# Planning for Hazards and Climate Change Impacts:
One County's Approach

Miami-Dade County, Florida

Like most coastal areas, Florida's Miami-Dade County is vulnerable to climate change. With the county's unique topography, computer models predict that sea level rise will increase flooding on both the eastern and southwestern boundaries of the Everglades, causing the county and its infrastructure, people, and natural resources to be "squeezed." The county's major economic sectors, agriculture and tourism, will suffer greatly.

But many Miami-Dade officials believe that preparing for climate change is an opportunity to identify and implement enhanced mitigation and adaptation options that will allow the county to thrive and become a more sustainable, livable community.

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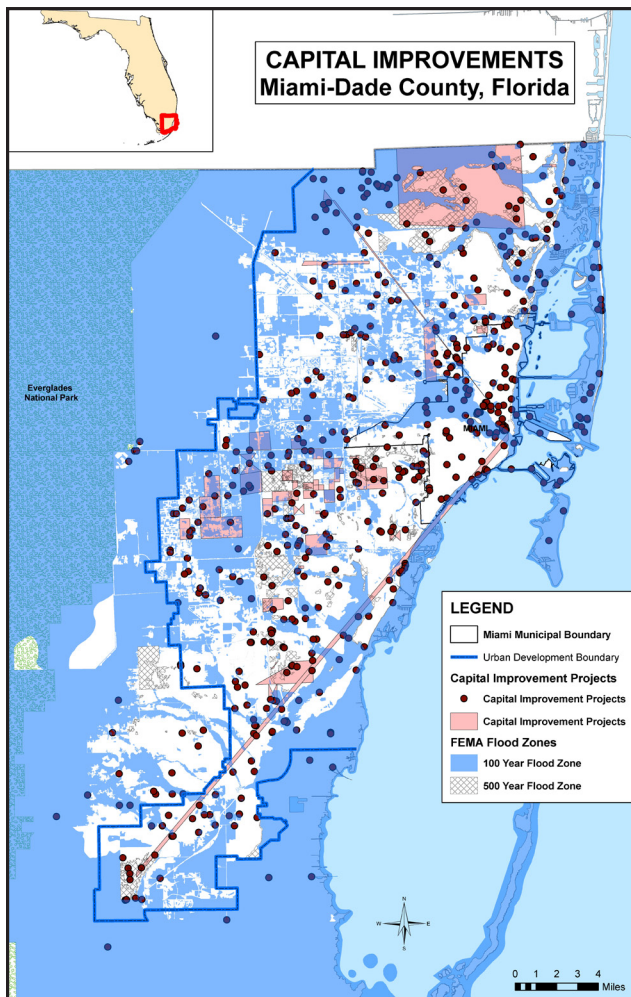
Getting Started

Finding ways to get the county to focus on climate change in the face of so many community issues is a challenge. Miami-Dade officials found that the best approach was to put a hazards and climate lens on existing issues (such as water availability, stormwater management and runoff, infrastructure maintenance and placement), which means identifying how hazards and climate change can intensify these issues. This lens is applied by incorporating relevant hazards and climate data and information into ongoing assessment and planning processes.

Another challenge: figuring out where it makes the most sense to incorporate hazard and climate change planning, since county operations involve many organizations and administrative processes.

To meet this issue head-on, Miami-Dade thought it best to focus all climate change-related efforts into one office, the Office of Sustainability (*www. miamidade.gov/oos/*). This office, created in 2009 and led by Susanne Torriente, helps the county evaluate potential hazard and climate impacts and examines existing response and planning efforts. Since all of Miami-Dade is vulnerable to hazards and climate change, officials stress that the approaches must be countywide and include all stakeholders (e.g., citizens, nonprofits, government, etc.).

Torriente realized the need for central goals for her office, goals that are linked to existing county government priorities. Any action plan also needed to include knowledge and perspectives from across the various county departments.

Taking these facts into consideration, the Office of Sustainability formalized two primary goals:
- Add climate adaptation to ongoing sustainability initiatives
- Engage county and municipal decision makers in identifying hazards and climate change issues and make connections to existing planning and policy efforts

Making It Happen

The county began work on a sustainability plan, called GreenPrint (*www.miamidade.gov/greenprint/*). The plan's focus is on preparing Miami-Dade for future impacts of climate change through existing county plans (land use, infrastructure, public safety, etc.). Through GreenPrint, the Office of Sustainability hopes to leverage present sustainability initiatives and develop new ones where needed.

