

Environment

South Florida ecosystems are unique, diverse, and directly linked to water management. They range from coral reefs, subtropical estuaries, barrier island beaches, wetland habitats to pine rocklands and tropical hammocks that occur nowhere else in the continental United States. Underlying all of South Florida is the Biscayne Aquifer, a shallow, porous limestone formation that has historically provided all urban and agricultural freshwater supply.

Natural systems are nursery habitats for fish, wildlife, and tropical plant communities, including globally imperiled species. These settings contribute to recreational and economic opportunities for residents and visitors. Wetlands, forests, and submerged plant communities also sequester carbon, contributing to reduction in greenhouse gases. The beach dunes, reefs and mangrove shoreline provide a buffer against storm erosion. Wetlands and other open lands are natural water reserves, storing and filtering freshwater and recharging the aquifer. So valuable are these critical resources that two National Parks, a National Marine Sanctuary, State of Florida aquatic preserves and water conservation areas, and County environmental regulations and programs have been established to protect them.

Environment

Assessment Area

The environment is a core sustainability pillar along with the economy and social equity. Water, air, and natural systems must be sustained for the viability of current and future residents. Miami-Dade County has experienced major population growth, and continued careful management of environmental resources is crucial for sustainability.

South Florida ecosystems are unique, diverse, and directly linked to water management. They range from coral reefs, subtropical estuaries, barrier island beaches, wetland habitats to pine rocklands and tropical hammocks that occur nowhere else in the continental United States. Underlying all of South Florida is the Biscayne Aquifer, a shallow, porous limestone formation that has historically provided all urban and agricultural freshwater supply.

Natural systems are nursery habitats for fish, wildlife, and tropical plant communities, including globally imperiled species. These settings contribute to recreational and economic opportunities for residents and visitors. Wetlands, forests, and submerged plant communities also sequester carbon, contributing to reduction in greenhouse gases (GHGs). The beach dunes, reefs and mangrove shoreline provide a buffer against storm erosion. Wetlands and other open lands are natural water reserves, storing and filtering freshwater and recharging the aquifer. So valuable are these critical resources that two National Parks, a National Marine Sanctuary, State of Florida aquatic preserves and water conservation areas, and County environmental regulations and programs have been established to protect them.

The topography and meteorological patterns of South Florida help remove harmful air emissions from our community. Although air quality is Good most of the time, days when the air quality falls within the Moderate and Unhealthy for Sensitive Groups categories are of concern. In April 2009, EPA made findings under the Clean Air Act that six key greenhouse gases (GHGs) constitute a threat to human health and welfare and as such shall be regulated air pollutants. Therefore, just as the sources of traditional and 'new' air pollutants are similar, initiatives to reduce those emissions will provide co-benefits for air quality and climate change mitigation.

The environment assessment area encompasses surface water, groundwater, stormwater, and air, as well as the following natural resources: environmentally endangered lands, coastal habitats, wetlands, and tree canopy.

SUMMARY OF KEY SUSTAINABILITY CHALLENGES

Main challenges identified through collaborative stakeholder analysis of assessment data & indicators

- Managing water to protect drinking water supplies, prevent flooding, and to support critical natural systems.
- Restoring and enhancing Biscayne Bay, vital coastal and freshwater wetlands, reef communities, beaches, and forest communities to protect fish and wildlife habitats, improve water quality, protect the shoreline from erosion, and promote aquifer recharge, especially in light of increasing populations and other external factors including storms and the impacts of climate change.
- Addressing state ocean outfall legislation, including the elimination of outfalls and implementing the 60 percent wastewater reuse requirements.
- Ensuring that the proposed reuse of treated wastewater, while progressive and important to sustain water quantity, does not degrade groundwater quality or sensitive natural systems.

- Preventing further salt water intrusion that threatens drinking water wellfields and sensitive natural areas through water management and improved water control structure operations and infrastructure.
- Continuing acquisition and management of strategically located environmentally sensitive lands to protect rare or imperiled communities and complement regional conservation land management and restoration programs. Securing additional funding is the greatest challenge for furthering these efforts.
- Increasing the tree canopy through planting 'the right tree in the right place' to minimize the costs of planting and maintenance and the potential damage and removal from storms.
- Adapting water management and stormwater infrastructure to address flooding that may increase with rising groundwater levels. Continued collaboration with federal and state agencies will be needed to assess effectiveness of the existing canal network. Over the long-term, canals and other drainage infrastructure may not function effectively if sea level increases.
- Planning in the absence of regional monitoring of agreed upon "vital indicators" of climate change.
- Implementing the Comprehensive Everglades Restoration Plan (CERP).
- Reducing the number of days when overall ambient air pollution levels in Miami-Dade are harmful to sensitive populations.
- Reducing exposure of sensitive populations to air toxics, including diesel emissions and asbestos. While comprehensive monitoring data for air toxics is not available, the likelihood of exposure to air toxics such as emissions from diesel engines and asbestos fibers from renovation and demolition building activities is well understood and should be reduced through the continued implementation of programs at the federal, state and county levels.

ASSESSMENT DATA & INDICATORS

Data and analysis to identify key challenges & establish a sustainability baseline

Natural resources have been altered throughout the years. The low-lying terrain and porous aquifer are especially vulnerable to contamination and to projected impacts from sea level rise and related elements of climate change. In particular, as sea level continues to rise, movement of saltwater further inland and through the aquifer threatens coastal water supply wellfields and may overwhelm protective coastal dunes and mangroves. Gravity-based drainage infrastructure and canals will not perform as effectively as groundwater levels increase in the future. Populations of native plants and animals are increasingly threatened by invasive exotic species, which reduce the ecological and human-related benefits that the natural communities provide. New water treatment technologies promise more sustainable alternative water supply through the beneficial reuse of wastewater, but are energy intensive. Conservation and restoration of natural resources will create a healthier and more resilient environment more adaptable to climate change.

A multi-billion dollar federal and state program, the Comprehensive Everglades Restoration Plan (CERP), has been authorized by Congress to restore the South Florida ecosystem by improving water quantity, quality and delivery to more closely resemble natural patterns. Successful implementation of CERP is expected to improve conveyance of water quantity and quality to South Florida. Although CERP will not create new supplies of water for human consumption or increase flood protection, additional freshwater may help to reduce the effects of saltwater intrusion and increase the resilience of the natural system to climate change and development impacts.

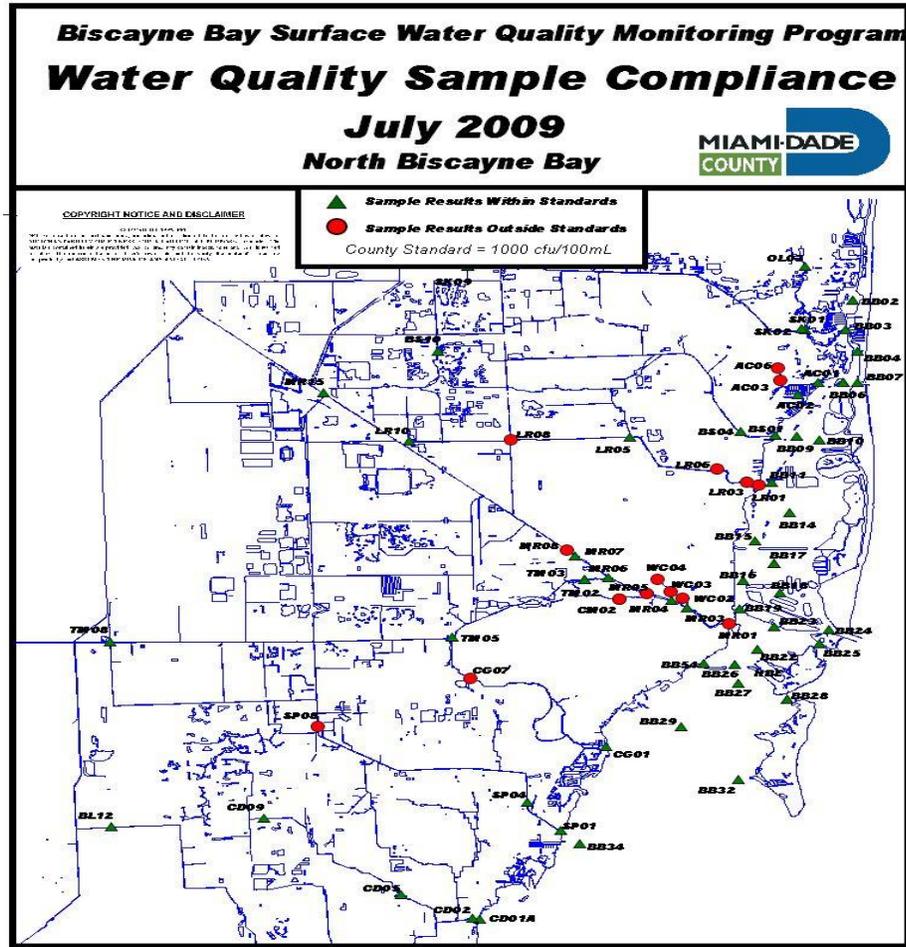
The County implements a broad array of regulatory, monitoring and assessment, restoration, endangered land acquisition, and water management programs to protect, maintain or improve air, ground and surface water quality and to conserve or enhance environmentally sensitive natural habitats. These programs include initiatives undertaken pursuant to the County's own local authority, as well as collaborative efforts with federal, state, other local government and non-government resource management partner organizations.

