



Our Environment

Miami-Dade County is internationally recognized for its beaches and pristine waters. Beyond the beaches are ecosystems that are unique, diverse and directly linked to water management. So valuable are these critical resources that two national parks, a National Marine Sanctuary, State of Florida aquatic preserves and water conservation areas have been created. Underlying all of South Florida is the Biscayne Aquifer, a shallow, porous limestone formation that has historically provided all urban and agriculture supply of fresh water.

Vulnerable natural resources have been altered throughout the years. Progressive environmental programs seek to protect, restore, and minimize harm to these resources, but major paradigm shifts are upon us, and we must continue to act.

Goals

- **Maintain exceptional quality of air, drinking water, and coastal waters used for recreation**
Continue to achieve the best air quality rating at least 90 percent of the year and exceed drinking water quality standards. Prevent degradation of our outstanding florida waters
- **Protect and enhance Biscayne Bay, the Everglades, and vital ecosystems**
Restore and enhance more than 500 acres of coastal habits and wetlands, and preserve more than 24,000 acres of environmentally endangered lands
- **Reinvent our solid waste system**
Reduce or divert 75 percent of our solid waste by 2020 through reusing, recycling, and generating electricity



Our Environment

"Practically without exception, areas that have been turned over to the Service as national parks have been of superlative value with existing features so outstanding that if the Service were able to merely retain the status quo, the job was a success. This will not be true of the Everglades National Park. The reasons for even considering the lower tip of Florida as a national park are 90 percent biological ones, and hence highly perishable. Primitive conditions have been changed by the hand of man, abundant wildlife resources exploited, woodland and prairie burned and reburned, water levels altered, and all the attendant, less obvious biological conditions disturbed."

Daniel B. Beard, Wildlife Reconnaissance: Everglades National Park Project, 1938

Strengths & Accomplishments...Opportunities & Actions

Miami-Dade is a leader in environmental protection

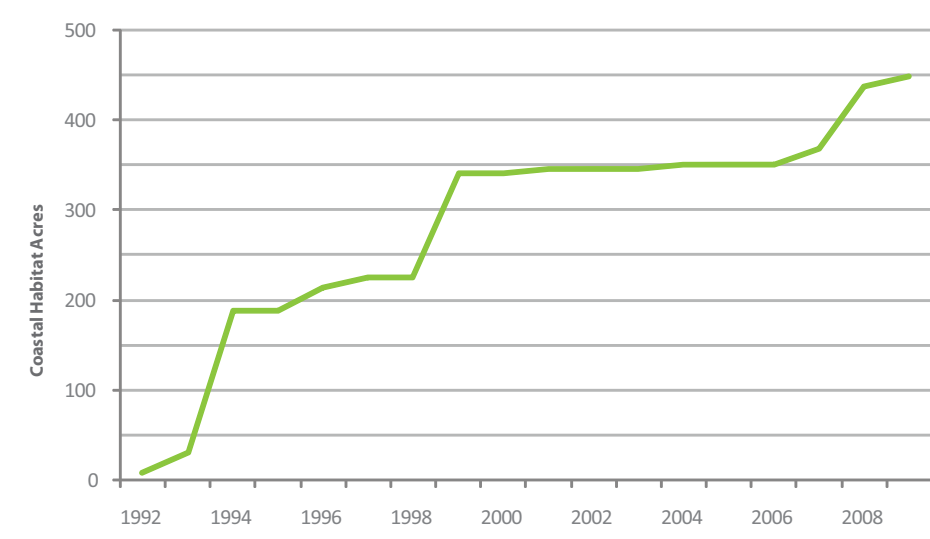
Our drinking water, drawn from the shallow Biscayne Aquifer, is of exceptional quality and rated among the best nationally. It has been protected through strong land use regulations, other legal protections and a community culture of preservation. To assure that there is an adequate supply of fresh water to meet the needs of both the natural system and human uses, strong water conservation, wastewater reuse, and development of alternative water supply are growing priorities. In spite of continuous significant population increases bringing increased pollution potential and other pressure on natural resources, our beaches remain swimmable, and portions of Biscayne Bay seagrass communities and mangrove shorelines remain largely undisturbed. Twenty miles of our barrier island beaches, once severely eroded, are now continually renourished through federal, state and local efforts, including restored coastal dune systems and sea turtle nesting habitats. Our air quality is excellent.

