

# Memorandum



**Date:** August 20, 2015

**To:** Honorable Chairman Jean Monestime  
and Members, Board of County Commissioners

Agenda Item No. 2B10  
October 6, 2015

**From:** Carlos A. Gimenez  
Mayor

A handwritten signature in blue ink, appearing to read "Carlos A. Gimenez", written over a white background.

**Subject:** First Quarterly Status Report for Resolution No. R-48-15, Directing the Mayor or Mayor's Designee to Work in Conjunction with the Office of Intergovernmental Affairs and Jointly with the South Florida Water Management District, the United States Geological Survey and other Member Counties of the Southeast Florida Regional Climate Change Compact to Conduct a Comprehensive Study and Develop Adaptation Strategies to Address Potential Flood Damage Reduction and Salt Water Intrusion Associated with Sea Level Rise

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On January 21, 2015, the Board of County Commissioners (Board) passed seven (7) resolutions, each supporting the implementation of one of the seven recommendations included in the "Miami-Dade Sea Level Rise Task Force Report and Recommendations." Resolution R-48-15, which requires a quarterly status report and a final report within 364 days, directs the Mayor or Mayor's designee to work in conjunction with the Office of Intergovernmental Affairs (OIA), the South Florida Water Management District (SFWMD), the United States Geological Survey (USGS), and other member Counties of the Southeast Florida Regional Climate Change Compact (Compact) to conduct a comprehensive study and develop adaptation strategies to address potential flood damage reduction and salt water intrusion associated with sea level rise. Pursuant to R-48-15, this status report is submitted for your review.

## **Background**

In July 2013, the Board created the Miami-Dade Sea Level Rise Task Force (Task Force) for the purpose of reviewing current and relevant data, science and reports, and to assess the likely and potential impacts of sea level rise and storm surge on Miami-Dade County over time. On July 1, 2014, the Task Force presented a report to the Board entitled, "Miami-Dade Sea Level Rise Task Force Report and Recommendations," providing the requested assessment along with recommendations of how Miami-Dade County may can begin planning and preparing for projected sea level rise impacts. In addition, Resolution R-451-14 and Ordinance 14-79 were adopted in 2014, requiring that planning, design and construction of County infrastructure consider potential sea level rise impacts.

In February 2008, Miami-Dade County entered into Joint Funding Agreement 08E0FL20817 with the USGS to develop an integrated surface/groundwater numerical flow model, with one of the objectives of the project being to evaluate if sea level rise will cause salt water intrusion into coastal wellfields. Technical staff from the Miami-Dade Water and Sewer Department (WASD) has worked with the USGS on this project since then, and the numerical model was formally published by the USGS in September 2014. The model is designed to evaluate if the current surface-water structure control operational criteria effectively control saltwater intrusion and flooding with projected population increase and sea level rise, among other uses.

This enhanced modelling capability is extremely important to all forthcoming adaptation planning for sea level rise in Miami-Dade County and the Southeast Florida region because it is a significant improvement upon former models used to generate “bathtub” sea level rise inundation maps. It will provide critical information about the effects of sea level rise and precipitation events on the groundwater table, and how this may affect water resource management, including water supply, wastewater disposal, and canal operations. This will facilitate a more accurate understanding of areas and infrastructure more vulnerable to flooding in Miami-Dade County. WASD and the USGS used the modified guidance developed by the U.S. Army Corps of Engineers (USACE, 2011) and a planning scenario of 9 to 24 inches additional rise by 2060, consistent with projections presented in the 2014 National Climate Assessment, and formally adopted by the partner counties in the Compact for the modelling effort. Future efforts include updating the model to include the revised sea level rise projection, which is expected to be published in August 2015, by the Compact’s Sea Level Rise Consensus Workgroup.

The SFWMD is the primary water management agency for Southeast Florida. As a result, their primary infrastructure and water management strategies are critical to good water supply, water quality, and flood control in the region, and consequently determines Miami-Dade’s water management strategies and operation of secondary structures. The SFWMD and Miami-Dade County have a long history of close collaboration on water management and supply, as well as Everglades restoration, and this continued collaboration will be critical in effectively facing the additional challenges of climate change and sea level rise.

In 2009, the SFWMD’s Interdepartmental Climate Change Group published a report entitled, “Climate Change and Water Management in South Florida.” This report provided a good overview of the potential impacts of climate change to South Florida with regards to sea level rise, temperature, and evapotranspiration, rainfall, floods, drought, and tropical storms and hurricanes. In this report, the SFWMD stated that flood protection in Southeast Florida may be impacted by sea level rise and they identified several existing SFWMD coastal structures in Miami-Dade County that could be potentially impacted. Retrofitting of more structures with forward pumps will be considered as a feature of adaptation plans being developed to address sea level rise and rainfall changes in Miami-Dade County. The SFWMD has initiated a new pilot project to determine the current level of flood protection in the C-4 basin, to consider future changes that may impact flood protection, and to develop adaptation strategies to address such impacts. The SFWMD will also initiate similar efforts in the C-7, C-8, and C-9 Canal basins in Miami-Dade County with funding from the Federal Emergency Management Agency (FEMA).

