

# RESILIENT MARTIN



## RESILIENT MARTIN

SEA LEVEL RISE PLAN SUMMARY





# EXECUTIVE SUMMARY

## ► INTRODUCTION

Climate change is a global issue with long-term implications, especially for coastal communities like Martin County. Compelling scientific evidence shows trends in rising amounts of greenhouse gases (GHG) in the atmosphere, resulting in increasing temperatures, warming seas, shrinking ice sheets and increasing ocean acidification. This is a story of extremes that chronicles the dangerous occurrences of prolonged drought, intense storm events, flooding and storm surge and rising sea level. It is the point where these conditions intersect that presents the greatest amplification of impact and a daunting challenge to coastal communities preparing for a future impacted by climate change. “Resilient Martin” (RM) is a program

established by Martin County to identify and address these future climate threats to both the natural and built environments. The RM program provides a coordinated and multidisciplinary approach to climate change resilience that can be clearly communicated to the public. As an initial step, a sea level rise (SLR) plan has been developed to review and analyze existing County technical data, identify data gaps and provide recommendations for data acquisition, adaptation steps and policy development. The RM Sea Level Rise Plan (SLR Plan) is a stepping-stone in the Resilient Martin program’s path, building upon efforts already initiated by the County and other entities.



## ▶ THE THREATS AND SOLUTIONS

Martin County has many miles of ocean, estuarine and freshwater coastlines and marsh habitats, as well as constructed infrastructure and natural uplands that are fundamentally at risk from climate change. The County's infrastructure and natural resources serve the community needs and provide important resilience functions that stand to be impacted by future SLR and climate variability. These areas also pose significant concerns for long-term floodplain management.

The County has already begun to see the impacts from SLR and unpredictable weather patterns. This is manifested in nuisance flooding that is increasing in frequency and severity, extreme coastal erosion, recurring drainage issues, water quality degradation, ecosystem shifts and health impacts from vector-borne and heat-related illnesses. Water management decisions are becoming increasingly more complex and far-reaching, and now include consideration of identified at-risk geographic areas and vulnerable populations. The good news is that there is time to plan for cost-effective responses to expected impacts and those responses will provide long term savings to the County. The National Institute of Building Sciences (NIBS) found that every \$1 invested in disaster mitigation saves \$6 in recovery costs. While the county is experiencing some SLR induced impacts, our higher land elevation is a benefit compared to lower lying communities to our south where immediate action is necessary. The SLR Plan provides a vulnerability assessment and recommendations for actions that address sea level rise-related issues including storm surge, king tides, elevated groundwater and saltwater intrusion. These issues are compounded by expected increases in extreme precipitation events that can result in flash flooding and acute stormwater runoff.

The SLR Plan recommends actions to address climate risks in identified vulnerable sectors through modeling and mapping such as critical facilities, land use, transportation and utilities. The solutions may include infrastructure maintenance and improvements, water management plans and environmental restoration of natural areas, as well as integration of adaptation elements into capital project design, revised building codes and development regulations that account for future flood risk.

## ▶ RESILIENCE PLANNING

Building resilience is crucial for ensuring the long-term viability of our county and health of our residents. Resilience planning provides the opportunity to develop actionable measures that can include updating land use codes, zoning, development standards and other plans or policies to better prepare for predicted changes. The basic steps in resilience planning include: 1) identify challenges, 2) evaluate a wide range of solutions, 3) recommend optimized actions and 4) develop a timeline for implementation of the selected action.

Martin County has the ability, and a demonstrated desire, to plan more resiliently for the future. A critical SLR vulnerability assessment was completed between 2018 and 2020 that draws upon data developed regionally coupled with other sound scientific data. It was fine-tuned to also address the new SLR criteria in FEMA's National Flood Insurance Program, specifically the Community Rating System (CRS). The assessment evaluated local infrastructure and assets, natural resources and businesses while overlaying climate scenarios to identify impact areas. The results provide a better understanding of current vulnerabilities and help identify where more analysis is needed for better adaptation

planning. A direct outcome of the SLR Plan development is the recognition of the added value from integrated County project management, collaboration and communication. Similarly, the County, business owners and residents must become part of the process to develop a joint response to these threats for the common good.