"Clean air, clean drinking water, swimmable waters, and quality ecosystems are fundamental for our future. They are the backbone of a healthy community. They support our economic system. Without a doubt, environmental protection costs less than treatment, restoration, or irreparable loss."

-Carlos Espinosa, Department of Environmental Resources Management Director

Much of our now-developed land was historically pine rockland forests or part of the greater Everglades ecosystem, made up of wetlands that allowed flow of freshwater from sawgrass prairies to coastal wetlands and estuaries. In other words, today's built environment has replaced much of our native, natural and wet areas. Flood control canals and structures were built to allow for agriculture, residential development and water supply but altered the natural patterns of freshwater flow. This canal system does provide effective drainage, and with additional improvements, we now rank in the top five percent in the nation for flood control efforts according to the Federal Emergency Management Agency's Community Rating System. We have approximately 148,200 acres of wetlands remaining within Miami-Dade County borders, important for recharging

Cumulative Acres of Coastal Habitat Restored



our aquifer. Since 1990, our County has acquired and preserved more than 23,000 acres of environmentally endangered lands and restored more than 450 acres of degraded coastal ecosystems. In addition, the state and federal governments have preserved 80,000 acres within Miami-Dade County in addition to Everglades National Park, the Everglades Wildlife Conservation Area and Biscayne National Park. These preserved areas provide habitat for native fish and wildlife, as well as threatened natural forest, wetlands and tropical plant communities. Agriculture, open lands, and environmental protection areas in south and west Miami-Dade help to provide a "green" buffer between the national parks and urban development.

We cannot credit these accomplishments to luck. The keys have been leadership, commitment, careful County stewardship and governance achieved through strategic planning and successful programs, as well as collaborative efforts with federal, state, other local government and non-governmental resource-management organizations.

In spite of these efforts, we face several concerns



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. Acquisition ensures that these lands are shielded from development and will continue to thrive as natural habitats. Current acquisitions exceed 20,000 acres and include rockridge pinelands, tropical hardwood hammocks, freshwater wetlands, coastal wetlands, coastal wetlands, and scrub habitat.

New water-treatment technologies promise more sustainable alternative water supplies through the beneficial reuse of wastewater, but they are expensive and energy intensive. Our low-lying terrain and porous aquifer are especially vulnerable to contamination and to potential impacts from sea-level rise and other climate change factors. As sea levels 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, economic and lifestyle benefits that the natural communities provide. Conservation and restoration of natural resources will create a healthier and more resilient environment more adaptable to climate change.

In response to the effects caused by development, a multi-billion dollar federal and state program, the Comprehensive Everglades Restoration Plan (CERP), was approved by Congress in the Water Resources Development Act (WRDA)

of 2000. It includes more than 60 elements 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 topography and meteorological patterns of South Florida help remove harmful air emissions from our community, but we produce greenhouse gas emissions that impact our neighbors. The Environmental Protection Agency (EPA) is strengthening its air-quality standards, which will result in reduced ratings in the near future. Initiatives to reduce emissions will provide benefits for both air quality and climate change mitigation.

Developing a sustainable solid waste system

Our Environment is not only composed of the natural beauty described above, but also the management of the resources we use. The amount and type of waste generated by a community – and the strategies employed to manage or treat that waste – contribute to the many facets of a sustainable community: human health, the environment, land use, and economic development. Our solid-waste system is at a crossroads and must be reinvented for the most effective use of our land resources and out of economic necessity. A new solid waste master plan is under development, and its operational and

In 2008, 21 percent of our solid waste was recycled, 20 percent was converted into energy through incineration, and 59 percent was landfilled. Through incineration, we converted waste into nearly 305 million kWh, enough energy to power approximately 21,000 homes in that same year.

financial foundation is sustainability. This plan should provide the highest and best value for waste-stream components. The planning process will address several realities, including decreasing landfill capacity, expiring customer contracts, disposal tonnage that is significantly impacted by the economy and hurricane activity, and a new statewide goal to divert the bulk of solid waste from landfills. The master plan will explore more waste-to-energy opportunities, mulching and composting alternatives, examine a “pay-as-you-throw” collection system, and consider rate structure options for the disposal system, all within the context of the entire solid waste management system. It will also address how to reinvent the current business model, which relies on waste for disposal revenue.

