Landscaping," FS, requiring local governments to ~~adopt~~consider enacting a ~~xeriscape~~ a Florida Friendly Landscaping ordinance ~~by October 1, 1992,~~ in order to conserve water.

Broward County Environmental Licensing and Building Division enforces Chapter 46, "Plumbing," Section 46-14.13, Table 46R2, The South Florida Building Code, Broward Edition, which contains standards for ultra-low volume plumbing fixtures to be used in all new construction. See Table WM-38 Plumbing Standards.

Table WM-38: Plumbing Standards

| Fixture | Flow Rate |
|---|---|
| Toilet | 1.6 gal/flush |
| Shower Heads | 2.5 gal/minute |
| Faucets | 2.0 gal/minute |

Broward County Board of Rules and Appeals has approved the above standards for ultra-low plumbing fixtures at 80 psi, effective September 1, 1992 in Broward County. This continues an ongoing conservation program.

BCWWS continues to implement its conservation-oriented rate structure within its BCWWS utility systems. BCWWS implemented a progressive rate structure on June 1, 1988, applicable to all customers within the BCWWS utility districts.

BCWWS maintains a leak detection program to reduce the amount of unaccounted-for water loss within its BCWWS utility systems. BCWWS has increased the frequency of meter calibration for large meters to an annual level and improved the change-out

cycle for small meters so that replacement occurs every 10-15 years rather than 20 years.

BCWWS conducts a year-round public information and education program promoting water conservation. BCWWS also participates in the Broward Water Partnership Program and conducts its own toilet rebate program.

PWE addresses only the needs of the BCWWS system and BMSD areas of Broward County as the County has no control over the systems of municipal and private service providers. Data was provided in section II for completeness purposes only. Specific funding needs for municipal systems will be addressed in the Capital Improvements Element of the respective government's comprehensive plan. The Capital Improvement Element applies only to improvements for which the local government has fiscal responsibility.

### B. Sources

1. Broward County Health Department (BCHD)
2. Broward County Water and Wastewater Services (BCWWS)
3. Broward County Planning and Development Management Division (PDMD)
4. South Florida Water Management District (SFWMD)
5. Broward County Environmental Licensing and Building Division (ELBPD)
6. City of Hollywood Utilities Division
7. City of Ft. Lauderdale Utilities Division
8. City of Pompano Beach Planning

## SANITARY SEWER

### A. Authority

The BCWWS is concerned with the treatment and collection of wastewater. The EPGMD regulates the operation of sanitary sewer treatment facilities. The EPGMD applies a stringent performance standard to wastewater treatment plants. Because most

package plants cannot meet the standard, they are effectively disallowed under the regulations. The Florida Department of Health issues septic tank permits in Broward County for installation, design, and location of septic tanks.

The wastewater daily flow design factors for development utilized by EPGMD in determining adequacy and concurrency of sanitary sewer facilities described in Broward County Code of Ordinances, Chapter 27, Article V, Water Resource Management shall be applied to the County's sanitary sewer facilities as well as those municipal and private utilities serving the BMSD Areas EPGMD

The Broward County Land Development Code (LDC) Section 5-182(g), requires adequate wastewater treatment and disposal service prior to issuance of any development permit in the BMSD Area. Section 5-198(f) of the LDC requires adequacy of wastewater treatment and disposal service for developments within municipalities which are required to plat. Adequacy of service is based upon the demonstration that an existing wastewater treatment and disposal facility has sufficient capacity to provide for the needs of the new development and the other developments in the service area. If service is not currently available, but there is an economically and fiscally feasible plan to provide service, the development permit may be conditioned on that availability.

The Broward County PHU has regulatory responsibility for issuing septic tank permits under Chapter 10D-6, FAC and Broward County Ordinance 78-50. The PHU Environmental Health Section inspects all constructed systems before they are covered to assure compliance with State and County rules. Permits must be obtained from the Broward County PHU to install a septic tank. The permitting of septic tanks is conducted on a case by case basis. Septic tanks are permitted if existing sewer lines are more than one-quarter (1/4) mile from a proposed subdivision or one hundred feet from a single-family unit. There are approximately 200 new septic tank systems approved for operation annually. The demand factor is based on the square footage for residential, private well or public water supply, and commercial use. The design flow demand factor is 2500 gallons per day for residential use and 1500 gallons per day for commercial use.

## B. Sources

1. Broward County Public Health Unit (BCPHU)

2. Broward County Water and Wastewater Services (BCWWS)
3. Broward County Environmental Protection and Growth Management Department (EPGMD)
4. Broward County Planning and Development Management Division (PDMD)
5. Broward County Environmental Licensing and Building Permitting Division (ELPBD)
6. City of Hollywood Utilities Division
7. City of Ft. Lauderdale Utilities Division
8. City of Sunrise City Utilities Division
9. City of Cooper City Utilities Division
10. Indian Trace Community Development District
11. City of Pompano Beach Planning

# DRAINAGE AND NATURAL GROUNDWATER AQUIFER RECHARGE

## A. Authority

The Broward County Water Management Division (WMD) was created in 1983 by merging the Broward County Water Management Division with the Section 208 staff of the Broward County Planning Council. Established by Section 40.11 of the Broward County Administrative Code, the WMD was vested with the responsibilities of the Water Management Division created by Chapter 61-1969, Special Acts, Laws of Florida. This included the responsibility for county-wide issuance of water management works permits, in accordance with the "Water Management Regulations and Standards" manual, July, 1977. Following another reorganization, that authority is now exercised by the EPGMD. The WMD also acts as the staff to various dependent water management districts. The DNRP was established in 1991 pursuant to Section 8.17 of the Charter of Broward County. The County Charter transferred and vested County Government (DNRP) the authority of the Broward County Environmental Quality Control Board

(EQCB) originally created by the Broward County Charter. DNRP's successor agency, first DPEP and currently EPGMD, has the power to adopt regulations which must then be ratified by the Board of County Commissioners. The EPGMD exercises jurisdiction over all of Broward County through existing regulations. Water quality standards for both surface waters and groundwaters are established and enforced by the EPGMD as part of its responsibilities for water pollution control and abatement. The EPGMD maintains a surface water quality and ground water monitoring network throughout the County and regulates wastewater discharge. Also, the EPGMD has promulgated storage tank and hazardous materials regulations intended to prevent contamination of the aquifer. A license is required from the EPGMD for any dredging and filling within the "regulated aquatic and wetland resources" as defined in Chapter 27 Article 11 of the Broward County Code of Ordinances.