In addition to working with state and regional partners, the SFWMD is also engaging international expertise in addressing these issues. In April of 2014, the SFWMD signed a three year Memorandum of Agreement (MOA) with the Ministry of Infrastructure and the Environment of the Netherlands, and the Delfland Water Board, to work cooperatively and share information, expertise and strategies in flood control, water supply, spatial development, environmental ecosystem restoration, crisis management, modelling, service level practices, sea level rise, climate adaptation strategies and salt water intrusion impacts. Because there are many similarities in the water management systems of South Florida and the Netherlands, these two (2) organizations agreed to work towards a comprehensive thematic annual work program on information and best practices exchange, and to evaluate and update the work program annually. Therefore, the additional expertise of these Dutch partners will contribute to the regional efforts of the SFWMD, the USGS, Miami-Dade County and the Compact to better understand potential flood damage and saltwater intrusion and begin to develop adaptation strategies.

**Quarter 1 Progress (January 31, 2015 – April 30, 2015)**

- The SFWMD has recently initiated a two year grant project that is funded by the National Oceanographic and Atmospheric Administration's Sectoral Applications Research Program. It was awarded to the SFWMD and their partner, Deltares, for their project entitled, "Flood and Drought Risk Management Under Climate Change: Methods for Strategy Evaluation and Cost Optimization." Deltares is an independent research institute which focuses on applied research in the field of water, subsurface, and infrastructure. Deltares is based in Delft and Utrecht in the Netherlands, with a USA branch (Deltares USA) based in Silver Springs, Maryland.

This project is anticipated to contribute significantly to the directives required by R-48-15 because the project team has chosen Miami-Dade County as a pilot area to implement concepts of flood and drought risk management to: (1) determine the current level of flood protection in the C-4 basin, (2) consider future changes that may impact flood protection, and (3) develop adaptation strategies to address such impacts. Furthermore, the SFWMD will also initiate similar efforts in the C-7, C-8, and C-9 Canal basins in Miami-Dade County with FEMA funding. This project aims to accomplish several relevant objectives:

- Further analyze the impacts of climate change on the occurrence of floods and droughts in the SFWMD;
  - Gain more insight into the intended and unintended effects of flood and drought risk reduction measures;
  - Develop and apply a method to evaluate the capability of the water management system to effectively address extreme events (floods and droughts), and use the outcomes for the assessment of comprehensive adaptation strategies aimed at flood and drought risk reduction under climate change;
  - Apply an economic optimization method for determining the optimal investment in flood risk reduction. With this application, the project will document the process of moving the method from the Netherlands to Florida, and identify what is required to apply the optimization method to other regions;
  - Assess and communicate the usefulness of applying this optimization method for decision making in water resource management; and
  - Publish the general outcomes on the methods and the specific outcomes for the case study area, through two stakeholder and expert workshops and scientific (journal) publications.
- The SFWMD and its Deltares partners held a project kick-off meeting and site tour on March 23-25, 2015, where local and regional partners and contributors were formally introduced to the project and encouraged to provide suggestions for data gathering and project implementation. The Miami-Dade Office of Sustainability and WASD hosted the meetings on the first two (2) days, and appropriate County technical staff participated to provide input and suggestions. Staff from WASD and Public Works and Waste Management's Stormwater Master Planning Program will be integral contributors to the project.
  - Staff of the Miami-Dade Regulatory and Economic Department (RER) and WASD are working to establish an internal working group comprised of technical staff from key departments to begin evaluating the engineering and other expertise needed to conduct a thorough analysis and develop cost estimates to acquire the expertise and begin formulating a capital plan. One of the

first tasks for the technical workgroup is to develop criteria and parameters for use in the groundwater/surface water integrated model, which will then be utilized to help determine areas and infrastructure more at risk for flooding and inundation.

- The Compact's Sea Level Rise Consensus Workgroup is currently finalizing a revised Sea Level Rise Projection for Southeast Florida. This projection, which is expected to differ to some degree from the original sea level rise projection developed in 2011, will be utilized by the partners of the Compact, including Miami-Dade County, for planning purposes. This revised projection and accompanying document are expected to be finalized and released in August 2015.
- The SFWMD hosted a meeting on April 30, 2015, with their Netherlands MOA partners, the Ministry of Infrastructure and the Environment of the Netherlands, and the Delfland Water Board, to discuss a variety of climate change and sea level rise related topics, including saltwater intrusion and "science based adaptation strategies" for water and climate. County staff participated to see how the work associated with this MOA can contribute to accomplishing the tasks required in Resolution R-48-15.

In accordance with Ordinance 14-65, this memorandum and report will be placed on the next available Board of County Commissioners meeting agenda.

If you have questions concerning the above, please contact Mark R. Woerner, AICP, Assistant Director for Planning, Department of Regulatory and Economic Resources, at (305) 375-2835 or [mwoerner@miamidade.gov](mailto:mwoerner@miamidade.gov).

cc: Honorable Harvey Ruvlin, Clerk of Courts, Eleventh Judicial Circuit  
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