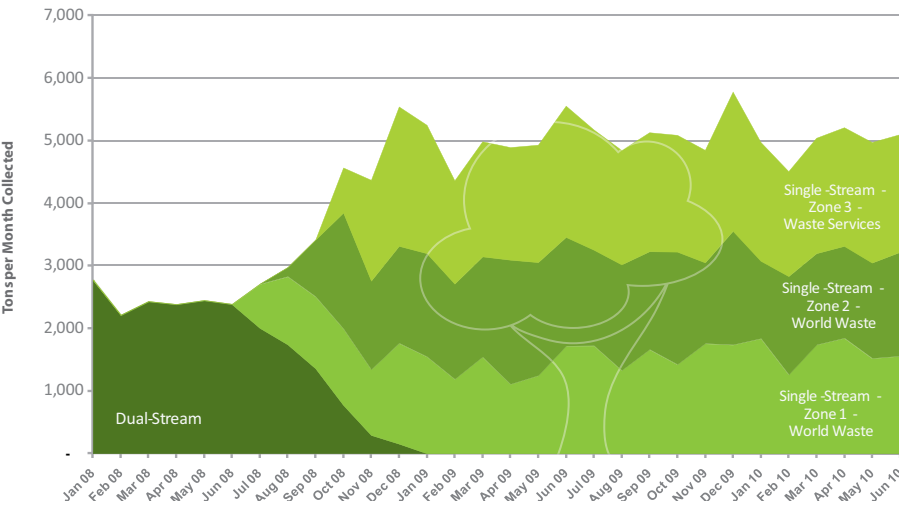
The master plan is an opportunity to build upon many strengths. Since 2008, residential recycling increased 88 percent with the introduction of an easy and convenient single-stream approach. Recently, the County has begun the process to sequester methane gas from the South Dade landfill to help power the Water and Sewer South District Wastewater Treatment facility.

The following strategies and initiatives within *GreenPrint* outline specifically how we will maintain drinking water quality, protect and restore our natural environmental resources, and meet our waste system needs now and in the future.

Strategies

- Implement wastewater reuse to provide future water supply and benefit the environment
- Address salt intrusion that threatens drinking water wellfields and sensitive natural areas
- Protect, enhance, and restore our natural resources
- Protect environmental and other lands that may be important for ecosystem and community resilience
- Develop a sustainable Solid Waste System and Master Plan, using waste to benefit our economy and environment

Recycling Conversion from Dual-Stream to Single-Stream
Tons Collected per Month - Cumulative



Waste Production

	2003	2004	2005	2006	2007	2008
Tons of Waste/Person	1.79	1.73	1.88	2.08	1.86	1.61
percent Change in Waste/Person	-0.5 percent	-3.5 percent	8.7 percent	10.6 percent	-10.6 percent	-13.44 percent

(Annual Tonnage - Wastestream/Population) • (FDEP 2008 Report/Calendar year/grosstons)

The initiatives in this goal area build upon our conservation success. Together, they illustrate the connections of the natural environment to protect and preserve our water supply. And, of course, these actions steps address and highlight the management and treatment of waste within the context of sustainability.

Our Environment Initiatives:

1. Implement wastewater reuse to provide future water supply and benefit the environment

- Implement Wastewater Reuse Projects consistent with the 20-Year Water Use Permit and the Miami-Dade Water and Sewer Department (WASD) Master Plans to recharge the Biscayne Aquifer
- Develop a water and wastewater utility and municipal working group to identify and implement wastewater reuse opportunities at both the utility and municipal levels
- Assess the feasibility of using highly treated wastewater to rehydrate wetlands and Biscayne Bay



South Florida historical natural communities are restored on publicly owned lands through the cooperative efforts of federal, state, and local agencies. In the photo above, red mangroves (*Rhizophora mangle*) were planted by community volunteers at an 85 acre wetlands restoration site at Bill Baggs Cape Florida State Park.