There are fourteen independent and nine dependent special taxing districts within Broward County which are responsible for operating and maintaining drainage systems within their boundaries. Independent special taxing districts have final authority for decisions regarding taxes levied against property owners. Four of the dependent special taxing districts are reliant upon the Broward County Board of Commissioners for taxing authority, while the Bonaventure Development District, Indian Trace Development District, Lauderdale Isles Water Management District, North Lauderdale Water Control District, and Twin Lakes Water Control District rely upon the local municipal commissions in which they are located. The independent water management districts issue surface water management permits within their respective districts. The EPGMD exercises jurisdiction for surface water management in all other areas of the County, including the County's dependent drainage districts.

The South Florida Water Management District (SFWMD), formerly known as the Central and Southern Florida Flood Control District, is the primary drainage permitting authority for South Florida. Its water management permitting program was initiated in 1976 through Chapter 373, Florida Statutes. Permitting rules and permitting criteria are contained within Chapters 40E-4, 40E-40, and 40E-41, FAC with detailed information and criteria contained within "Management and Storage of Surface Waters - Permit Information Manual Volume IV".

The Florida Department of Environmental Protection and the South Florida Water Management District have delegated authority to the Broward County Environmental Protection and Growth Management Department (EPGMD) for certain permitting,

compliance and enforcement responsibilities, in the geographical areas of Broward County outside of the independent drainage districts, associated with the implementation of the Environmental Resource Permit (ERP) program under the authority of Chapter 373 Florida Statutes. There is no project acreage limitation on EPGMD's delegated authority.

The SFWMD may also delegate its water management permitting functions for projects less than forty acres to local governments under the authority of Chapter 373 Florida Statutes. Three independent drainage districts have obtained this permitting authority. The Coral Springs Improvement District, North Springs Improvement District, and Old Plantation Water Control District may review and approve permits for projects under 40 acres, without SFWMD review. The Plantation Acres Improvement District has the same condition, but with a 10 acres threshold.

The U.S. Army Corps of Engineers (COE) permitting authority emanates from the Rivers and Harbors Act of 1899 and the Federal Water Pollution Control Amendments of 1972 and 1977. Current permitting authority extends to dredge and fill activities in waters of the United States. The Florida Department of Environmental Protection (DEP) also has permitting authority with regard to dredge and fill activities in state waters, although Broward County has been given authority to issue these permits within certain areas of the County.

Most municipalities conduct limited water management reviews and issue permits in accordance with Section 4605 of the South Florida Building Code which states, that it is unlawful to commence any work involving surface or other drainage work without a permit. The Broward County Planning and Development Management Division routes all approvals for projects located outside of the boundaries of the independent drainage districts through the WRD for review and permitting of water management facilities.

## B. Sources

The primary document used to develop this Element is the Analysis of Water Management Review and Permitting in Broward County, Florida, 1986, prepared by the Economic Development Council of Broward County and the Broward County Water Management Division, and the SFWMD's Atlas.

# APPENDICES

## Appendix A

## Broward County Water Control Districts 2006

| District Name | Type | Local Government Authority | Creation Documents | Statutory Authority | Permitting Program |
|---|---|---|---|---|---|
| Bonaventure Development District | Dependent | City of Weston | City Ordinance 98-61 Ch 2001-303 LOF | 189.4041 F.S. | Permitting of district facility usage |
| Central Broward Water Control District | Independent | Broward County | Ch. 61-1439, 65-1006, 70-479, 91-350, 94-426 LOF | Section 298.01 F.S. | Permitting of district facility usage |
| Cocomar Water Control District | Dependent | Broward County | Margate City Ordinance 80-23, Coconut Creek City Ordinance 109-80 | Section 298.01 F.S. | Permitting of all water facilities within district |
| Coral Bay Community Development District | Independent | City of Margate | City Ordinance 89-22 | Chapter 190, F.S. | Permitting of district facility usage |

| District Name | Type | Local Government Authority | Creation Documents | Statutory Authority | Permitting Program |
|---|---|---|---|---|---|
| Coral Springs Improvement District | Independent | Broward County | Ch. 70-617, LOF | Chapter 298, F.S. | Surface water management; permitting projects less than 40 acres (by delegation of SFWMD); permitting facility usage |
| Cypress Cove Community Development District | Independent | City of Margate | City Ordinance 90-7 | Chapter 190, F.S. | Permitting of district facility usage |
| Indian Trace Community Development District | Dependent | City of Weston | City Ordinance 18 | 189.4041 F.S. | Permitting of district facility usage |
| Lauderdale Isles Water Management District | Dependent | City of Fort Lauderdale | County Resolution 11/17/70; Ch. 77-518 LOF | Ch 298 F.S. | Permitting of district facility usage |
| North Springs Improvement District | Independent | Broward County | Ch. 71-580, LOF | Ch 298 F.S. | Surface water management; permitting projects less than 40 acres (by delegation of SFWMD); permitting facility usage |
| North Lauderdale Water Control District | Dependent | City of North Lauderdale | Ch. 63-661 LOF | Ch 298 F.S. | Permitting of district facility usage |
| Oakridge Community Development District | Independent | City of Hollywood | City Ordinance 95-71 | Chapter 190, F.S. | Permitting of district facility usage |

| District Name | Type | Local Government Authority | Creation Documents | Statutory Authority | Permitting Program |
|---|---|---|---|---|---|
| Old Plantation Water Control District | Independent | Broward County | Ch. 99-435, LOF | Section 298.01 F.S. | Surface water management; permitting projects less than 40 acres (by delegation of SFWMD); permitting facility usage |
| Pine Tree Water Control District | Independent | Broward County | Ch. 61-1979, 85-391, 93-372, 94-430, LOF | Ch 298 F.S. | Permitting of district facility usage |
| Plantation Acres Improvement District | Independent | Broward County | Ch. 2002-367, LOF | 189.404 F.S. | Surface water management; permitting projects less than 40 acres (by delegation of SFWMD); permitting facility usage |
| South Broward Drainage District | Independent | Broward County | Ch. 98-524, LOF | Section 298.01 F.S. | Permitting of district facility usage |
| Sunshine Water Control District | Independent | Broward County | Ch. 63-661 LOF | Section 298.01 F.S. | Permitting of district facility usage |
| Tindall Hammock Irrigation & Soil Conservation District | Independent | Broward County | Ch. 98-523 LOF | 189.404 F.S. | Work within the District (rightsof-way) and surface water management |