SURFACE WATER QUALITY

In Biscayne Bay, water quality is generally good and meets standards in most cases. Exceptions are the Miami River and some canals, which were designed to capture stormwater runoff and are heavily influenced by interconnection with groundwater. Issues with quality include nitrogen associated with agricultural practices and bacteria due to an aging wastewater infrastructure.

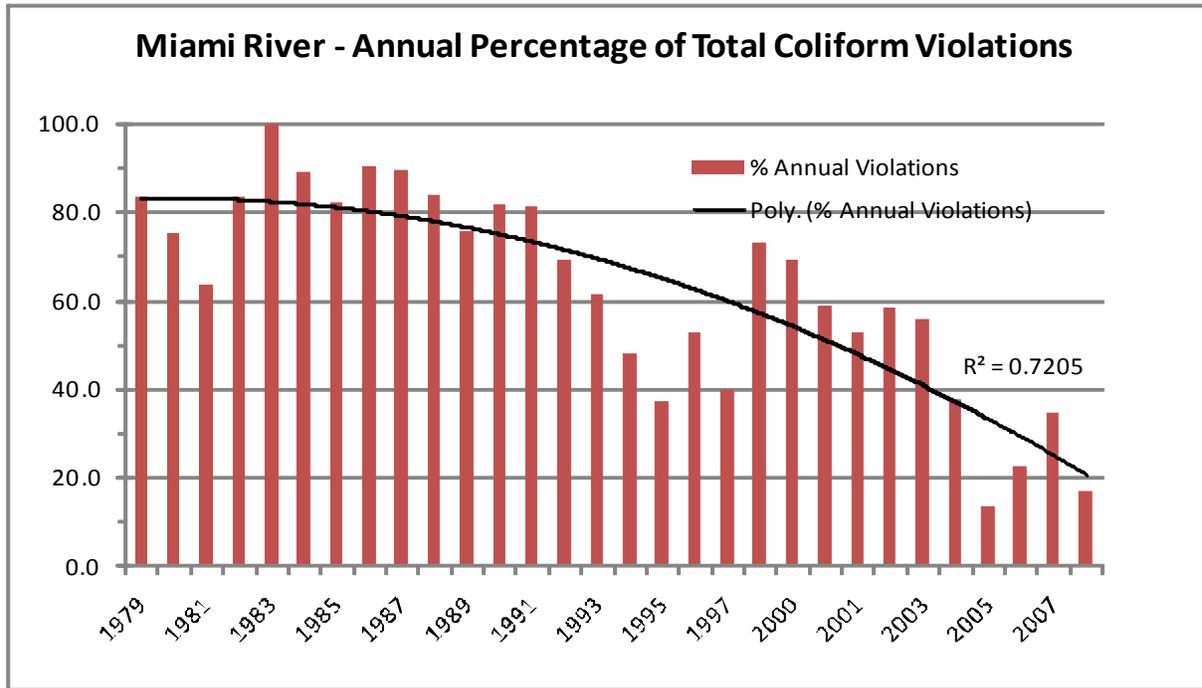
As part of a comprehensive long-term surface water quality monitoring program, samples from approximately 100 locations in Biscayne Bay and its watershed are collected each month and tested for coliform bacteria, an indicator of sewage pollution. Standards have been established for various bacterial indicators to determine levels safe for human recreational uses involving water contact, such as swimming or fishing. Bacteria concentrations may be related to illegal discharges, human uses, other natural sources, or physical factors such as salinity or temperature. The open waters of Biscayne Bay are designated as Outstanding Florida Waters and rarely exhibit concentrations of bacteria that exceed any established standards. However, some tributaries and canals suffer from chronic contamination. Figure 1 illustrates the spatial extent of the sampling program and analysis resulting from this program and the samples that exceed coliform bacteria standards.

Figure 1



There continues to be a general decrease over time in the concentration of bacteria, and the number of violations. Figure 2 shows the percentage of samples annually in violation of the County bacteria water quality standard. The past four years have had the lowest percentages of violations since 1979, the beginning of data collection. The County's water quality standard for Total Coliform is 1,000 ppm.

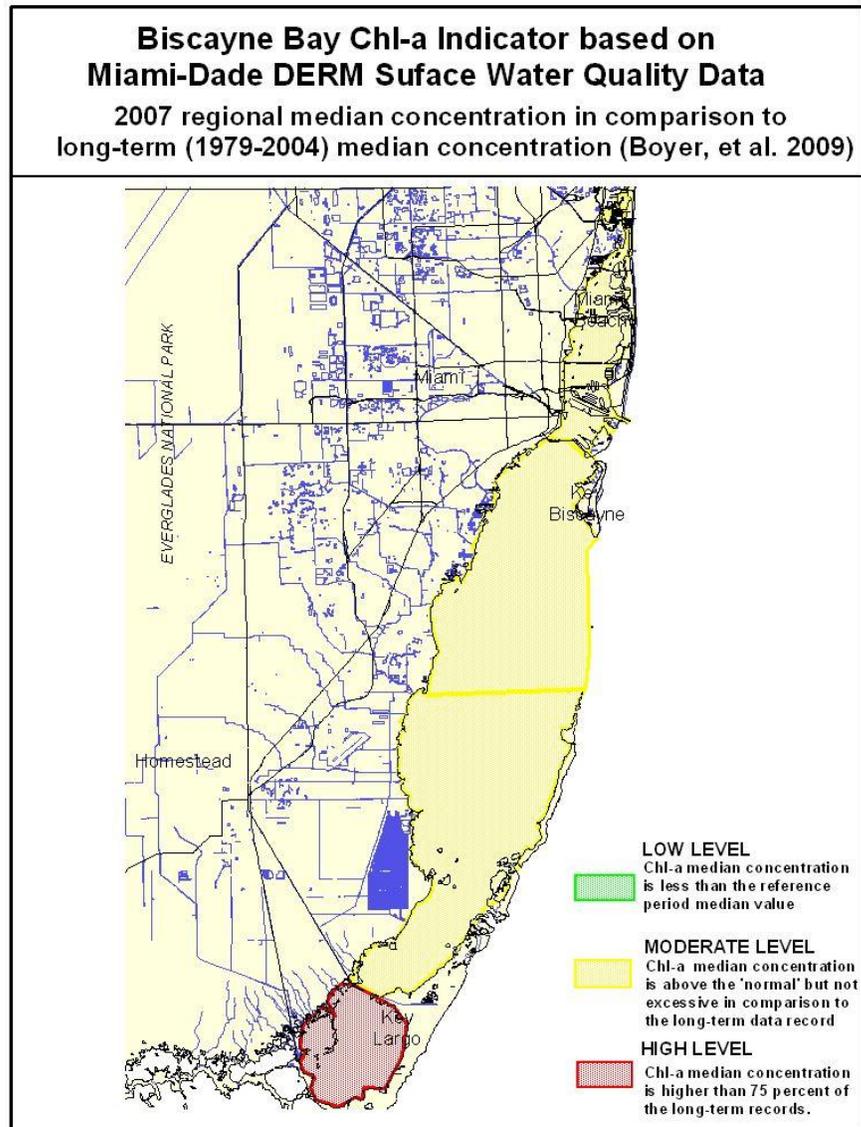
Figure 2



Ecological indicators have been developed by a team of Comprehensive Everglades Restoration (CERP) scientists to help evaluate the status of the South Florida ecosystem and how its key components are responding to restoration and water management activities. Biscayne Bay is a clear-water estuary and is typically characterized by very low concentrations of nutrients and algae. An algal bloom measure, based on chlorophyll concentrations in the water is used to gauge its ecological health. Algal blooms result from increased inputs of nutrients into the coastal waters and are indicative of discharges or disturbance of the natural balance.

In 2006-2007, Biscayne Bay experienced persistent algal blooms, correlated with increased concentrations of the nutrient phosphorous. During this period, there were severe storms and a large construction project in southern basins. Barnes Sound “stoplight” rating was red, and all other basins were rated yellow. This indicator is based on a comparison of chlorophyll concentrations in specific basins of the Bay to a reference baseline documented over more than a decade. Figure 3 is a “stoplight” graphic is used to illustrate comparative trends: a basin is shown in “green” if annual chlorophyll levels are equal to or less than the long-term baseline; “yellow” represents annual chlorophyll levels modestly higher than the reference; and “red” for annual chlorophyll levels in the highest bracket.

