RESOLUTION NO. 2014-

A RESOLUTION OF THE VILLAGE COUNCIL OF THE VILLAGE OF KEY BISCAYNE, FLORIDA SUPPORTING THE MIAMI-DADE SEA LEVEL RISE TASK FORCE RECOMMENDATIONS AND URGING THE BOARD OF COUNTY COMMISSIONERS TO IMPLEMENT SUCH RECOMMENDATIONS; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the world's scientific community has reached consensus that human-induced climate change is occurring and is causing sea level rise; and

WHEREAS, Miami-Dade County, its wildlife, natural lands, water supply, vital facilities, and infrastructure are especially vulnerable to the impacts of sea level rise; and

WHEREAS,climate scientists and other groups have predicted the potential erosion of dry land and loss of property and natural resources in Miami-Dade County as a result of sea level rise; and

WHEREAS, a U.S. Geological Survey study concluded that sea levels along the east coast of the country will rise three to four times faster than the global average over the next century and the U.S. Army Corps of Engineers has projected that the water around Miami could rise up to 24 inches by 2060.

WHEREAS, parts of Miami-Dade have already experienced an increased frequency of urban flooding caused by higher high tides, elevated groundwater levels, and over saturated soils, and without any action, these rising tides will pose a significant threat to the city's tourism industry; and

WHEREAS, the Miami-Dade Sea Level Rise Task Force ("SLRTF") reviewed the relevant data and prior studies, assessments, reports, and evaluations of the potential impact of sea level rise on vital public services and facilities, real estate, water and other ecological resources, water front property, and infrastructure; and

WHEREAS, the SLRTF issued a report with their findings on July 1, 2014, that included a comprehensive and realistic assessment of the likely and potential impacts to sea level rise and storm surge over time, to be used to help develop a set of recommendations relative to amendments to the CDMP, capital facilities planning, budgetary priorities and other County programs as necessary to ensure that Miami–Dade County is taking all appropriate actions to reduce its contributions to climate-induced sea level rise and to ensure its resiliency to the increase in sea level rise, storm surge and related impacts which are expected to occur; and

WHEREAS, the SLRTF set forth numerous recommendations in their report that, if followed would aid Miami-Dade County in coping with the inevitable consequences of this measurable, tractable, and relentless reality of sea level rise; and

WHEREAS, the Miami-Dade Board of County Commissioners will discuss the adoption of various resolutions to move the recommendations of the SLRTF into action; and

WHEREAS, the Village of Key Biscayne seeks to work collaboratively and jointly with Miami-Dade County to ensure our quality of life and economy is protected; and

NOW, THEREFORE BE IT RESOLVED, BY THE VILLAGE COUNCIL OF THE VILLAGE OF KEY BISCAYNE, FLORIDA AS FOLLOWS:

Section 1. That the Village of Key Biscayne supports the adoption of sound resolutions to move the recommendations of the SLRTF into action.

Section 2. That the Village of Key Biscayne urges the Board of County Commissioners to ensure the language contained in the resolutions is action-oriented, and furthers the process of preparing Miami Dade County and its natural and built environment for the inevitable rise in sea level.

Section 3. This resolution shall be effective immediately upon its adoption.

PASSED AND ADOPTED this 28th day of October, 2014.

_____
MAYOR FRANKLIN H. CAPLAN

ATTEST:

_____
CONCHITA H. ALVAREZ, MMC, VILLAGE CLERK

APPROVED AS TO FORM AND LEGAL SUFFICIENCY:

_____
VILLAGE ATTORNEY

Miami-Dade Sea Level Rise Task Force Report and Recommendations

July 1, 2014

Miami-Dade Sea Level Rise Task Force Members

Harvey Ruvin, Task Force Chairperson, Honorable Clerk of Courts, Miami-Dade County

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SEA LEVEL RISE TASK FORCE REPORT

"The potentially empowering capacity to be able to 'foresee and forestall' is what ultimately distinguishes the human species from all others..."
Buckminster Fuller, Legendary Futurist

Sea Level Rise is an inevitable consequence of the warming of the oceans and the accelerated melting of the planet's ice sheets -regardless of cause. It is a measurable, trackable and relentless reality. Without innovative adaptive capital planning it will threaten trillions of dollars of the region's built environment, our future water supply, our unique natural resources, our agricultural soils, and our basic economy.