| District Name | Type | Local Government Authority | Creation Documents | Statutory Authority | Permitting Program |
|---|---|---|---|---|---|
| Turtle Run Community Development District | Independent | City of Coral Springs | City Ordinance 86-163 | Ch. 190, F.S. | Surface water management |
| Twin Lakes Water Control District | Dependent | City of West Park | County Resolution 12/29/70 | Section 298.01 F.S. | Permitting of district facility usage |
| West Lake Community Development District | Independent | City of Hollywood | City Ordinance 93-15 | Ch. 190, F.S. | Permitting of district facility usage |
| Broward County Water Control District # 2 | Dependent | Broward County | Chapter 61-1969; LOF | Section 298.01 F.S. | Permitting of all water facilities within district |
| Broward County Water Control District # 3 | Dependent | Broward County | Chapter 61-1969; 90- 487; 91-348, LOF | Section 298.01 F.S. | Permitting of all water facilities within district |
| Broward County Water Control District # 4 | Dependent | Broward County | County Resolution # 1998-850 | Section 298.01 F.S. | Permitting of all water facilities within district |

Source:
http://www.floridaspecialdistricts.org/OfficialList/by_distr.asp

# Appendix B

## Broward County Water Basins – Functions and Level of Service Standards

| | | |
|---|---|---|
| WCA 2A | To provide viable wetland habitat; to detain and store flood and drainage water during the wet season for water supply during the dry season; to prevent water accumulating in the Everglades from overflowing into urban and North New River and Miami lands in eastern Broward County; to receive and store regulatory releases from Lake Okeechobee and WCA 1; to provide conveyance for water supply releases from Lake Okeechobee to eastern Broward County; and to supply water to eastern Broward County and WCA 2B. | Designed to pass the Standard Project Flood. |
| WCA 2B | To provide viable wetland habitat; to recharge regional groundwater (i.e., the Biscayne Aquifer); to supply water to adjacent basins in Broward County; to receive and store regulatory discharges from WCA 2A; and to prevent water accumulating in the Everglades from overflowing into urban and agricultural lands in eastern Broward County. | Designed to pass the Standard Project Flood. |
| WCA 3A | To provide viable wetland habitat; to detain and store flood and drainage water during the wet season for water supply during the dry season; to prevent water accumulating in the Everglades from overflowing into urban and agricultural lands in eastern Dade and Broward counties; to receive and store regulatory releases from Lake Okeechobee and WCA 2A; to provide conveyance for water supply releases from Lake Okeechobee to eastern Dade County and Everglades National Park (ENP); and to supply water to eastern Dade County and ENP. | Designed to pass the Standard Project Flood. |
| WCA 3B | To provide viable wetland habitat; to recharge regional groundwater (i.e., the Biscayne Aquifer); to supply water to adjacent basins in Dade County; to provide conveyance for water supply releases from Lake Okeechobee and WCA 3A to eastern Dade County and southeastern Everglades National Park (ENP) to receive and store regulatory discharges from WCA 3A; to prevent water accumulating in the Everglades from overflowing into urban and agricultural lands in eastern Dade County; and when WCA 3B cannot store the regulatory discharges from WCA 3A, to provide conveyance for the discharges through the WCA for subsequent discharge to tidewater. | Designed to pass the Standard Project Flood. |

| | | |
|---|---|---|
| Hillsboro Canal | To provide flood protection and drainage for the basin; to supply water to the basin during periods of low natural flow; to convey excess water from WCA 1 to tidewater; to intercept and control seepage from WCA 2A; and to maintain a groundwater surface elevation west of the Deerfield Lock adequate to prevent saltwater intrusion into local groundwater. | There is no design storm for the Hillsboro Canal as it was constructed prior to the Project. The Hillsboro Canal above the Deerfield Lock provides flood protection of approximately three-quarters of an inch of run-off per day; however, allowable runoff into the canal above Deerfield Lock is 1.3 inches of runoff per day. |
| Cypress Creek (C-14) Canal | To provide flood protection and drainage for the basin; to supply water to the C-14, the Pompano Canal and the C-13 basins during periods of low natural flow; to convey excess water from WCA 2A to tidewater; to intercept and control seepage from WCA 2A; and to maintain a groundwater surface elevation west of the S-37A adequate to prevent saltwater intrusion into local groundwater. | The eastern basin was designed for 1-30 year flood protection; the western basin was designed for 1-10 year flood protection. |
| Pompano Canal | To provide flood protection and drainage for the basin; to supply water to the basin during periods of low natural flow; and to maintain a groundwater surface elevation west of the G-57 adequate to prevent saltwater intrusion into local groundwater. | Designed for 1-25 year flood protection. |
| Middle River (C-13) Canal | To provide flood protection and drainage for the basin; to supply water to the basin during periods of low natural flow; to intercept and control seepage from WCA 2B; to supply water to the City of Plantation in the North New River Canal basin; and to maintain a groundwater surface elevation west of the S-36 adequate to prevent saltwater intrusion into local groundwater. | The C-13 was designed to provide 1-25 year flood protection. |