Figure 3

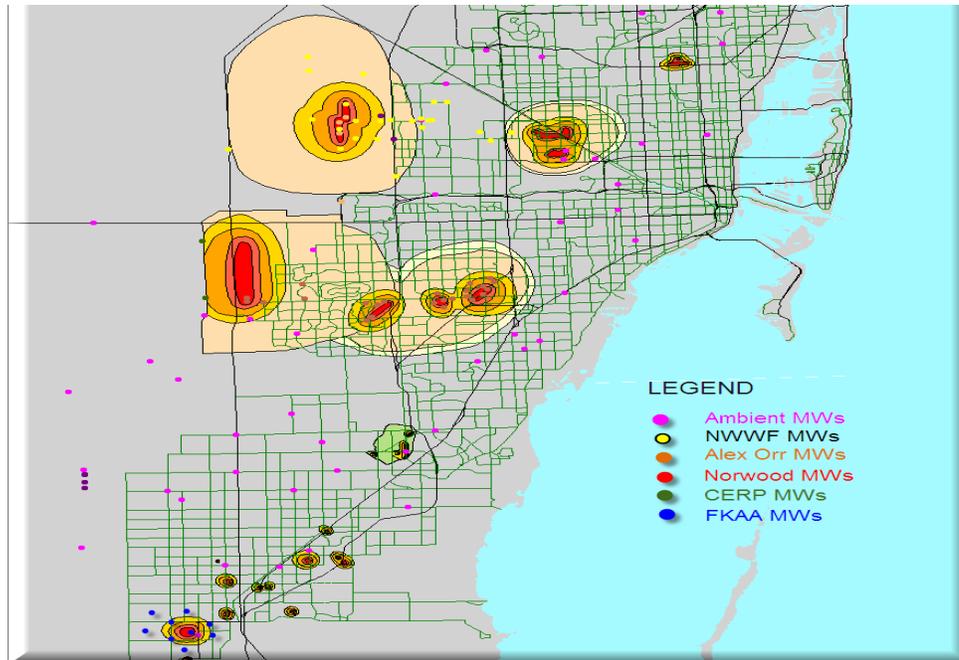


GROUNDWATER QUALITY

Groundwater quality in Miami-Dade is generally good, however there are new threats to water quality protection including sea level rise, salt intrusion, environmental stress as population increases, mandates towards alternative water supply, wastewater reuse and groundwater recharge (described at more length in the Water & Sewer Section).

The County maintains a network of groundwater monitoring locations pursuant to regulatory and voluntary programs. The two main water quality monitoring programs are the Wellfield Protection Monitoring (WPM) program and the Ambient Groundwater Monitoring (AGW) program. The WPM targets four of the County's major Wellfield Protection areas. The program consist of a network of monitoring wells located radially around and at varying distances from the drinking water production wells in each wellfield. The monitoring wells are sited between the wellheads and major potential pollutant sources to intercept any contaminant migrating towards the wellheads and therefore providing early warning of any contaminant threats to the production wells. These wells are constructed to intercept different vertical intervals in the aquifer including the production zone. The WPM program consists of approximately one hundred and seventy monitoring wells which are sampled quarterly for a variety of parameters. Figure 4 shows spatial distribution of the monitoring locations.

Figure 4: Miami-Dade County Ambient Groundwater and Wellfield Protection Water Quality Monitoring Locations



The Ambient Groundwater Monitoring Program (AGW) consists of a network of wells located outside wellfield protection areas and is designed to monitor major land uses and potential pollution sources. The AGW program consists of 56 wells which are sampled bi-annually. Approximately 18,000 measures are recorded in groundwater annually, approximately 8,000 in the WPM program (2008-2009 DERM data) and approximately 10,000 in the AGW program.

Wastewater Reuse

Wastewater reuse is a sustainable alternative to wastewater disposal. In the past wastewater reuse has been limited in southeast Florida due to the costs of treatment and distribution relative to the low cost of providing potable water to meet the needs of residents. Now the situation has changed dramatically. Shallow ground water is no longer available to meet new water supply demands, and the County has identified projects to meet about 50% of new water supply needs over the next 20 years with reclaimed wastewater.

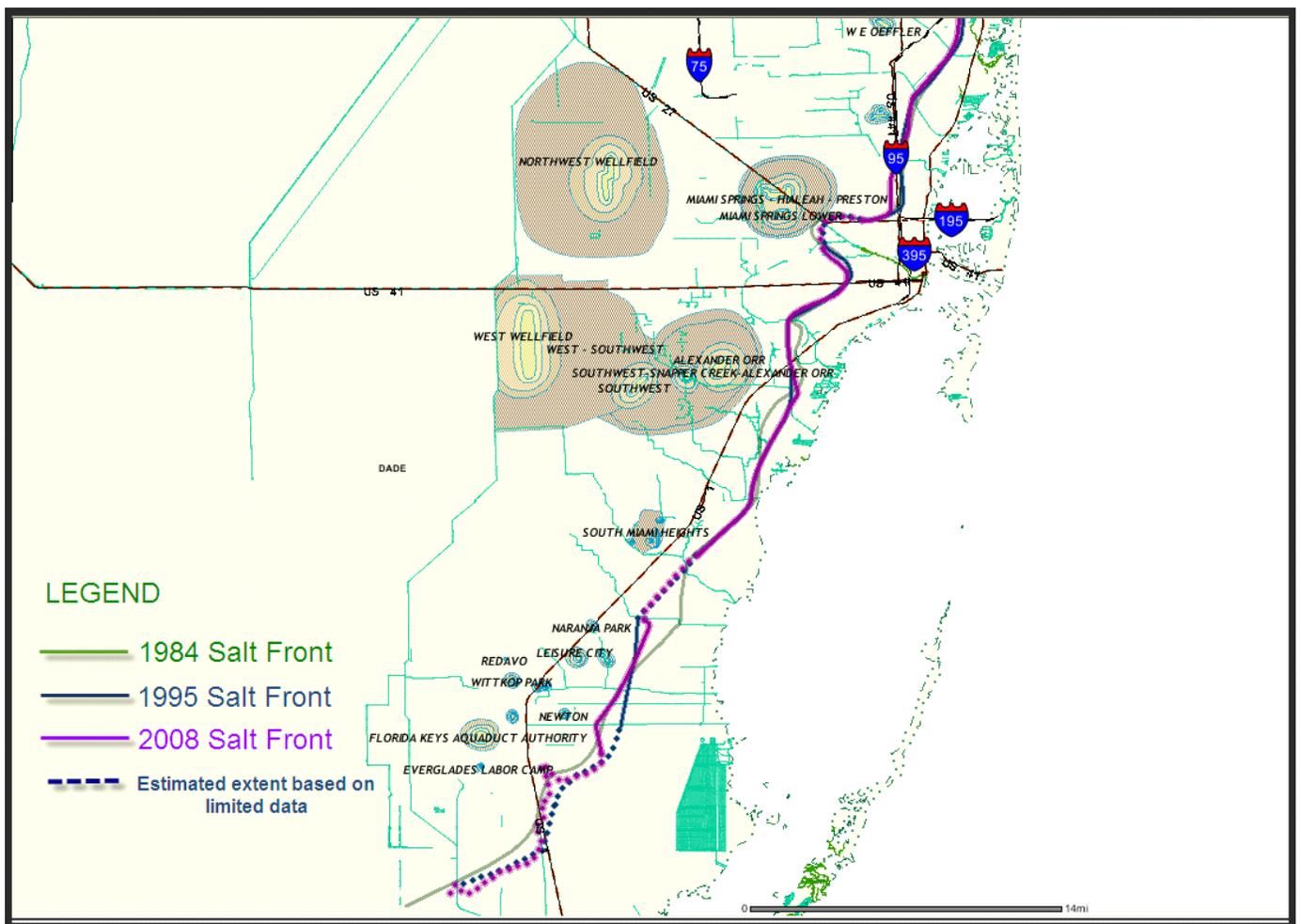
In addition, a 2008 State law requires that ocean outfalls cease being used for disposal of treated wastewater by 2025, with at least 60% of those flows being reused. A plan to comply with these requirements must be prepared and submitted to the State no later than 2013. The Water and Sewer Department is evaluating the significant projected cost, increase in energy use, and potential impact on hydrology necessary to meet these requirements. The types of projects already identified to meet water supply needs include reclaimed water for irrigation purposes, industry (such as cooling water for power plants), and replenishment of ground water, as is currently being done in other parts of the nation. Very highly treated wastewater may be suitable for environmental restoration projects such as rehydration of coastal wetlands to help restore the Everglades. A critical component to these projects is ensuring that the treated wastewater slated for groundwater recharge or wetland restoration meets all applicable criteria and does not pose a threat to the potable water supply, drainage system, or sensitive ecological receptors. Existing monitoring networks will require evaluation to ensure continued and appropriate coverage of major pollutant sources and enhanced for possible new non-regulated contaminants and emerging pollutants of concern. Best available treatment technology will be used to address these potential issues. As all of these options and opportunities are evaluated,

it will be important to have the flexibility to select alternative water supply options that are cost-effective, protective of public health and natural resources, and truly sustainable in terms of all long term consequences.