A county-wide assessment of risk and vulnerabilities was necessary, with input from county and municipal decision makers. It was important that these groups review the data and information and share their concerns, priorities, and ideas. This input and interaction would not only provide a diverse perspective, but would also be beneficial in terms of implementation.

A workshop was the best way to bring these groups together. To help with this effort, the Office of Sustainability sought technical assistance from the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center. The two organizations customized a participatory process workshop (Roadmap for Adapting to Coastal Risk) for county stakeholders.

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Preparing for the Workshop

To plan the workshop, the NOAA Coastal Services Center worked with a county planning team consisting of members from the Office of Sustainability, Department of Environmental Resources Management, Office of Emergency Management, Water and Sewer Department, and the GIS Division.

This team provided several key resources to the workshop planning process:

- Local perspectives of the issues, concerns, and planning activities
- Identification of workshop participants, including key staff members representing the county departments
- Knowledge about and access to credible data and information for the county
- Data were an important tool for the workshop, since displaying data in a map helps clarify complex situations by serving to visualize potential hazards and their impacts on a community.
- Miami-Dade County has an extensive GIS program and data holdings that the county actively maintains. But even good data can be challenging to present in a meaningful way.
- To get stakeholder participation and buy-in, the Office of Sustainability needed assistance in pulling together the information from the databases in a way that could be used effectively in a stakeholder process. The result was the development of maps that workshop participants used to visualize hazards, vulnerabilities, and community strengths.

To choose the appropriate data to use in the assessment, the Center worked with Miami-Dade to determine
- the decisions that spatial data could help to inform;
- the hazards and climate change impacts of most concern to the county;
- the local problems or management issues they were trying to address;
- the data and information that represent the county's populations, the built environment, and natural resources; and
- the inventory of data the GIS and planning departments deemed suitable for the assessment.

Miami-Dade County's Enterprise Technology Services Department's GIS Division was instrumental in providing county data, information, and maps to use in the workshop. The county did not create any new data, but rather used what they had.

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The Roadmap Workshop as an Assessment and Planning Process

The workshop, the Roadmap for Adapting to Coastal Risk, used a participatory process that emphasized the value of collaboration, local knowledge, spatial data, and multimedia materials (photos, charts, newspaper articles) to enable people to share their concerns and priorities.

The Roadmap process is intended to help answer the following.
• What are you trying to accomplish?
• How can risk and vulnerability information help you do this?

The Roadmap workshop involved staff members across county departments to obtain a cross-county, cross-sector perspective. During the workshop, the participants were grouped by county government sectors (public services and capital improvements; infrastructure and capital improvements; planning and development, and social services and public safety; environment, recreation, and culture).

Each group was charged with answering the following questions:
• What are current hazard concerns?
• What are future hazard concerns?
• What are the impacts to populations, infrastructure, and natural resources based on current and future hazards and climate change concerns?
• What plans or policies could be better informed with this risk and vulnerability information and results?
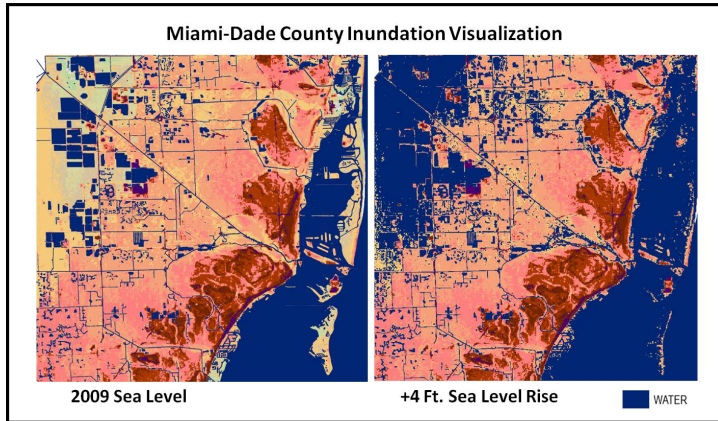• What actions could be taken to lessen these risks and their impacts?

Participants used local maps and multimedia materials (news stories, photos, etc.) to develop storyboards highlighting specific vulnerabilities they were most concerned about. Participants evaluated the storyboards and community vulnerabilities to develop potential solutions to the issues.