| | | |
|---|---|---|
| Plantation (C-12) Canal | To provide flood protection and drainage for the basin; to supply water to the basin during periods of low natural flow; and to maintain a groundwater surface elevation west of the S-33 adequate to prevent saltwater intrusion into local groundwater. | The C-12 was designed to provide 1-25 year flood protection. |
| North New River Canal | To provide flood protection and drainage for the basin; to supply water to the basin during periods of low natural flow; to convey excess water from WCAs 2A, 2B, and 3A to tidewater; and to intercept and control seepage from WCA 2B. | Adequate for 1-25 year protection. |
| South New River (C-11) Canal | To provide flood protection and drainage for the basin; to supply water to the basin during periods of low natural flow; to intercept and control seepage from WCA 3A; and to maintain a groundwater surface elevation west of the S-13 adequate to prevent saltwater intrusion into local groundwater. | The C-11 system was designed to provide flood protection of up to three-quarters of an inch of runoff per day from the western basin. The pumping station at S-13 was designed to provide the eastern basin with flood protection of up to three-quarters of an inch of runoff per day.<br>Depending on the headwater and tailwater stages at the S-13 spillway, gravity flow from the eastern C-11 basin to the east may provide additional flood protection of up to three-quarters of an inch of runoff per day. |
| Hollywood (C-10) Canal | To provide flood protection and drainage for the basin. | The C-10 was designed to pass the Standard Project Flood. |
| Snake Creek (C-9) Canal | To provide flood protection and drainage for the basin; to supply water to the C-9 basin for irrigation and municipal water supply during periods of low natural flow; to intercept and control seepage from WCA 3B; and to prevent saltwater intrusion into local groundwater. | The C-9 in the eastern basin was designed to pass the Standard Project Flood. The western subbasin is prone to flooding because of low ground surface elevations relative to the eastern subbasin. |

# Appendix C

## Broward County Water Structures -- Design Criteria

| Basin | Structure | Type | Design HW Stage (ft NGVD) | Design TW Stage (ft NGVD) | Optimum Stage (ft NGVD) | Design G (cfs) | Peak Stage (ft NGVD) and Q (cfs) |
|---|---|---|---|---|---|---|---|
| Hillsboro | Deerfield Lock (G-56) Stage divide | Weir with flashboards<br>5-bays, 12 ft. each<br>Crest lgth = 60 ft.<br>Crest elev = 1.0 ft. NGVD gated Spillway<br>Crest lgth = 25 ft.<br>Crest elev = 4.5 ft. NGVD | 4.0 | 3.5 | HW=7.7 | 1,600 | HW = 10.86<br>TW + 9.2<br>Q = 3,700 |
| | S-39 Water supply, regulatory releases to Hillsboro Canal from WCA-1 | Spillway<br>Taintor gate<br>16 ft. x 9.2 ft.<br>Weir lgth = 15 ft.<br>Crest elev = 2.5 ft. NGVD | 11.0 | 9.0 | TW = 9.0 max<br>HW = WCA 1 Regulation schedule | 800 | TW=12.39 |
| | S-39A Stage divide | Culvert with riser and stop logs<br>3 - 72 in. x 54 ft. CMP | | | HW =7.0 to 7.5 | | |
| | S-38B Divide C-14 and Hillsboro basins | Gated Culvert<br>1 - 66 in x 72 ft. CMP<br>Invert elev = 0 ft. NGVD | 9.0 | 7.65 | | | |

| Basin | Structure | Type | Design HW Stage (ft NGVD) | Design TW Stage (ft NGVD) | Optimum Stage (ft NGVD) | Design G (cfs) | Peak Stage (ft NGVD) and Q (cfs) |
|---|---|---|---|---|---|---|---|
| C-14 | S-37A Stage divide | Spillway, 2 gates 25 ft. x 12.8 ft. Crest lgth = 50 ft. Crest elev = 7.7 ft. NGVD | 3.0 | 2.0 | HW=3.5 | 3,890 | HW = 5.19 TW = 4.28 Q = 3,800 Q = 3,060 (measured) |
| | S-37B Stage divide | Spillway, 2 gates 25 ft. x 6.6 ft. Crest lgth = 50 ft. Crest elev = 0 ft. NGVD | 7.2 | 4.7 | HW=7.5 | 3,390 | HW = 8.99 TW = 6.14 Q = 3,108 (measured) |
| | G-65 Divide C-14 and Pompano Canal | Gated Culvert 1 - 54 in. x 1,500 ft. RCP Invert elev = 0 ft. NGVD | | | TW = 4.5 (at G-57) | 50 - 55 (water supply) | |
| | S-38C Stage divide, C-13 and C-14 water supply C-13 | Culvert with risers and stop logs 2 - 72 in. x 35 ft. CMP Invert elev = 1.55 ft. NGVD | | | | | |
| | S-38A Stage divide, L-36 stage and C-14 stage | Culvert with risers and stop logs 2 - 60 in x 70 ft. CMP Invert elev = 1.55 ft. NGVD | 9.0 | 8.0 | HW = 7.65 | 190 | |
| | S-38 Water supply, C-13 and C-14 | Gated Culvert 2 - 72 in x 52 ft. Invert elev =2 ft. to 3 ft. NGVD | 9.8 | 7.0 | TW = 8.2 max (not to exceed 8.2) | 500 | HW = 15.47 TW = 10.47 Q = 586 |

| Basin | Structure | Type | Design HW Stage (ft NGVD) | Design TW Stage (ft NGVD) | Optimum Stage (ft NGVD) | Design G (cfs) | Peak Stage (ft NGVD) and Q (cfs) |
|---|---|---|---|---|---|---|---|
| Pompano | G-57 Stage divide | Steel sheet - pile dam with 6-bay, flashboard controlled weir Net lgth = 31.5 ft. Crest elev = 2.5 ft. NGVD | | | HW = 4.5 (dry season) HW = 2.5 (flood conditions) | 375 | HW = ~5.5 |
| | G-65 Divide C-14 and Pompano Canal | Gated Culvert 1 - 54 in. x 1500 ft. RCP Invert elev = 0 ft. NGVD | | | TW = 4.5 (at G-57) | 50 - 55 (water supply) | |
| C-13 | S-36 | Spillway, 1-gate 25 ft. x 14 ft. Crest lgth = 25 ft. Crest elev = 7 ft. NGVD | 5.6 | 5.0 | HW = 4.5 | 1,560 | HW = 7.38 TW = 5.71 Q = 2390 |
| | S-125 Divide C-13 and North New River Canal (Water supply to City of Plantation) | Gated Culvert 1 - 48 in. x 40 ft. CMP Invert elev = 2 ft. NGVD | 6.5 | 6.0 | HW = 6.0 TW = 3.5 - 4.5 (at Sewell Lock) | 40 (Regulatory releases) | HW = 8+ |
| | S-38C Stage divide, C-13 and C-14 water supply C-13 | Culvert with risers and stop logs 2 - 72 in. x 35 ft. CMP Invert elev = 1.55 ft. NGVD | | | | | |