Dealing with this challenge will require a coordinated effort of unprecedented commitment. As the report chronicles, that effort has already begun. Miami-Dade County has been a leader among local governments, thinking globally and acting locally.

The prior Miami-Dade Climate Change Advisory Task Force (CCATF), after nearly 5 years of work, produced a range of recommendations dealing with adaptation of both our built and natural environments. The current Sea Level Rise Task Force (Task Force), rather than reinvent the wheel, is recommending a more structured implementation and oversight commitment by the County Administration.

The ongoing Southeast Florida Regional Climate Change Compact has been doing great work in helping to set the stage for what needs to be a multi-level intergovernmental partnership to effectively address sea level rise. The City of Miami Beach, with newly elected and appointed leadership is meeting the short term challenge of "sunny day flooding" (a harbinger of sea level rise) in a proactive way. Others are lining up to be part of the solution.

This Report is an urgent, though optimistic, call to begin the step by step process needed to design and build a re-engineered urban infrastructure that over time will withstand a worst case scenario. It begins with the Board's calling for a commitment by the Administration to obtain the technical expertise needed to vet the elements and timing of the plan.

Make no mistake, it will be costly, but its costs are dwarfed by the potential human, physical and economic values at stake. The members of your Sea Level Rise Task Force are grateful for the opportunity to present this Report and are confident that both the Board and the Mayor will take the necessary actions.

Harvey Ruvin

Harvey Ruvin, Chair

Report

I. Introduction

Warming of the oceans, melting ice sheets, and extreme weather events have become more prominent realities during the past year. Southeast Florida has been experiencing some of these effects first-hand, with severe downpours and "king tides" causing localized flooding in some areas of Miami-Dade County. These events provide a glimpse into the future of what we may expect to experience even more frequently and to more extremes in the region. They also provide an opportunity to better understand what these extremes may mean for our community and how we can begin to address these impacts now. Noting the mounting evidence supporting the overwhelming scientific consensus that climate change is real and in fact already accelerating sea level rise, the Miami-Dade Board of County Commissioners (BCC) wisely created the Miami-Dade County Sea Level Rise Task Force (Task Force) in July 2013 by unanimously passing Resolution No. R-599-13 (Appendix A), as a focused next step to better gauge and plan for what lies ahead.

Our charge was multifaceted:

a) To provide a realistic assessment of the likely impacts of sea level rise and storm surge over time.

b) To make recommendations relative to the Comprehensive Development Master Plan (CDMP), Capital Facilities Planning and other priorities.

The Task Force was provided with prior studies, reports and evaluations of potential impacts on vital services and facilities, ecological resources and infrastructure. The Task Force met fourteen times and heard presentation from various experts on topics ranging from a review of county and regional planning efforts regarding climate impacts, storm-water management and drainage, sewerage systems, vulnerabilities of freshwater aquifers and wells, the role of Everglades restoration and natural systems in resilience, how to build resilience in communities, as well as the serious insurance and reinsurance implications of expected sea level rise.

All presentations and minutes of the Task Force meetings are posted on line at the Miami-Dade Sea Level Rise Task Force webpage.[1] All of our deliberations and discussions have been guided by Sunshine Law directives. A detailed list of all presentations made at the Task Force meetings can be found in Appendix B.

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[1] Southeast Florida Regional Climate Change Compact (June11, 2012).
Retrieved from: HTTP://WWW.MIAMIDADE.GOV/PLANNING/BOARDS-SEA-LEVEL-RISE.ASP

II. Overarching Recommendation

This Report contains five recommendations, the first of which is the most crucial.