Saltwater Intrusion

In the coastal area, saltwater extends landward underground and is overlain by a shallow layer of less dense freshwater. As sea level rises, or as freshwater is drained from the land or withdrawn at wellfields, the saltwater boundary can move farther inland. The excavation of canals, lakes, and navigation channels in the coastal areas and lowering of the water table for flood protection had the consequence of providing an inlet for saltwater intrusion into the aquifer. Since the 1940s, control structures have been built in key drainage canals to control the migration of saltwater upstream. Engineered solutions have partially stabilized the rate of the saltwater intrusion towards the west. However, due to consumption of freshwater, drainage, and sea level rise, the migration of the salt front to the west has brought up legitimate concerns especially for the protection of coastal drinking water supply wellfields. This especially holds true in the southeastern portion of Miami-Dade where the salt-freshwater boundary at the base of the aquifer) has migrated to the west, in some areas at an approximate rate of 460 feet/year. Figure 5 illustrates the change of the isochlor line from the time period of 1984, 1995, and 2008 with respect to the spatial distance of the wellfield protection areas.

Figure 5: Salt Intrusion Threats



Additionally, the County in conjunction with the United States Geological Survey (USGS) monitors a network of groundwater monitoring wells and surface water stations for indicators of sea level rise and salt water intrusion, specifically; water level, specific conductivity, and chloride concentrations.

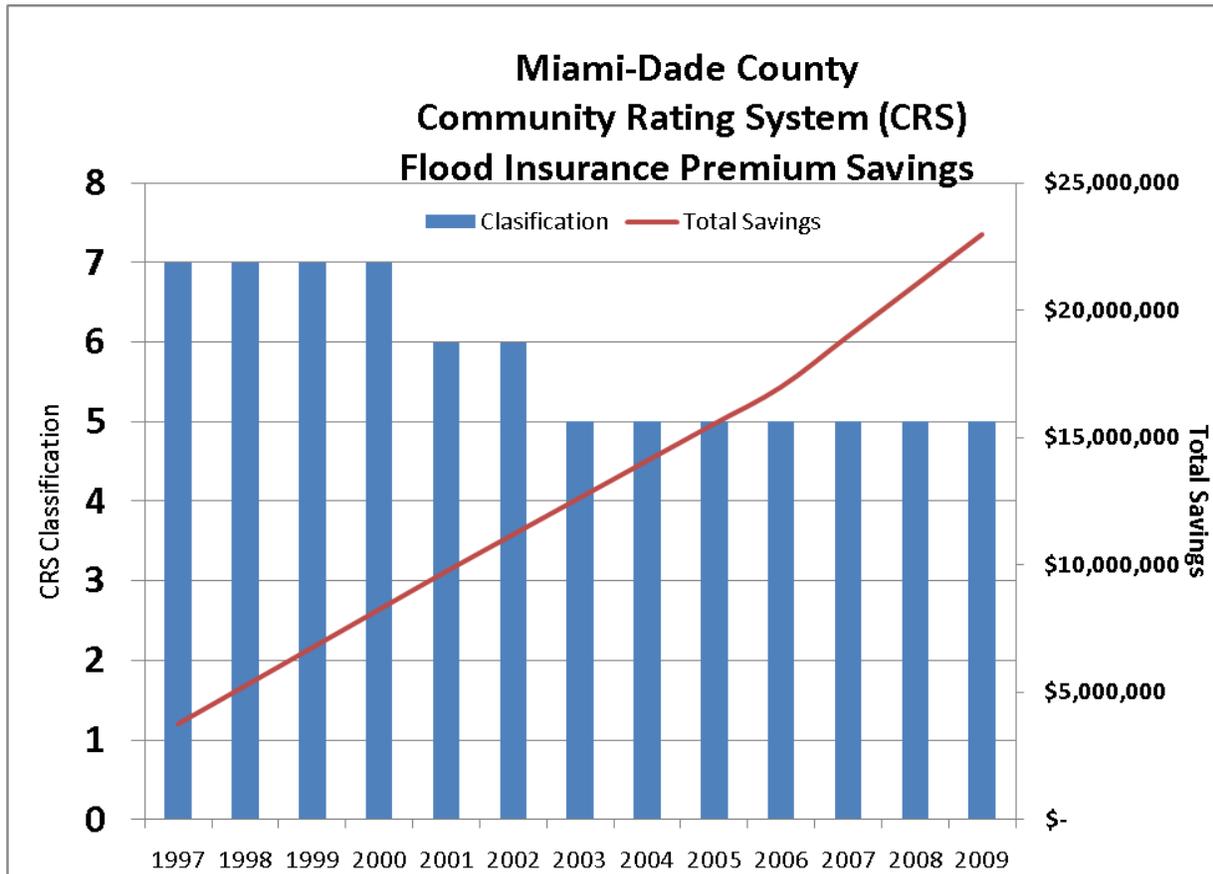
STORMWATER MANAGEMENT

Miami-Dade County is low-lying and stormwater management will need to adapt to rising sea levels to ensure adequate drainage. Proactive and effective ways are used to monitor and adapt the stormwater system to changing environmental conditions. The Stormwater Master Plan (Master Plan) and participation in the Federal Emergency Management Agency (FEMA) Community Rating System (CRS) ensure there is careful planning and response to flooding. The primary canals are maintained by the South Florida Water Management District (SFWMD). The portion of the drainage system maintained by the County consists of the following elements; Secondary Canal System of 187 miles, water control structures/gates, culverts, weirs, pump stations, ditches, swales, retention and detention ponds, drainage wells, and street drainage systems. Planning, design, construction, and maintenance of this system are the responsibility of the Miami-Dade County Stormwater Utility (Utility).

The Master Plan is an overall approach to identifying the flood potential of all areas of the County and charting the need for drainage improvements. The Master Plan is used by the County's water managers to determine the priorities for managing stormwater across the County. Improvements to the water control structures, secondary canal improvements and maintenance needs, culvert upgrades or replacement, and hydraulic connections to the area-wide SFWMD Primary Canal System are all identified by the Master Plan.

The goals of FEMA's CRS program are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. Communities that regulate new development in their floodplains are able to join the FEMA's National Flood Insurance Program (NFIP), which provides federally-backed flood insurance for properties in participating communities. The CRS, part of the NFIP, is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. The County is currently rated at Class 5 resulting in an annual reduction in flood insurance premiums for its residents of over \$20 million. Class 5 puts the County in the top 5 percent of all 1,055 communities in the country that participate in the CRS Program. Only six communities nationwide are currently rated at Class 4 or better. The County currently receives the highest savings in flood insurance premiums nationwide (among all participating communities). Figure 6 shows the County's progression to Class 5 rating and the savings.

Figure 6



Repetitive Losses

Key indicators in flood management and control activities are the annual FEMA reported Repetitive Losses, which the County must mitigate and close out. Repetitive loss refers to properties where FEMA has validated more than one flood insurance claim. Since 1991, there have been 2,125 Repetitive Losses. 579 of these are considered mitigated by county, state, and federal programs. 477 are located within private systems and need to be mitigated by the Homeowner’s Associations, and 1,069 remain to be mitigated. FEMA maintains a process to identify repetitive losses that are primarily the results of major storm events. Implementation of mitigation strategies is prioritized according to the regional severity of the flooding and number of losses in the same drainage area. In addition, the county has a Flood Inspection Program that monitors critical areas where flood events have been documented or Master Plan modeling has identified as needing attention. Results from these monitoring activities are used to program stormwater capital infrastructure improvements and maintenance cycles throughout unincorporated Miami-Dade County.

NATURAL RESOURCES

Environmentally Endangered Lands

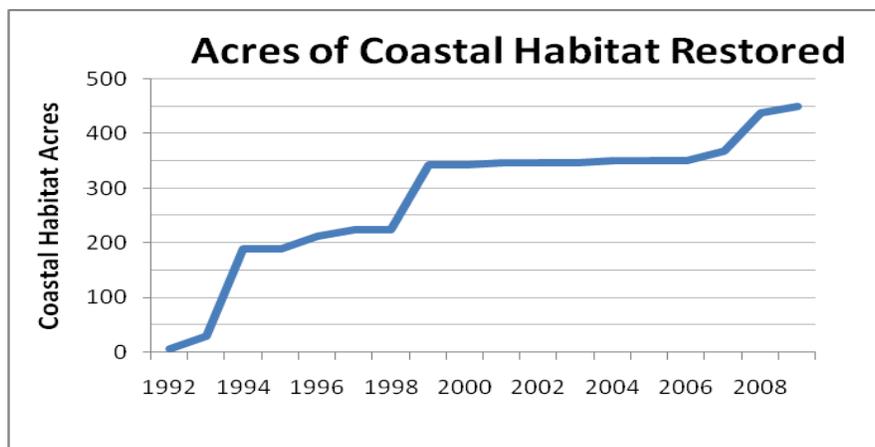
The Environmentally Endangered Lands (EEL) Program was established in 1990 through a countywide referendum which approved a two-year tax increase to acquire, restore, and maintain environmentally endangered lands. In 2004, an additional \$40 million was approved for EEL projects as part of the Building Better Communities Bond. As of December 2009, EEL and its partners had acquired over 20,000 acres of land. Over 53 percent of acres on the Board of County Commissioners approved lists have been acquired. In addition 2,800 acres of park

natural areas have been designated as EEL sites. In total the EEL Program funds active management of approximately 22,800 acres of natural areas.