| Basin | Structure | Type | Design HW Stage (ft NGVD) | Design TW Stage (ft NGVD) | Optimum Stage (ft NGVD) | Design G (cfs) | Peak Stage (ft NGVD) and Q (cfs) |
|---|---|---|---|---|---|---|---|
| | S-38 Water supply, C-13 and C-14 | Gated Culvert 2 - 72 in. x 52 ft. CMP Invert elev = 2 - 3 ft. NGVD | 9.8 | 7.0 | TW = 8.2 Maximum | 500 | HW = 15.47 TW = 10.47 Q = 586 |
| | S-124 Normal flow-closed Flood conditions - open | Gated Culvert 5 - 72 in. x 48 ft. CMP Invert elev = 1 ft. NGVD | 7.02 | 6.57 | HW =5.0 - 5.5 | 490 | *HW = 7.8+ TW = 6.86 *HW may have been above 8.0 |
| C-12 | S-33 Stage divide | Spillway, 1-gate 20 ft. x 9 ft. Crest lgth = 20 ft. Crest elev = 2 ft. NGVD | 5.9 | 4.9 | HW=35 | 920 | HW = 6.13 TW = 5.89 Q = 614 |
| North New River | Sewell Lock (G-54) Stage divide | Flash board spillway 8 bays Net lgth = ~ 45 ft. Weir elev = 3.6 ft. NGVD | 3.5 | 3.0 | HW=3.5-4.0 | 1,300 | HW = 5.97 TW = 4.66 Q = 2040 |
| | S-124 Normal flow - closed Flood conditions - open | Gated Culvert 5 - 72 in. x 49 ft. CMP Invert elev = 1 ft. NGVD | 7.02 | 6.57 | HW = 5.0 - 5.5 | 490 | *HW = 7.8+ TW = 6.86 *HW may have been above 8.0 |
| | S-34 Water supply to NNR Canal | Gated Culvert 2 - 72 in. x 133 ft. CMP Invert elev = 3 - 4 ft. NGVD | 16.9 | 6.0 | HW = ~ 11 - 11.5 TW = 3.5 - 4.0 TW = 6.0 max | 350 | HW = 13.08 TW = 7.05 Q = 728 |

| Basin | Structure | Type | Design HW Stage (ft NGVD) | Design TW Stage (ft NGVD) | Optimum Stage (ft NGVD) | Design G (cfs) | Peak Stage (ft NGVD) and Q (cfs) |
|---|---|---|---|---|---|---|---|
| | S-125 Divide C-13 and North New River Canal (Regulatory releases to NNRC from C-13 | Gated Culvert 1 - 48 in. x 40 ft. CMP Invert elev = 2 ft. NGVD | 6.5 | 6.0 | HW = 6.0 TW = 3.5 - 4.5 (at Sewell Lock) | 40 (Regulatory releases) | HW = 8+ |
| | G-123 Pumps from NNRC to WCA-3A | Pumping Station 4 units: 100 cfs each | 2.0 | 12.0 | HW = 3.5 HW = 11.0 | 400 | |
| | S-141 Stage divide | Sheet-pile overflow weir in L-38E Flashboard control Crest lgth = 30 ft. Crest elev = 7 ft. NGVD | 10.0 | 8.0 | Regulation Schedule in WCA 2B | 435 | |
| | S-142 Stage divide Water supply | Gated Culvert 2 - 72 in. x 42 ft. CMP Invert elev = 2 ft. NGVD | 11.0 | 9.0 | Regulation Schedule in WCA 3A | 500 | |
| | S-143 Stage divide Water supply | Gated Culvert 2 - 72 in. x 70 ft. CMP Invert elev = 2 ft. NGVD | 13.0 | 10.0 | Regulation Schedule in WCA 2A | 500 | |

| Basin | Structure | Type | Design HW Stage (ft NGVD) | Design TW Stage (ft NGVD) | Optimum Stage (ft NGVD) | Design G (cfs) | Peak Stage (ft NGVD) and Q (cfs) |
|---|---|---|---|---|---|---|---|
| C-11 | S-13 Stage divide | Pump and spillway,<br>3 units, 180 cfs each<br>1 - 16 ft. x 11.3 ft. gate<br>Weir lgth = 16 ft.<br>Weir crest elev = -8 ft.<br>NGVD | 1.2 (gravity)<br>2.2 - 2.5 (pump) | 1.0 (gravity)<br>6.2 - 6.5 (pump) | HW = 1.6 (gravity)<br>HW = 2.2 (gravity) | 540 (gravity)<br>540 (pumped) | HW = 4.02<br>TW = 4.85<br>Q = 1050 |
| | S-13A Divide structure during flooding | Gated Culvert<br>2 - 72 in. x 66 ft. CMP<br>2 - 54 in. x 60 ft. CMP | 2.5 | 2.0 | 3.0 to west | 120 | HW (west) 6.27<br>TW (east) 4.79 |
| | S-9 | Pump, 3 units<br>960 cfs each | 4.0 | 14.4 | HW = 3.0 - 3.5 | 2,880 | Intake = 6.1<br>Q = 2060 |
| | S-9XS Stage divide | Culvert with risers and stop logs<br>2 - 72 in. x 42 ft. CMP<br>Invert elev = -1 ft. NGVD | | | HW = 6.8 | | |
| | S-9XN Stage divide | Culvert with risers and stop logs<br>2 - 72 in. x 84 ft. CMP<br>Invert elev = -4.8 ft. NGVD | | | HW=6.0 | | |
| | G-86S Stage divide | Culvert with risers and stop logs<br>1 - 60 in. x 135 ft. CMP<br>Invert elev = -1.14 ft. NGVD | | | HW = 5.5 | | |