In order to secure a future that is resilient to threats of sea level rise, much detailed and truly comprehensive expert analysis must be undertaken in order to plan and design a robust capital plan: not just to update, but in a sense, to reinvent our urban infrastructure in a timely, sequenced manner to meet our future as it unfolds. In order to accomplish this, we need to start the process now. The following overarching recommendation is a critical first step.

RECOMMENDATION 1: The Sea Level Rise Task Force recommends accelerating the adaptation planning process by seeking and formally selecting the engineering and other relevant expertise needed to develop the robust capital plan, vetting the elements (i.e., flood protection, salinity structures, pump stations, road and bridge designs, etc., just to name a few possibilities) as well as what measurable indicators will trigger timely sequencing.

The plan, its development and its implementation must be fully collaborative, involving all levels of government. The framework for action should also include the South Florida Water Management District (District). The Southeast Florida Regional Climate Change Action Plan (RCAP) will also be essential as an overarching guide as implementation gets carried out. Involving the Re-Insurance Industry in the plan's development will facilitate their effective buy in. Carrying out this plan will be costly, but far less than the cost of inaction.

III. Laying the Foundation for Action

In 2006 the Miami-Dade Board of County Commissioners (BCC) created the Miami-Dade Climate Change Advisory Task Force (CCATF), comprised of eighteen individuals, a multi-disciplinary group of stake-holders and experts, tasked to make recommendations on the overall issue of Climate Change, focusing predominantly on adaptation. This group divided into sub-committees and directly involved hundreds of others in sixty-five separate meetings over the five-year period. At the time of their sunset, fifty-seven multi-part recommendations had been produced regarding needed steps relative to adaptation of natural systems, built environment, health and economic systems, as well as a series of Green House Gas mitigation recommendations (Appendix C – Miami-Dade County CCATF Members & Recommendations).

Many of these recommendations were incorporated into GreenPrint, Miami-Dade County's community-wide sustainability plan developed in 2010, and are currently being

implemented. The CCATF recommendations addresses the cross section of specific elements called for in Resolution # 599-13.

RECOMMENDATION 2: The Sea Level Rise Task Force recommends that the Miami-Dade Board of County Commissioners direct County administration to establish formal oversight, and dedicate sufficient resources and staffing to ensure implementation and update of the specific Climate Change Advisory Task Force (CCATF) recommendations.

In 2010, recognizing that climate change has little regard for man-made territorial boundaries, the four counties in southeast Florida formed the Southeast Florida Regional Climate Change Compact (Compact). Miami-Dade, Broward, Palm Beach and Monroe counties became the first, perhaps the only, neighboring local governments to collaborate on their common concerns about climate change. These four counties, comprised of over 100 cities and representing over 30 percent of the state's population, agreed to contribute staff, resources, and expertise to address climate change issues, including sea level rise. In October 2012, the Compact produced over one hundred recommendations in a well thought-out Regional Climate Action Plan for Southeast Florida (RCAP) (Appendix D – A Region Responds to a Changing Climate).[2]

Clearly this format provides a pathway structure to continue to build on.

In October, 2013, the Board of County Commissioners approved amendments in the County's Comprehensive Development Master Plan (CDMP) which incorporate language addressing climate change and sea level rise in over thirty Objectives and Policies of the Plan (Appendix E). This followed the CDMP 2011 Evaluation and Appraisal Report (EAR), as required per Florida statutes, when these issues were identified as priorities to address as part of the CDMP update. For example, CDMP Land Use Element Policies LU-3K and LU-3L focus on determining vulnerable areas that can be designated as Adaptation Action Areas, which will facilitate focused funding and adaptation planning in these areas to help mitigate impacts and build resilience to climate change and sea level rise. These CDMP policies now form a sound foundation for Miami-Dade County to actively incorporate these considerations into existing capital investment and infrastructure planning processes, and will continue to be evaluated and updated as part of the ongoing EAR process.