- Continue to support the Comprehensive Everglades Restoration Plan (CERP)
- Report the air quality benefits of mass transit use and reduced vehicle miles traveled
- Continue to pursue funding for government and private diesel retrofit projects in partnership with the EPA Southeast Diesel Collaborative

4. Protect environmental and other lands that may be important for ecosystem and community resilience

- Continue to acquire important lands through the Environmentally Endangered Lands (EEL) program
- Explore alternative funding sources for the EEL program such as a carbon offset sequestration program

At the end of the day, this is Miami-Dade, and it's all about the water: protecting it, conserving it and preserving it.

2. Address salt intrusion that threatens drinking water wellfields and sensitive natural areas

- Formalize an interagency working group to evaluate and address issues associated with salt water intrusion
- Monitor the isochlor line and address spatial gaps in salt intrusion data gathering
- Construct a water control structure on/near the Florida City Canal to isolate this canal from South Florida Water Management District's dry season agricultural drawdown
- Construct a earthen plug at the Card Sound Road Canal

3. Protect, enhance, and restore our natural resources

- Continue to minimize the impact of development on natural resources such as air, wetlands, Biscayne Bay and coastal habitats, natural forest communities, and trees through regulatory programs
- Identify dedicated funding sources for beach renourishment projects to maintain quality beaches and minimize the negative impacts of storm events
- Continue to enhance and restore coastal habitats important for the health of Biscayne Bay
- Develop appropriate indicators of the status and health of the resources of Biscayne Bay, through a collaborative approach with academic, governmental, nongovernmental organizations, and stakeholder entities

Estimated Facility Capacity by Year

	Facility Estimated to Reach Capacity by Year:
North Dade Landfill	2012-2014
South Dade Landfill	2017-2020
Resources Recovery Ash Landfill	2020-2023

5. Develop a sustainable Solid Waste System and Master Plan, using waste to benefit our economy and environment

- Continue to develop a sustainable Solid Waste Master plan
- Use waste as energy at the WASD South District Wastewater Treatment facility
- Explore a residential composting program
- Explore a private sector development of a local soil/compost industry
- Continue to increase participation in the residential recycling program
- Partner with community leaders, and private entities to elevate commercial and multi-family recycling
- Mandate recycling in all local government buildings
- Explore a pilot composting and mulching program for County operations such as the Park and Recreation and Public Works departments

The environment is one of the three pillars of sustainability, and *GreenPrint* is a plan about balance. We have been successful in prioritizing the environment in Miami-Dade, and continuing to balance the environment with our society and our economy will make us stronger and more resilient for years to come.

It is estimated that over 80 percent of the economic benefits from beach renourishment are from storm damage reduction. During Hurricane Andrew in 1992, the project prevented more than \$20 million in storm damage, based on U.S. Army Corps of Engineers computer models. In the original project design, the Corps estimated a 10.5:1 benefit-to-cost ratio for the project. Subsequent development of the Miami-Dade shoreline has likely increased that ratio significantly. Domestic and international tourism provides regional and national benefits. For every dollar invested in nourishing Miami Beach, the nation's economy earns \$1,470 in foreign exchange (U.S. Army Corps of Engineers 3).



Baynanza is one Miami-Dade's ways of celebrating our Bay. This shoreline cleanup event was created in 1982 in an effort by Miami-Dade County to save Biscayne Bay, one of South Florida's most important natural resources. At the time, the Bay was being threatened by various sources of pollution like sewage runoff, marine debris, and other contaminants. The event was born with the idea to involve the community in its rescue efforts. Through the years, Baynanza has become the largest shoreline cleanup in South Florida with an average of 7,000 community participants and 30 tons of trash collected annually.