| Basin | Structure | Type | Design HW Stage (ft NGVD) | Design TW Stage (ft NGVD) | Optimum Stage (ft NGVD) | Design G (cfs) | Peak Stage (ft NGVD) and Q (cfs) |
|---|---|---|---|---|---|---|---|
| | G-86N Stage divide | Culvert with risers and stop log 1 - 60 in. x 135 CMP Invert elev = -1 ft. NGVD | | | HW = 5.5 | | |
| | G-87 Presently used as a drainage divide between C-11 and C-9 basins | Gated Culvert 1 - 84 in. x 75 ft. CMP Invert elev = -5 ft. NGVD | | | | (Divide structures) | |
| C-9 | S-29 Stage divide | Spillway, 4 gates 22 ft. x 15 ft. Crest lgth = 88 ft. Crest elev = -11 ft. NGVD | 3.0 | 2.5 | HW = ~2.0 | 4,780 | HW = 3.88 Q = 4,100 |
| | S-31 Controls outflows from CA-3B to C-6 | Gated Culvert 3 - 84 in. x 172 ft. CMP Invert elev = -3 ft. NGVD | 6.0 | 4.0 | | 700 | TW = 6.59 Q = 1090 |
| | S-30 Controls water stored between L-30 and SR 27 | Gated Culverts 3 - 84 in. x 288 ft. Invert elev = -5 ft. NGVD | | | | | |
| | S-32 Water supply to C-9 | Gated Culvert 2 - 72 in. x 40 ft. CMP Invert elev = -2 ft. NGVD | 2.5 | ~1.60 | TW = 2.0 HW = 6.0 | 2 | HW = 6.59 |
| ~~WCA 2A~~ | | | | | | | |
| ~~WCA 2B~~ | | | | | | | |
| ~~WCA 3A~~ | | | | | | | |

| Basin | Structure | Type | Design HW Stage (ft NGVD) | Design TW Stage (ft NGVD) | Optimum Stage (ft NGVD) | Design G (cfs) | Peak Stage (ft NGVD) and Q (cfs) |
|---|---|---|---|---|---|---|---|
| ~~WCA 3B~~ | | | | | | | |

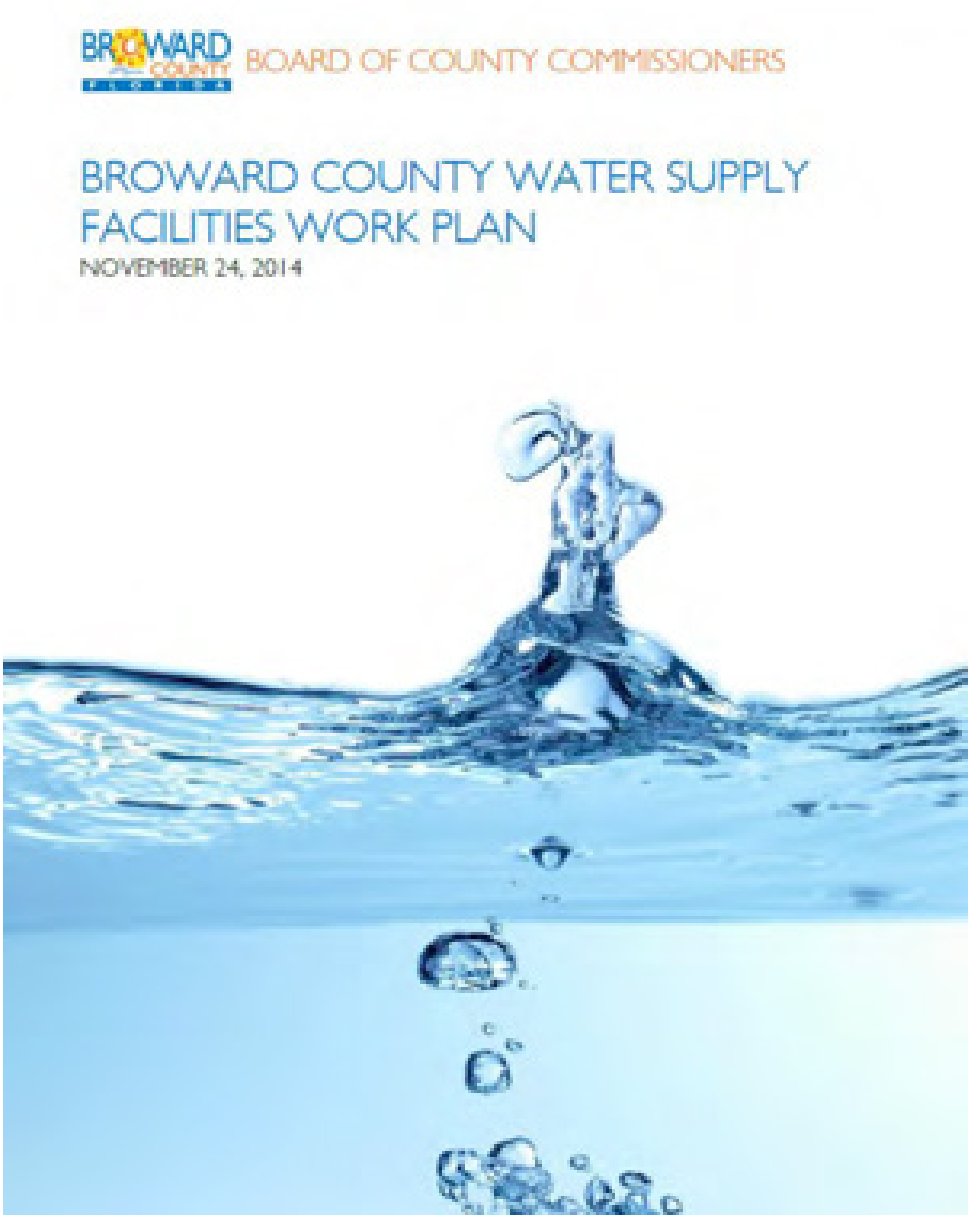
KEY TO ABBREVIATIONS USED IN APPENDIX C

| | | | |
|---|---|---|---|
| in = inches | Lgth = length | CMP = Corrugated metal pipe | HW = Head water |
| ups = upstream | ft = feet | TW = Tail water | RCP = Reinforced concrete pipe |
| cfs = Cubic feet per second | elev = elevation | Q = discharge in cfs | ds = downstream |
| ft NGVD = Feet relative to National Geodetic Vertical Datum | | | |

SOURCE: An Atlas of Eastern Broward County Surface Water Management Basins, by Richard M. Cooper and Jim Lane (November 1987), South Florida Water Management District.