Workshop Results

During the workshop, participants were able to look at the hazards that impacted their community in a new light. Several times during the workshop, participants commented that they had not thought about a particular concern, issue, or impact from that perspective before. Being able to hear the issues in a different context enabled them to think more broadly about ways to address multiple issues, as opposed to concentrating on a single issue such as water treatment or conservation.

Some of the key outcomes of the Roadmap workshop included the following:
• Shared knowledge among participants about biology process, infrastructure development, and planning techniques
• Identification of vulnerabilities that were unknown to many of the participants
• New solutions (many innovative, simple, and cheap) identified to help resolve issues and increase the sustainability of the county
• Realization about the value of the county GIS Division and the power of maps in decision-making

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Miami-Dade County Inundation Visualization

2009 Sea Level   +4 Ft. Sea Level Rise   ⬛ WATER

Next Steps

Torriente and the staff of the Office of Sustainability compiled the feedback from the Roadmap workshop and are identifying near- and long-term steps that should be taken to implement climate change adaption strategies.

During the workshop it was found that county staff members were generally unaware of all the technical resources available to them. The county GIS Division is working with other county offices to better understand their technical needs, as well as to inform them of the available data, tools, and technical training.

Additionally the workshop revealed that the model the county was using to determine sea level rise impacts was not as accurate as it could be. Teaming up with neighboring South Florida counties, the technical staff members participated in an Inundation Mapping Workshop offered by the NOAA Coastal Services Center to determine how best to develop a regional data set. View the Digital Coast in Action (*www.csc.noaa.gov/digitalcoast/action/ slr-seflorida.html/)* for more details.

For a long-term action item, the Office of Sustainability will use the information and relationships forged through the workshop as a catalyst for working closely with the county to evaluate current plans and identify opportunities for implementing improved sustainable land use, infrastructure, capital improvement, social programs, and environmental protection.

The Roadmap workshop is viewed as an important first step for translating the large, sometimes overwhelming climate adaptation goals into useful, "actionable" tasks for county managers.

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An Important Step for All Coastal Communities

Even if a county or municipality does not have an Office of Sustainability, there are most likely departments or decision makers already thinking about how they can tackle climate change adaptation from a county or community perspective. Talking with planning, hazard mitigation, and natural resources departments, as well as nonprofits, can be helpful in determining who is interested, who already has opportunities in the works, and how knowledge and resources can be leveraged.

Learning from communities with similar goals, such as Miami-Dade, is also helpful.

Resources that you might find helpful:

Data
- Spatial Hazard Events and Losses Database (*http://webra.cas.sc.edu/hvriapps/sheldus_setup/sheldus_login.aspx*)
- Google Earth FEMA Flood Data (*www.fema.gov/library/viewRecord.do?id=3293*)
- NOAA Sea Level Trends (*http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml*)
- Social Vulnerability Index (SOVI) (*http://webra.cas.sc.edu/hvri/products/sovi.aspx*)
- Census (*www.census.gov/main/www/cen2000.html*)
- Spatial Trends in Coastal Socioeconomics (*www.csc.noaa.gov/digitalcoast/data/stics/download.html*)
- HAZUS MH (*www.fema.gov/plan/prevent/hazus/*)
- Coastal Change Analysis Program High-Resolution Land Cover (*www.csc.noaa.gov/digitalcoast/data/ccaphighres/index.html*)
- Miami-Dade County GIS (*www.miamidade.gov/gis/*)

Tools
- Coastal County Snapshots (*www.csc.noaa.gov/snapshots*)
- Coastal Resilience Long Island Tool (*www.csc.noaa.gov/digitalcoast/tools/longisland/index.html*)

Trainings
- Roadmap for Adapting to Coastal Risk (*www.csc.noaa.gov/digitalcoast/training/coastalrisk.html*)
- Introducing Green Infrastructure for Coastal Resilience (*www.csc.noaa.gov/digitalcoast/training/green.html*)
- Coastal Community Planning and Development (*www.csc.noaa.gov/training/ccpd.html*)
- Coastal No Adverse Impact (*www.floods.org/index.asp?menuID=460*)
- Coastal Inundation Mapping (*www.csc.noaa.gov/digitalcoast/training/inundationmap.html*)

Guidebooks
- Coastal Inundation Mapping Guidebook (*www.csc.noaa.gov/digitalcoast/inundation/_pdf/guidebook.pdf*)
- Mapping Socio-Economic Variables Using 2000 Census Data (*www.csc.noaa.gov/digitalcoast/inundation/_pdf/census_methodology.pdf*)

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