Coastal Habitat Restoration

Following recommendations of the 1981 Biscayne Bay Management Plan, the Biscayne Bay Restoration and Enhancement Program was established within the Department of Environmental Resources Management (DERM), to improve and restore coastal habitats in Miami-Dade. Since 1985, DERM has been conducting coastal habitat restoration and enhancement projects throughout the County. As of the beginning of FY 2009, 451 acres of coastal habitat had been enhanced over the program history. Projects include creation or enhancement of mangroves, coastal wetlands, dunes, and hammocks along Biscayne Bay, shoreline stabilization, bay island enhancement, and access improvements. These activities are funded primarily through mitigation payments derived from permits for coastal construction and matching revenues from state appropriations or grants. Figure 7 shows the cumulative acres of coastal habitats restored or enhanced.

Figure 7



Wetlands

Wetlands in Miami-Dade serve several vital functions which are essential to the ecological health of South Florida and the welfare of the people and wildlife. Much of Miami-Dade sits at an elevation that is in close proximity to groundwater levels, and this is especially true of wetlands, which tend to be found in lower lying, poorly drained, depressional areas. As such, one of the most important functions of wetlands is to provide direct recharge of water to the Biscayne Aquifer, the County's main source of drinking water. Moreover, because they are often at a lower elevation than surrounding areas and do not drain as quickly, wetlands act as storage areas for containing storm runoff to help minimize flooding and serve to filter and purify surface and ground waters that flow through them. Wetlands also provide habitat for wildlife, including many rare, threatened, and endangered species.

The County seeks to protect and manage the intrinsic value of the wetlands through the wetland regulatory program. Much of the remaining wetlands left today in Miami-Dade are part of the current Everglades National Park and Biscayne National Park, or were historically part of the original natural boundaries of these two protected areas.

Miami-Dade County Code requires that a Miami-Dade County Class I or IV Wetland Permit be obtained for all work within wetlands. While a Wetland Basins map exists showing areas that are likely to contain wetlands, the boundaries shown are approximate and it does not encompass all possible wetlands areas within the County. Therefore, it is a guidance document and not an absolute location map. For regulatory purposes, the Department of Environmental

Resources Management can provide onsite evaluation to determine the location. As part of this Sustainability Assessment, the acreage of existing wetlands within the County was estimated using the best available technology. Wetlands within the boundaries of Everglades National Park, Biscayne National Park islands, and the Water Conservation Areas were excluded from this effort as they would skew any attempt to quantify wetlands losses as a result of the wetlands regulatory program. Figure 8 represents the closest approximation possible to the current number of acres that fall inside and outside of the Urban Development Boundary (UDB) that meet the regulatory definition of wetlands.

Figure 8: Acres of existing wetlands within Miami-Dade County (excludes Everglades National Park, Water Conservation Areas and Offshore Islands in Biscayne National Park)

Location	Number of Acres
Inside the UDB	7,200
Outside the UDB	141,000
Total:	148,200

The determination of acres of mitigation lands within the County is more accurate as it includes the largest parcels that have been tracked as part of the mitigation banking process or as part of the Lake Belt Mitigation Committee purchase program. Between them, the two mitigation banks and the Pennsucco Wetlands make up a large percentage of the wetlands mitigation acreage in the County. Figure 9 shows the approximate acres of mitigation wetlands within Miami-Dade County, with 6,000 of those falling within the Everglades Mitigation Bank (owned and operated by FPL), 4,100 of those falling within the Hole-in-the-Donut Mitigation Bank in Everglades National Park and 11,250 of those falling within the Pennsucco Wetlands or onsite at the locations of the impacts.

Figure 9: Acres of mitigated wetlands within Miami-Dade County

Mitigation Area	Number of Acres
Hole-in-the-Donut	4,100
Everglades Mitigation Bank	6,000
Others (Pennsucco, onsite)	11,250
Total:	21,350

As part of the wetlands regulatory program, tracking of permits and their associated authorized impacts is essential to any effort to quantify the effects of the program as a whole. Since 1999, there have been 521 Class IV permits issued totaling approximately 13,371 acres of impacts to freshwater wetlands. This number represents approximately 10 percent of the total wetland acreage existing within the County currently (excluding the National Parks and Water Conservation Areas).

Tree Canopy

A community's green infrastructure provides many environmental, social, and economic benefits. A healthy urban forest, in particular, provides environmental benefits by slowing stormwater runoff, improving water quality, protecting soil from erosion, improving air quality, and storing atmospheric carbon. Urban forests are important because having an adequate amount of tree canopy offsets the negative effects of carbon in the atmosphere.

The introduction to the Executive Summary of the County's Street Tree Master Plan (STMP) adopted in 2007 states:

“The urban forest is stressed in many cities around the country, but in Miami-Dade County our urban trees are in critical condition. A number of factors have contributed to the diminished tree cover in Miami-Dade, but the problem became even more significant after the tree destruction by the 2005 hurricanes, Katrina, Rita and Wilma. Hurricanes and windstorms do not account for the entire deficit in tree cover. Further causes include development activities, increased impervious areas, and the removal of trees due to citrus canker.”

There are several studies that discuss the social and economic benefits of a healthy urban forest. Healthy tree canopy increases property values, protect property from hurricanes by serving as a wind break, increase and improve wildlife habitat, reduce noise levels by up to 50 percent, contribute to economic sustainability and enhanced community aesthetics and appeal. Research also shows that consumers are willing to shop longer and spend more in retail areas that have trees because trees provide a “human habitat”.

In 2006, Miami-Dade County adopted the Street Tree Master Plan that sets a target of 30 percent tree canopy cover for our County by 2020. This target is a national average at which a metropolitan area reaps the optimal benefits that a healthy urban forest provides. An Urban Ecosystem Analysis conducted by American Forests in 2007 reported that Miami-Dade County has 18 percent tree canopy coverage within the Urban Development Boundary in comparison to less than 10 percent in 1996. “The Structure, Function, and Value of Miami-Dade County’s Urban Forest” is a separate study based on the Urban Forests Effects model conducted by Dr. F. Escobido of the University of Florida in 2008. The study reported canopy coverage of approximately 12 percent translating into 13.9 million trees in our urban forest. Efforts are underway to increase the tree canopy in areas that are deficient and to develop systems to monitor the overall health and function on Miami-Dade’s urban forest.

AIR QUALITY

The topography and meteorological patterns of South Florida help remove harmful air emissions from our community. The indicators reveal that the overall air quality in Miami-Dade falls within the “Good” range of the Environmental Protection Agency’s (EPA) National Ambient Air Quality Standards over 80 percent of the days of the year. While this is true, the days when the air quality falls within the Moderate and Unhealthy for Sensitive Groups categories are of concern for the populations more sensitive to air pollution, such as the elderly and very young, and those suffering from respiratory illnesses and diseases.

Additionally according to the Florida Department of Health, the County’s asthma hospitalization rate has more than doubled in the last 10 years. The hospitalization and death rate associated with heart disease are higher than the national average. Furthermore, the imminent strengthening of the National Ambient Air Quality Standard (NAAQS) for ozone in 2010 will likely result in exceedances of these health-based standards in the near future.

In April 2009, EPA made findings under the Clean Air Act that six key greenhouse gases (GHGs) constitute a threat to human health and welfare and as such shall be regulated air pollutants. The regulation of these emissions will result in future indicators and key challenges as they relate to air pollution. While climate change is discussed at length in a separate section, it is important to note its interconnection with air pollution. In fact, while transportation is the largest contributor to local smog-forming air pollutants it is the second largest contributor to local CO₂ emissions. Therefore, just as the sources of traditional and ‘new’ air pollutants are similar, initiatives to reduce those emissions will provide co-benefits for air quality and climate change mitigation.

National Ambient Air Quality Standards (NAAQS)

The Clean Air Act of 1970 defined the following six criteria pollutants and established ambient concentration limits to protect public health and welfare: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), fine particulates (PM_{2.5}), sulfur dioxide (SO₂), and lead (Pb).

Miami-Dade County currently meets all NAAQS standards. This is determined by measuring the concentration of the criteria pollutants in air samples collected from a network of ambient air quality monitors located throughout Miami-Dade. Ozone and fine particulate matter are the two pollutants closest to the established NAAQS Attainment Values. Figure 10 depicts Miami-Dade County's ozone attainment status over a 10 year period. The line graphs represent the attainment averages for each of the two ozone monitoring sites in Miami-Dade County. The ozone standard was made more stringent in 2007 (red line) and monitoring data reveals that ambient concentrations are nearing those health-based standards (triangles and squares are individual daily readings and green and blue lines are annual averages).