# Appendix D

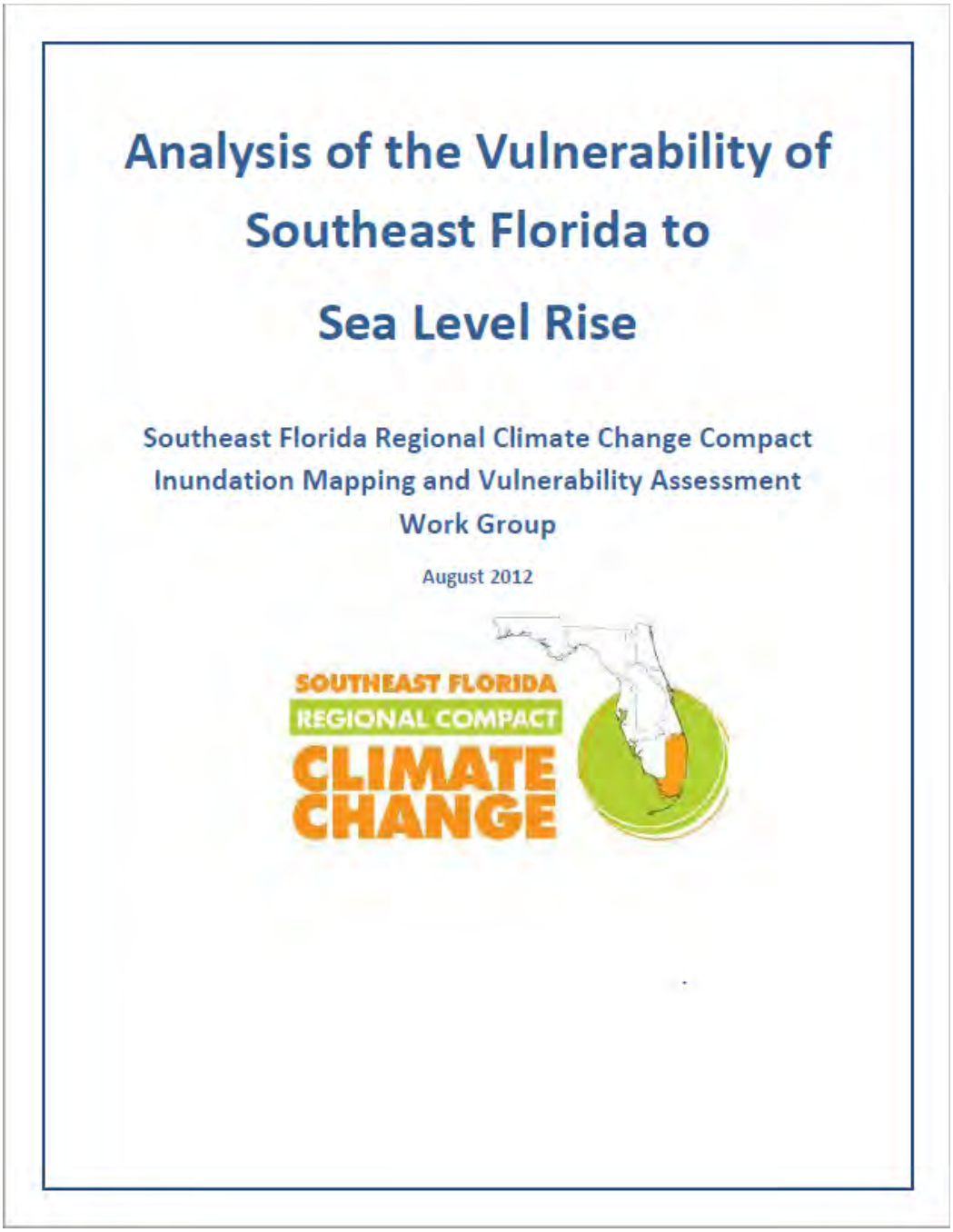
## Broward County Water Supply Facilities Work Plan – 2014




**Source:** Broward County Board of County Commissioners, Broward County Water Supply Facilities Work Plan

## Appendix E

## Analysis of the Vulnerability of Southeast Florida to Sea Level Rise -- 2012



# Analysis of the Vulnerability of Southeast Florida to Sea Level Rise

Southeast Florida Regional Climate Change Compact
Inundation Mapping and Vulnerability Assessment
Work Group