RECOMMENDATION 3: The Sea Level Rise Task Force recommends that Miami-Dade County implement the Adaptation Action Areas (AAA's) called for in the Comprehensive Development Master Plan (CDMP) and to incorporate sea level rise and storm surge risks utilizing best available data.

[2] Southeast Florida Regional Climate Change Compact (June11, 2012).
Retrieved from:
http://southeastfloridaclimatecompact.org/pdf/Regional@20Climate%20Action%20Plan%20Final%20ADA%20Compliant.pdf

The Board of County Commissioners has already taken a first bold step by unanimously adopting Resolution R-451-14 (Appendix F) on May 6, 2014, setting policy for Miami-Dade County by requiring all county infrastructure projects to consider the potential impact of sea level rise during all project phases and calling for an evaluation of existing infrastructure in the face of sea level rise. This action sets the stage for a fully comprehensive assessment and plan to provide an evolving infrastructure, resilient to a worst case scenario.

At the time of the submission of this Report, a proposed ordinance was pending before the BCC that would require inclusion of a statement regarding consideration of sea level rise for all agenda items related to planning, design and/or construction of County infrastructure. We urge passage of this ordinance as fully consistent with, and supportive of, this Sea Level Rise Task Force Report.

IV. Flooding Risk Due to Sea Level Rise, Storm Surge and Other Factors

About 90% of the excess heat due to Greenhouse Effect warming is absorbed by the ocean rather than the atmosphere or land. The basic science is that as water warms, it expands. This effect, coupled with ice loss from the Greenland and Antarctic ice sheets, are the fundamental causes of global sea level rise. In addition, as we lose reflective surface due to melting ice, we are seeing a feedback loop that increasingly reinforces the Greenhouse Effect and accelerates sea level rise.

Tide stations measure local sea level rise which refers to the height of the water as measured along the coast relative to a point on land. Because the heights of both the land (subsidence or uplift) and the ocean are changing, sea level in some locations is rising faster than the global average (e.g., New Orleans) while in other regions sea level my actually be falling (Alaska). By estimating present and future local rates of relative sea level change for a specific area based on observations and projections of global sea level rise, coastal managers and engineers can begin to analyze and plan for the impacts of sea level rise for comprehensive planning. Future land use decisions should reflect lessons learned from allowing development in vulnerable areas.

The Task Force chose to focus primarily on the next 50 years, to 2060, as our present planning horizon and relied heavily on the projections produced by the Southeast Florida Regional Climate Change Compact partners of two feet of sea level rise by 2060 (Figure 1 below). This projection was adopted by all four Compact counties as a guideline for planning purposes. The workgroup of experts convened by the Compact to develop this projection agreed to reconvene approximately every four years, or more often as needed,

to review new data and science to determine if the projection should be revised. The workgroup is expected to reconvene later in 2014. For longer range planning up to 2100, at least three feet of sea level rise should be utilized. Specific infrastructure and planning projects should design for the projected sea level during the life expectancy of a project.