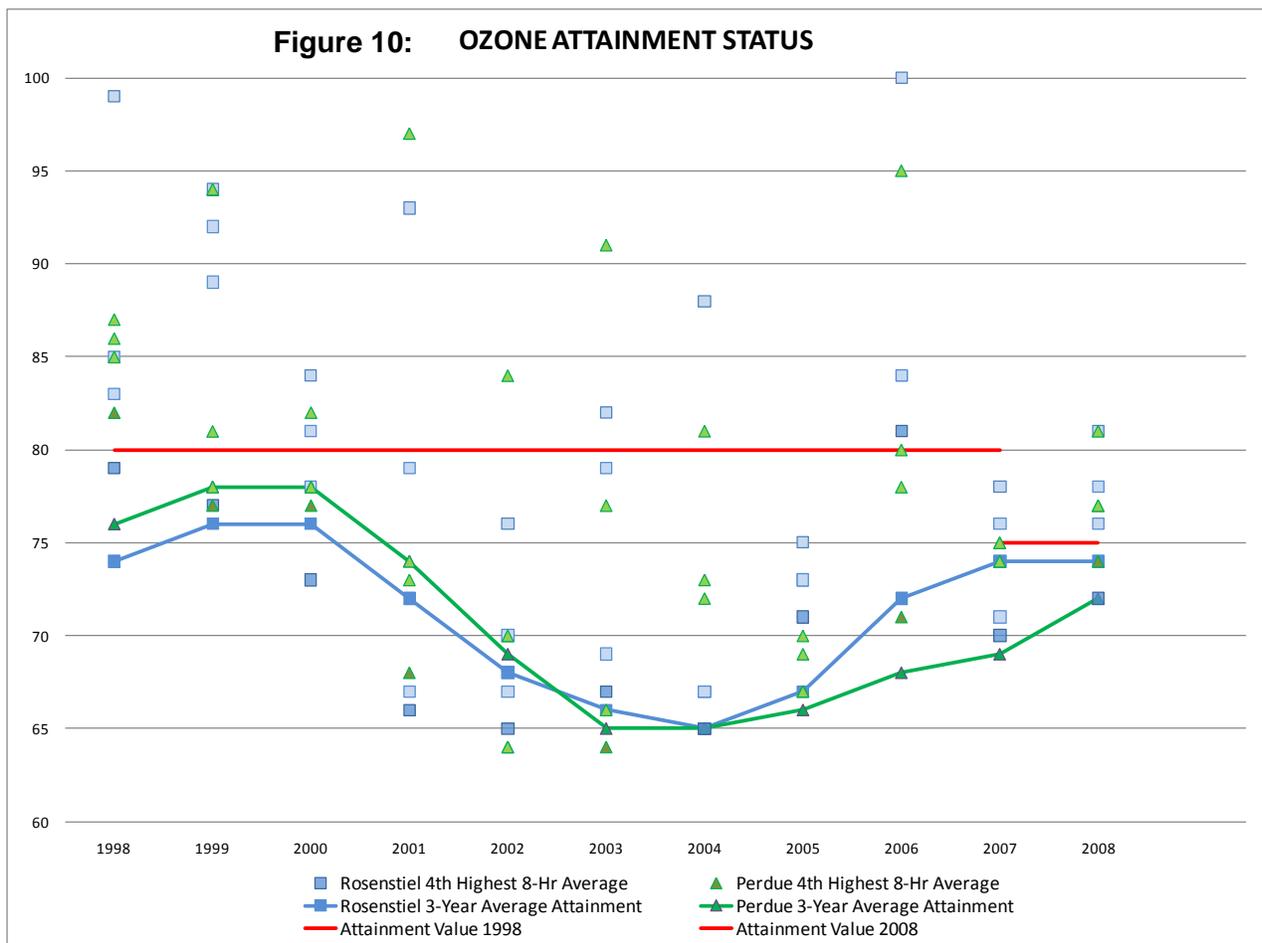
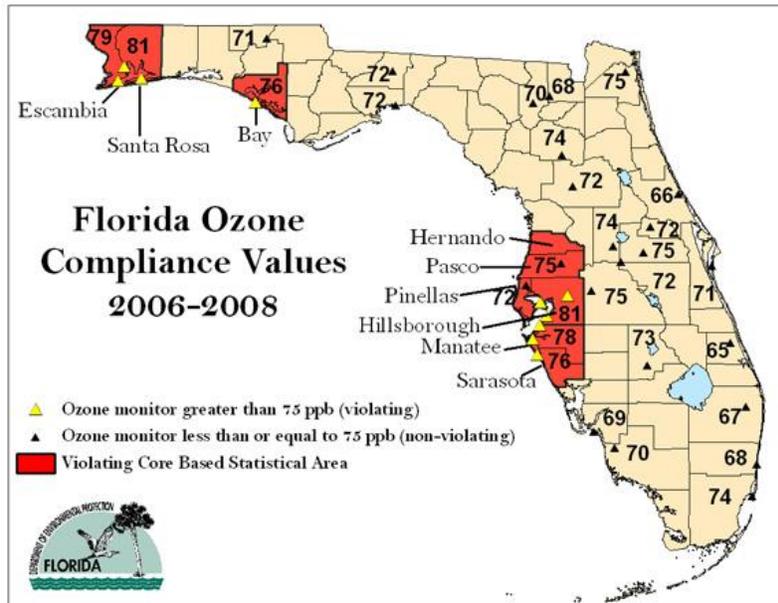


Figure 11 is a map depicting the 2006-2008 Ozone Attainment Status for all counties in the State of Florida (Ozone NAAQS is 75 ppb).

Figure 11

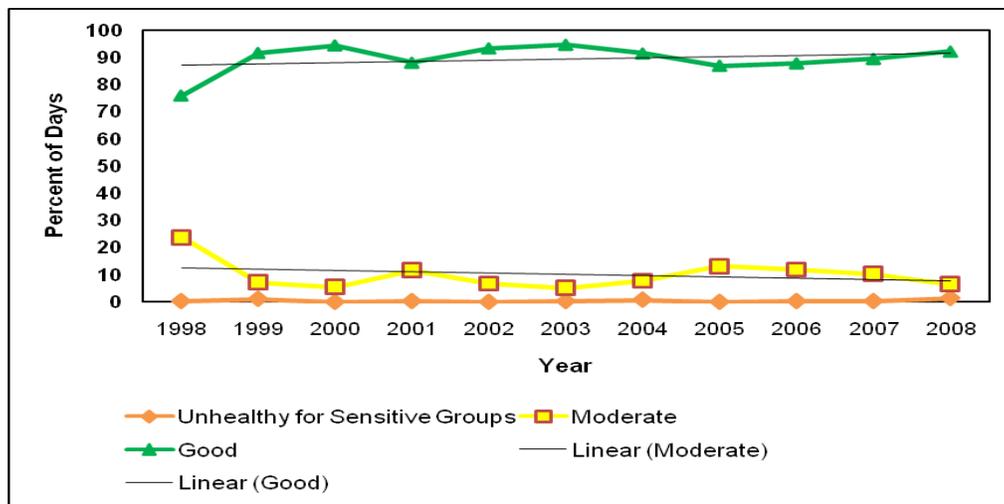


Air Quality Index Results

The Air Quality Index (AQI) was established as a reporting mechanism for the measurement of pollutants with NAAQS. The AQI converts the concentration of each measured pollutant present in the air to a number on a scale of 0 to 500, to which a category and color is assigned. Each category corresponds to a different level of health concern. The pollutant with the highest reading for a given day is reported in the daily Air Quality Index. Ozone and PM2.5, fine particulate matter, are the pollutants that are usually the governing (reported) pollutant for the AQI. In 2007-2008, Ozone was reported 72 percent of the time (days) and PM2.5 was reported 38 percent of the time.

The comparison of the AQI over the last 10 years (1999 to 2008) shows that the air quality in Miami-Dade has remained constant. The percentage of over 80 percent of days every year is in the Good range as shown in Figure 12.

Figure 12: Air Quality Index (AQI) Results



Air Pollution Sources

There are many different types and sizes of sources such as factories, power plants, dry cleaners, cars, buses, trucks and even windblown dust and wildfires. Emissions inventories conducted in the past reveal that emissions from mobile sources account for approximately 70 percent of the smog-forming ozone pollution in Miami-Dade County. Local industry also contributes to air pollution. These may range from smaller 'area sources' that collectively contribute emissions, such as vehicle repair and painting facilities, to larger 'point sources' such as power plants, cement manufacturing facilities, metal foundries, and landfills. Figure 13 is a list of facilities with Title V Major Source Air Pollution Permits.

Figure 13: Active Title V Major Source Air Pollution Permits

Industry Type	Facility Name
Aerospace Repair	AAR Landing Gear
	Goodrich Corporation
	Aero Kool Corp.
Cement Manufacturer	Titan America
	CSR Rinker Materials
Fiberglass Boat Manufacturer	RAM Investments
	Angler Boats
	Bertram Yacht
	Contender Boats
	Cigarette Racing Team
Fiberglass Products	DM Industries
Food Production/Baking	Flowers Baking
Grey Iron Foundry	US Foundry
Hospital/Incineration	VA Hospital
Inflatable Product Manufacturer	Eastern Aero Marine
Power Generation	City of Homestead Electric Utility
	FPL (Turkey Point)
	FPL (Cutler)
Surface Coating	Benada Aluminum
	Dyplast Products
	Exteria Building Products
	Fine Arts Lamps
Waste Operations	North Dade Landfill
	South Dade Landfill
	Resources Recovery (Waste Handling)
	Waste Management Landfill
Water/Wastewater Treatment	WASD-Virginia Key
	WASD - South District
	WASD - North District
	WASD - Hialeah/Preston
	WASD -Alexander Orr

EXISTING EFFORTS

Consolidates current plans, goals, and initiatives related to the specific assessment area

Comprehensive Development Master Plan

The Comprehensive Development Master Plan (CDMP) expresses the County's general objectives and policies addressing where and how it intends development or conservation of land and natural resources will occur during the next ten to twenty years, and the delivery of County services to accomplish the Plan's objectives. It provides for "sustainable development" - allowing for land capacity to meet projected needs, preservation of wetlands and agricultural areas and protection of (drinkable) water well fields.