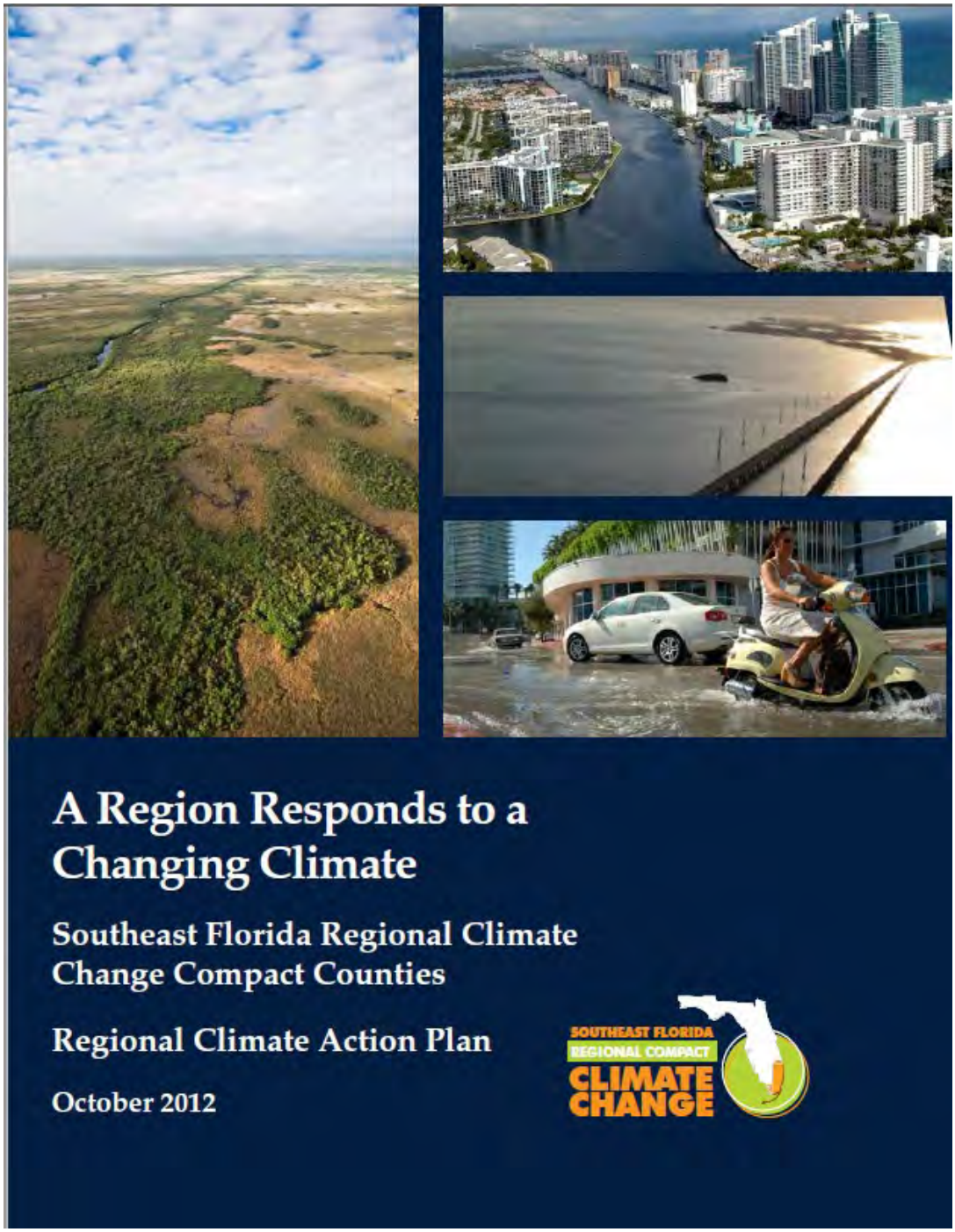
August 2012

SOUTHEAST FLORIDA
REGIONAL COMPACT
CLIMATE CHANGE

http://www.southeastfloridaclimatecompact.org//wp-content/uploads/2014/09/vulnerability-assessment.pdf

# Appendix F

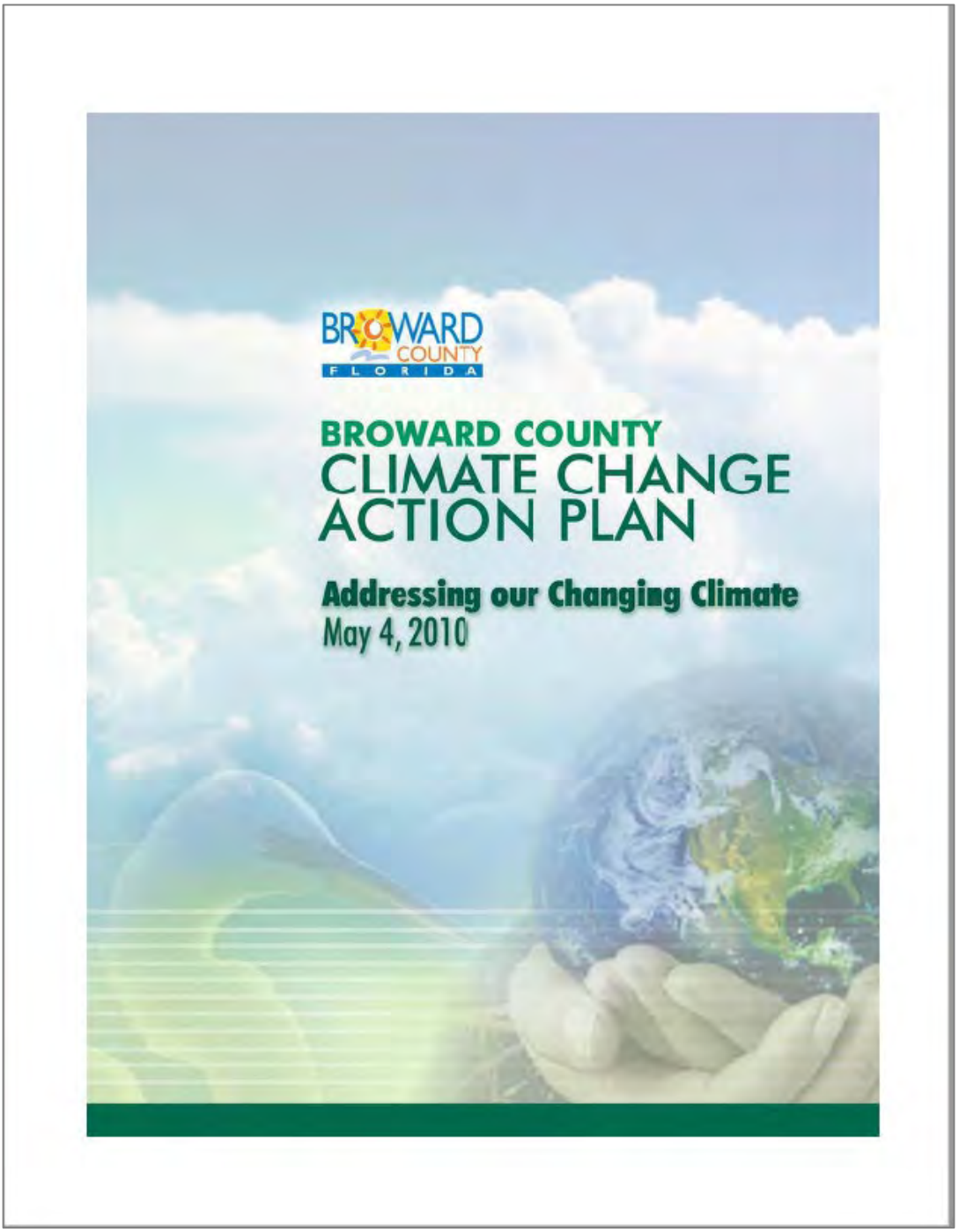
## Regional Climate Action Plan – 2012




http://www.southeastfloridaclimatecompact.org//wp-content/uploads/2014/09/regional-climate-action-plan-final-ada-compliant.pdf

# Appendix G

## Broward County Climate Change Action Plan – 2012




http://www.broward.org/NaturalResources/Documents/FinalCCActionPlan_forBCBCCappdxB.pdf