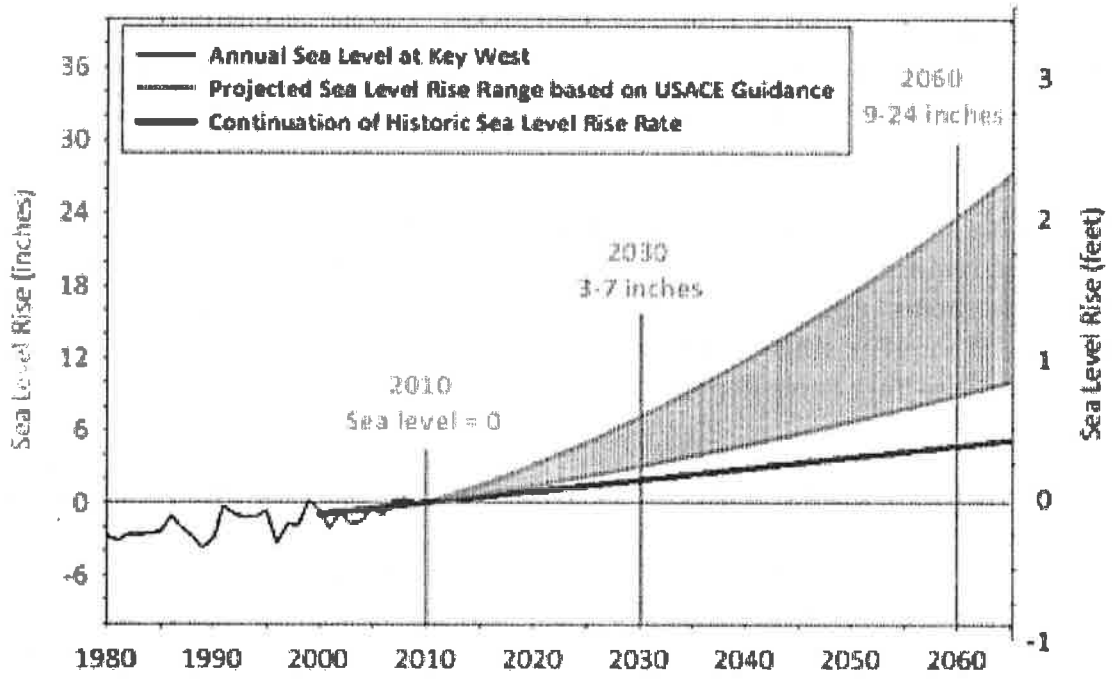

Figure 1 – The Southeast Florida Regional Climate Change Compact convened a group of experts in 2010 which reviewed the most current science and data and developed a sea level rise projection over time for the Southeast Florida region.

We must keep in mind that this is literally a moving target; sea level is no longer a constant and as new scientific research becomes available, the projections of the future rate of rise will also change. As we move forward, we will need to keep abreast of new information from key sources such as the Intergovernmental Panel on Climate Change (IPCC), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Army Corps of Engineers (USACE) and the National Climate Assessment (NCA), and stay alert to events that could have a dramatic impact on the rate of sea level rise. Because the County is now confronted with a changing environment, the challenge is to craft flexible policies that can adapt to evolving needs.

Storm surge is an abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed level of the sea surface and the tide level expected to occur in the absence of the storm. Storm surge can range from a few feet, up to fifteen to twenty feet in extreme cases, and typically lasts from several hours

up to a day. It is accompanied by large and destructive ocean waves, and will typically affect a specific stretch of shoreline, usually ten miles or less.

It is not possible to consider future storm surges without also accounting for the interacting effects of sea level rise. Although sea level rise is gradual (2-4 feet in this century) and less in magnitude than storm surge, it is always present, it affects shorelines everywhere and exacerbates the effects of storm surges when and where they occur. In the course of this century, sea level rise will eventually add up to one-fourth to one-half the magnitude of any storm surge that occurs on any parts of Miami-Dade County's coastline. Figure 2 below illustrates the disproportionate effect of a two-foot rise in sea level on a hypothetical storm surge accompanying a Category 3 Hurricane. Storm surge recedes, sea level rise does not.