The CDMP establishes the broad parameters for government to do detailed land use planning and zoning activities, functional planning and programming of infrastructure and services. As such, it is a framework for use by other programs to be developed to support its long-range planning goals. For each of the master plan elements, there are goals, objectives and policies, measures to be monitored and maps of planned future facilities.

The CDMP establishes a growth policy that encourages development:

- At a rate commensurate with projected population and economic growth.
- In a contiguous pattern centered around a network of high-intensity urban centers well-connected by multi-modal intra-urban transportation facilities.
- In locations which optimize efficiency in public service delivery and conservation of valuable natural resources.

The goal for the conservation, aquifer recharge and drainage element is to "PROVIDE FOR THE CONSERVATION, ENVIRONMENTALLY SOUND USE, AND PROTECTION OF ALL AQUATIC AND UPLAND ECOSYSTEMS AND NATURAL RESOURCES, AND PROTECT THE FUNCTIONS OF AQUIFER RECHARGE AREAS AND NATURAL DRAINAGE FEATURES IN MIAMI-DADE COUNTY."

- *Objective CON-1:* Improve air quality in the County to meet all National Ambient Air Quality Standards set by the Environmental Protection Agency (EPA) and their respective deadlines; and reduce human exposure to air pollution. Policies: CON-1A, CON-1B, CON-1C, CON-1D, CON-1E, CON-1F, CON-1G, CON-1H, CON-1L, CON-1J, CON-1K, CON-1L
- *Objective CON-2:* Protect ground and surface water resources from degradation, provide for effective surveillance for pollution and clean up polluted areas to meet all applicable federal, state and County ground and surface water quality standards. Policies: CON-2A, CON-2B, CON-2C, CON-2D, CON-2E, CON-2F, CON-2G, CON-2H, CON-2I, CON-2J, CON-2K, CON-2L
- *Objective CON-3:* Regulations within wellfield protection areas shall be strictly enforced. The recommendations of the NW Wellfield Protection Plan shall continue to be fully implemented, as are recommendations that evolve from the West Wellfield and South Dade Wellfield planning processes. Policies: CON-3A, CON-3B, CON-3C, CON-3D, CON-3E, CON-3F, CON-3G, CON-3H
- *Objective CON-4:* The aquifer recharge and water storage capacity of the presently undeveloped areas in western and southern Miami-Dade County shall be maintained or increased. Policies: CON-4A, CON-4B, CON-4C, CON-4D, CON-4E, CON-4F, CON-4G
- *Objective CON-5:* Miami-Dade County shall continue to develop and implement the Stormwater Master Plans comprised of basin plans for each of the twelve primary hydrologic basins being addressed by the County, and cut and fill criteria as necessary to: provide adequate flood protection; correct system deficiencies in County maintained drainage facilities; coordinate the extension of facilities to meet future demands

throughout the unincorporated area; and maintain and improve water quality. The Stormwater Master Plan is projected to be completed in 2005, and implementing actions recommended in each basin plan shall continue to commence immediately after the applicable plan is approved. Outside of the Urban Development Boundary the County shall not provide, or approve, additional drainage facilities that would impair flood protection to easterly developed areas of the County, exacerbate urban sprawl or reduce water storage. Policies: CON-5A, CON 5B, CON-5C, CON-5D, CON-5E, CON-5F, CON-5G, CON-5F, CON-5G, CON-5H

- *Objective CON-6:* Soils and mineral resources in Miami-Dade County shall be conserved and appropriately utilized in keeping with their intrinsic values. Policies: CON-6A, CON-B6, CON-6C, CON-6D
- *Objective CON-7:* Miami-Dade County shall protect and preserve the biological and hydrological functions of the Future Wetlands identified in the Land Use Element. Future impacts to the biological functions of publicly and privately owned wetlands shall be mitigated. All privately owned wetlands identified by the South Florida Regional Planning Council as Natural Resources of Regional Significance and wetlands on Federal, State, or County land acquisition lists shall be supported as a high priority for public acquisition. Publicly acquired wetlands shall be restored and managed for their natural resource, habitat and hydrologic values. Policies: CON-7A, CON-7B, CON-7C, CON-7D, CON-7E, CON-7F, CON-7G, CON-7F, CON-5G, CON-7H, CON-7I, CON-7J
- *Objective CON-8:* Upland forests included on Miami-Dade County's Natural Forest Inventory shall be maintained and protected. Policies: CON-8A, CON-8B, CON-8C, CON-8D, CON-8E, CON-8F, CON-8G, CON-8F, CON-8G, CON-8H, CON-8I, CON-8J, CON-8K, CON-8L, CON-8M, CON-8N
- *Objective CON-9:* Freshwater fish and wildlife shall be conserved and used in an environmentally sound manner and the net amount of habitat critical to federal, state or County designated endangered, threatened, or rare species or species of special concern shall be preserved. Policies: CON-9A, CON-9B, CON-9C, CON-9D, CON-9E, CON-9F

The Street Tree Master Plan

The 2007 The Street Tree Master Plan and the CDMP established a goal of 30% canopy coverage. The STMP also calls for the planting of quality trees in public rights-of-way, educating policy makers and the public on the importance of adequate tree canopy, promoting the design of urban spaces that adequately fit trees, developing and executing a tree management plan to craft sustainable tree structure, and encouraging local growers to produce the quality and species for public rights-of-way.

The Stormwater Master Plan

The Stormwater Master Plan goal is to develop and maintain plan for Miami-Dade County's hydrological basins through inter-agency grants, Stormwater Utility Funds or contractual agreements. The purpose of the master plan is to: document background investigations, evaluate existing water quantity and quality problems, and present recommended stormwater management solutions

The Stormwater Management Master Plan is an essential step towards identifying and solving the drainage related water quality problems in the County's Canal system, which discharges to Biscayne Bay. The Master Plan identifies and maps existing stormwater systems, estimates the effects of existing and future land uses on flood protection and water quality, and developing "Best Management Practices" (BMPs) for flood reduction and water quality improvement.

Existing Legislation

- Numerous federal, state, and local regulations protect water and natural resources, including Chapter 24 Miami-Dade Environmental Protection Code, Chapter 62 Florida Administrative Code (multiple sections), Code of Federal Regulations 40-403, Chapters 373, 376, 403, and 253 of Florida Statutes and the Clean Water Act.
- The 2007 Miami-Dade County Water Use Permit requires the County to develop and implement alternate water supply projects to meet the County's future water supply needs.
- The Florida legislature in 2008 approved a bill prohibiting most ocean outfalls of treated waste water after December 31, 2025.
- The Miami-Dade County Stormwater Utility operates through Article V, Chapter 24 of the Environmental Protection Code of Miami-Dade County which was created and established by the authority of Section 403.0891(3) Florida Statutes. Explicit authority is granted to the Utility to adopt stormwater utility fees sufficient to plan, construct, operate, and maintain stormwater management systems as set forth in the local program.
- Numerous federal, state, and local regulations to control and/or reduce emissions of air pollution from stationary and mobile sources of air pollution. Examples include the Clean Air Act, the Florida Administrative Code, and Chapter 24 of Miami-Dade County.

Federal

- *Proposed Greenhouse Gas Permitting Requirements on Large Industrial Facilities*
On September 30, 2009 EPA proposed new thresholds for GHG emissions that define when Clean Air Act permits under the New Source Review and Title V operating permits programs would be required. The proposed thresholds would tailor these permit programs to limit which facilities would be required to obtain permits and would cover nearly 70 percent of the nation's largest stationary source GHG emitters—including power plants, refineries, and cement production facilities, while shielding small businesses and farms from permitting requirements. These thresholds would expand local regulatory programs.
- *Final Mandatory Reporting of Greenhouse Gases Rule*
EPA has issued the Final Mandatory Reporting of GHG Rule. Signed by the Administrator on September 22, 2009, the rule requires in general that suppliers of fossil fuels and industrial greenhouse gases (GHGs), manufacturers of vehicles and engines outside of the light duty sector, and facilities that emit 25,000 metric tons or more of GHGs per year to submit annual reports to EPA. The rule is intended to collect accurate and timely emissions data to guide future policy decisions on climate change.
- *EPA and NHTSA Propose National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks*
On September 15, 2009, EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) proposed a new national program that would reduce greenhouse gas emissions and improve fuel economy for all new cars and trucks sold in the United States. EPA proposed the first-ever national greenhouse gas (GHG) emissions standards under the Clean Air Act, and NHTSA proposed Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. This proposed national program would allow automobile manufacturers to build a single light-duty national fleet that satisfies all requirements under both Federal programs and the standards of California and other states.