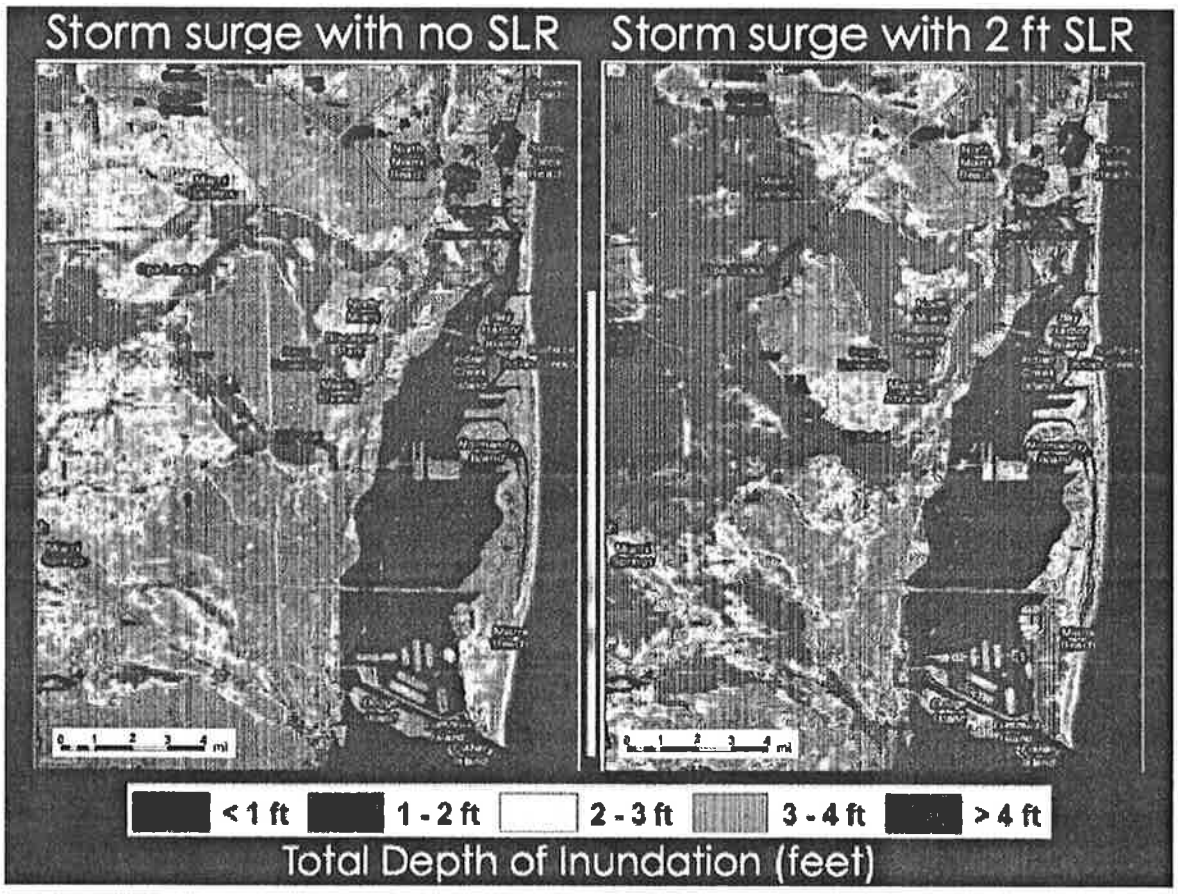

Figure 2 – Two images of Miami-Dade County showing the inundation from a hypothetical storm surge that would typically accompany a Category 3 Hurricane at high tide. On the left is the depth of surge as it would affect coastal and inland areas with present-day sea levels. On the right is the depth of surge as it would affect the same areas with an additional two feet of sea level rise if no adaptation measures are taken. Maps are based on the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) surge model used by the National Hurricane Center. (Courtesy of Dr. Keren Bolter).

Depending on measures taken globally to mitigate the effects of Greenhouse Gases on the planet -- and how soon they are implemented -- the world and specifically Miami-Dade County are committed to a continued rise in sea levels beyond this century with the potential to permanently inundate large parts of the County. *Long before permanent inundation occurs, however, and perhaps within decades, flooding events will become progressively more frequent,* especially in low-lying areas, due to the exacerbating effect of higher sea levels on high tides, heavy rain events and storm surges. Other aspects of climate change, such as the expected increase in the intensity of rainstorms and hurricanes, will further exacerbate the impacts of flooding events. The best illustration of this is what we have already observed happening in Miami Beach over the last decade and a half. The annual number of flooding events in Miami Beach from all causes has been steadily increasing and will likely continue to increase to the point where some areas will need to be abandoned or re-purposed when insurance becomes unavailable or too expensive, and/or engineering measures can no longer mitigate against the problems. What is now happening in Miami Beach is the "*canary in the coal mine*" for what will inevitably occur in other low-lying areas of the county. Saltwater intrusion into the Biscayne Aquifer, the primary source of freshwater for Southeast Florida, is also a considerable threat with sea level rise, and steps must be taken to avoid or mitigate this potential impact.