Current Initiatives

- The County implements a broad array of regulatory, monitoring and assessment, restoration, endangered land acquisition, and water management programs to protect, maintain or improve air, ground and surface water quality and to conserve or enhance environmentally sensitive natural habitats. These programs include initiatives undertaken pursuant to the County's own local authority, as well as collaborative efforts with federal, state, other local government and non-government resource management partner organizations.
- Federal, state, and local water managers are beginning to develop regional models to more effectively assess sea level rise and establish consistent, shared planning scenarios and climate data for South Florida. The County has already contributed by collecting improved topographic data and developing landscape models to illustrate the potential extent of inundation. Because the aquifer is very porous and South Florida peninsula is low-lying and surrounded by the sea, rising water will approach from all sides and through the underlying substrate.
- CERP and CERP-related projects that directly affect Miami-Dade County include the Tamiami Trail component of the Modified Water Deliveries, the C-111 Spreader (Western), and the Biscayne Bay Coastal Wetlands. Groundbreaking on initial construction phases of the Tamiami Trail and C-111 Spreader projects occurred in December 2009 and January 2010, respectively. Construction of initial components of the BBCW awaits Congressional authorization and funding, but may begin within the next fiscal year. Completion of all phases of these projects will occur over a decade or more. Federal authorities are also updating operation plans for canals, pump stations and other infrastructure that is already in place to improve delivery of water for ecological restoration, water supply, and flood protection.
- DERM is in the process of identifying spatial gaps in the data gathering in order to provide recommendations for the proper coverage when establishing the salt front lines. The process will include the identification of possible monitoring wells needed, along with appropriate depth recommendations, in order to delineate the horizontal and vertical extent of the chloride concentrations.
- The proposed construction of a control structure at the Card Sound Road Canal has been identified as one element to help combat the saltwater intrusion issues noted in the groundwater and surface water monitoring stations.
- In 2008 the County approved the design and construction of a 23 million gallons per day (mgd) advanced waste water treatment plant with recharge to the Biscayne Aquifer and indirect potable use and recently concluded a five month pilot test of the proposed treatment system. As reuse/recharge projects are implemented, the existing monitoring network will be evaluated and monitoring locations and indicator contaminants strategically added especially in areas of recharge. With the implementation of the advanced treatment South District Water Reclamation Plant, the County will join California among the elite in the nation with respect to producing high quality reclaimed water.
- US EPA National Clean Diesel Campaign Grant Projects: Transit Hybrid Bus Replacement Project, Clean Diesel Repower Rebate Program for Local Farmers, Project RIDE (Reducing In-Cabin Exposure to Diesel Emissions) – School Bus Clean Diesel

COMMUNITY FEEDBACK

Feedback & results gathered through the planning process or surveys

2035 Miami-Dade County Long Range Transportation Plan Public Involvement Survey October 2008

Public feedback was collected through both an online survey and the use of the OptionFinder Technology during public involvement sessions held throughout the County. A total of 417 responses were collected through the online survey, while a total of 294 responses were collected during public involvement sessions. The following is an air pollution-related question and result:

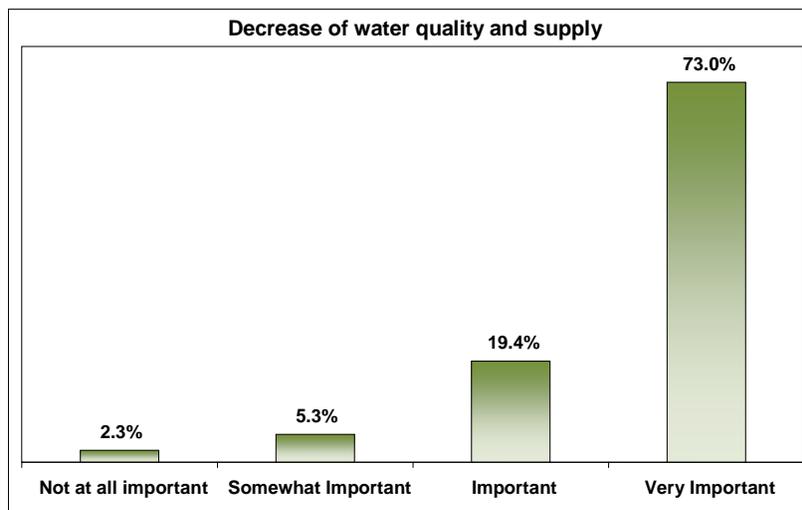
Environment

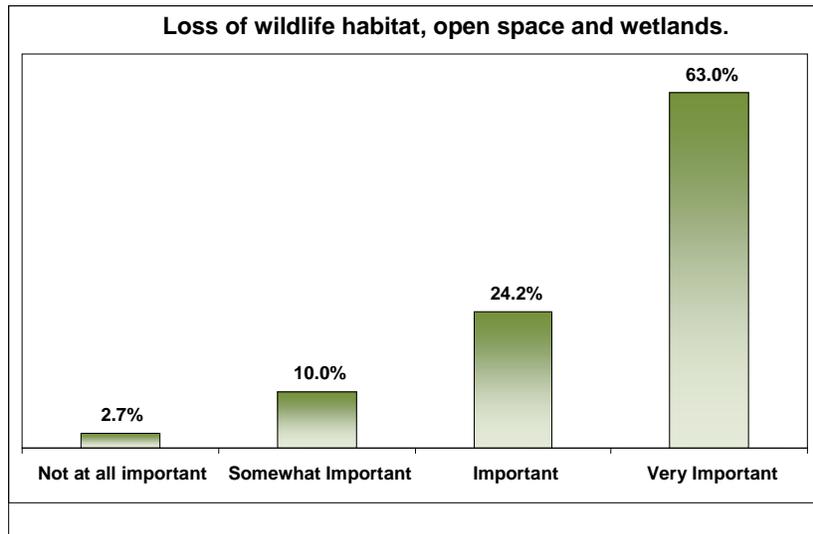
When asked about environmental issues, respondents were asked to rate the importance of each in a list of concerns that could be impacted by future transportation improvements on a four-point rating scale, where 1=Not At All Important, 2=Somewhat Important, 3=Important, and 4=Very Important. **Table 4** shows the list in rank order from highest to lowest level of importance.

According to **Table 4**, each of the four environmental issues received a high average rating, ranging from 3.4 to 3.6. This shows that respondents believe that these issues are all important. **Figures 16 through 19** show the percentage breakdowns of the responses to each of the individual issues.

Table 4
Frequency of Responses

Item	1	2	3	4	Total Responses	Average
	Not At All Important	Somewhat Important	Important	Very Important		
Decrease of water quality and supply	15	35	129	485	664	3.6
Decline of air quality	16	61	133	456	666	3.5
Loss of wildlife habitat, open space and wetlands	18	66	160	416	660	3.5
Global warming	47	63	154	408	672	3.4





Miami-Dade County Resident Satisfaction Survey 2008

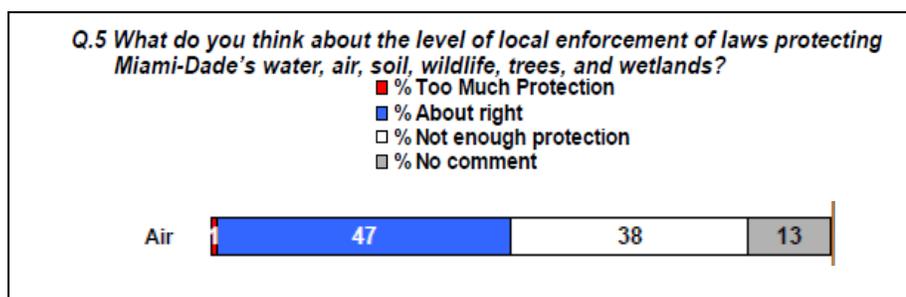
2008 County Resident Survey	Percent Positive Ratings (4&5)	Change since 2005
Cleanliness of waterways near your home	60.1%	11.1%
Prevention of street flooding on major streets	48.9%	9.9%
Prevention of street flooding on side streets	47.6%	6.6%
Tree canopy along major streets*	58.9%	18.9%
Tree canopy along side streets	57.7%	14.7%

*Highest positive percent change in 2008 survey and most improved area 2005 vs. 2008

DERM's Resident & Permitted Business Survey, Hay Group 2003

Public feedback was collected in 2003 through a sample of 2,000 Miami-Dade County residents and 3,000 permitted businesses. Summary of results:

- 79 percent of residents responded that environmental protection is extremely important
- 42 percent of residents responded that the level of local enforcement of laws supporting wetlands is not enough protection
- 35 percent of residents feel that laws protecting all environmental resources (*water, air, soil, wildlife, trees, and wetlands*) are not enough
- As opposed to businesses, residents view DERM's application of regulations as too lenient across many resources, especially wetlands.



Results indicate that air and water pollution are considered the most important resources to address.

Resources Important to Address	Most	Least
Air Pollution	57	7
Coral Reef Damage and Disease	15	27
Global Warming	17	26
Space for Future Landfills	7	37
Littering & Illegal Dumping	21	18
Loss of Tree Canopy	13	26
Loss of Wetlands	14	20
Any type of Water Pollution	53	2

Air and Water pollution most important (and, as seen earlier, many feel not enough done to protect these resources)