RECOMMENDATION 4: While recognizing the recent efforts to address flood protection and saltwater intrusion by the South Florida Water Management District and the Miami-Dade County, the Sea Level Rise Task Force recommends that Miami Dade County work jointly with the District and the SE Climate Compact partners to conduct a comprehensive study and develop adaptation strategies to address potential flood damage reduction and saltwater intrusion associated with sea level rise. This strategy should expeditiously address rising sea levels, a time frame for implementation, and a potential funding mechanism.

Lands in public ownership are crucial to restoring hydrology and surface water levels, which can help reduce the threat of salt water intrusion. Wise land use planning and incorporating the benefits received from natural systems must be an essential part of a resilience strategy, and funds and legislative support are needed to complete the targeted acquisitions and protect these natural areas.

RECOMMENDATION 5: The Sea Level Rise Task Force recommends that Miami-Dade County's resiliency efforts must incorporate support for Everglades restoration, including making restoration a top priority for County lobbying efforts, and must strategically utilize and fully fund both acquisition and management needs for the County's Environmentally Endangered Lands Program (EEL).

Clearly, without adaptation, current ground levels and essential fresh water, flood, and drainage related systems will be critically compromised, if not overwhelmed.

V. Reinsurance Industry and Potential Economic Implications

Perhaps the most impactful presentation made to the Sea Level Rise Task Force came from representatives of the Re-Insurance Industry. Mark Way, Sustainability Director of Swiss Re, stated that the insured losses for the global insurance industry totaled $6.4 billion per year in the 1980's for weather related impacts. This has risen to $40 billion during the first decade of this century. Over the past six years, Swiss Re has been conducting research to assess the cost of adapting to severe weather impacts using a rigorous risk management approach to assess local total climate risk and included proposed adaptation measures to address total climate risk on an economic basis. Using predictive scenarios, this study estimated the expected losses for Southeast Florida by scenario and by hazard ranged from $17 billion, or 8.5 percent of Gross Domestic Product (GDP) in 2008, to $33 billion or 10% of GDP in 2030. This study also suggested the most cost-effective ways to minimize loss. According to the cost/benefit curve developed in this study for the Southeast Florida region, it is estimated that approximately $30 billion of the total expected loss in 2050 could be avoided if a comprehensive plan for adaptation were implemented. It was explained to the Task Force that adaptation policies implemented now will significantly lower the insurance costs to the County and its residents in the future, and in some cases avoid or postpone wholesale abandonment due to non-insurability or the high cost of premiums.

A recent report by the Geneva Association (Appendix G), the leading international think tank for strategically important insurance and risk management issues, concluded that Historic Climate Records are no longer reliable tools in either risk assessment or rate setting. Insurance rates are climbing and could soon become prohibitive: the cruelest "tax" of all.

RECOMMENDATION 6: Recognizing the need to develop insurance mechanisms that will provide real help to the victims of climate change impacts, The Sea Level Rise Task Force recommends that Miami-Dade County consider initiating discussions with private insurance and reinsurance professional organizations, member local governments in the Southeast Florida Climate Change Compact and the Florida Office of Insurance Regulation in the Department of Financial Services to develop long-term risk management solutions.

VI. Conclusion

With trillions of dollars of built environment and invaluable natural resources at stake in the region, the economic imperative to take action sooner rather than later is clear.

WE BELIEVE THAT WITHOUT A PROFESSIONALLY WELL THOUGHT OUT ADAPTATION PLAN IN PLACE, WE RISK LOSING INSURABILITY AND FINANCIAL SUPPORT FOR OUR FUTURE.

Although the need to begin is urgent, we are optimistic that with commitment we can continue to build a future South Florida that will not just remain viable, but one that will continue its emerging status as a vibrant world class Region.

Appendices

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