The SLR Plan focuses on strategies to reduce the effects of SLR, the most immediate climate issue facing the County. The wide range of information available allowed the County to undertake an extensive modeling effort analyzing future SLR impacts, however, more information and analysis will be necessary to fully understand the broad implications for the County. The relationship between SLR, precipitation and groundwater is one area requiring further investigation because sufficient data was not yet available. However, ongoing work at the County level and at a regional level through a partnership between the SFWMD and the USGS may provide new insights into this important element in resilience planning. The SLR Plan is a start, not a conclusion. More observations, modeling, qualitative and quantitative data and information will be needed continue to adapt to a changing reality.

Success in implementing the SLR Plan recommendations will depend on a variety of factors. County staff need to assess the current organizational structure before and during implementation. Funding options for the proposed actions will need to be identified and regular hazard monitoring will be required to ensure the SLR Plan is responsive to changing climate impacts. Because implementation presents a long-term challenge, periodic internal coordination along with updates to the County Commission on progress will be necessary. To begin this essential process, the County must act now.



# IMPLEMENTATION: FROM SLR PLAN TO ACTION

Martin County has already made significant investments to become a more resilient community. The County's response to extreme conditions presented by climate change, will be an evolving process, using data collected as conditions change to adapt to the expected impacts. The process to develop the Resilient Martin program has been data-driven and transparent. Through the leadership of Martin County's Board of County Commissioners and the strong support from the FDEP's Resilient Coastlines grant program and NOAA's Office for Coastal Management, in addition to the groundbreaking work of the Southeast Florida Climate Compact, the Resilient Martin program has leveraged the current body of knowledge to move forward.

Investments in becoming a more resilient community provide a high value return and

this has been a driving force behind the development of the Resilient Martin program. The National Institute of Building Sciences (NIBS) released a report that determined the 6 to 1 return on pre-disaster mitigation also found that the financial benefits of exceeding local building standards, such as elevating homes higher than required in flood-prone areas and building structures to be more resilient yields \$4 for every \$1 spent. This underscores the fact that investing in resilience pays substantial dividends back to the community.

A coordinated effort among County staff, County programs, stakeholders, residents, federal and state agency resources and elected leaders generated shared support for the program and its initiatives. This SLR Plan is one step in a larger process to preserve the

quality of life in the Martin County as environmental conditions change, and it includes recommendations to assist in achieving that goal. The recommendations in the SLR Plan have a short, medium and long-range timeframe or they are an ongoing process. To implement recommendations successfully, they must be woven into the fabric of normal County operations. This means integrating them into the existing decision-making processes including project review, budgeting and Comprehensive Plan and code amendments. With all these actions pointing in the same direction, the County can achieve the goal of becoming a more resilient community.

► **Hazard Mitigation.** One specific way to invest in becoming a more resilient community is to improve participation in FEMA's CRS program. The County's submission date for its next CRS review is May 1, 2021. This in-person review will be the next and best available opportunity for the County to incorporate this SLR Plan into its documented strategy to improve its CRS Class score. A Resilience and Watershed Management Plan has been developed to fulfill some CRS credits which includes a more detailed overview of the County's efforts to date. If the Board of County Commissioners desires to use this Resilience and Watershed Management Plan to improve the County's CRS score, FEMA requires that the Board formally review and adopt it through a resolution prior to its submittal to FEMA.

► **Future Data/Modeling/Analysis.** Advancing to the next step in assessing climate change vulnerabilities requires more detailed data related to surface water/groundwater/SLR relationships, extreme precipitation events, hurricane induced storm surge and king tides, site-specific property information such as existing building and infrastructure elevations and the cost-benefit of specific

adaptation projects. Much of the data for these analyses either does not exist or needs further refinement. For that reason, the County should expand the communication and coordination with agencies such as FDEP, SFWMD, USGS, U.S. Army Corps of Engineers and other entities that have the resources to fill these gaps. Future analysis related to demographic and socioeconomic information has also been recommended to better plan for adaptation response in an equitable way.

► **Coordination of Capital Improvements.**

This coordination is a high priority to Vulnerability mapping has identified areas where impacts are expected in the next 20 to 50 years, well within the useful life of many County projects. Annual and multi-year budgeting processes should incorporate this review to ensure that investments are made with a long-term view. It should be noted that adoption of the SLR Plan will increase the eligibility and ranking of related County projects in many grant programs. Therefore, projects should be evaluated to determine if resilience criteria exists to maximize the project's useful life and to ensure that assumptions about SLR impacts are part of the planning process. Full implementation will require that projects subject to resilience review demonstrate that the SLR Plan findings have been incorporated into these projects.

► **Comprehensive Plan and Code.** A local government's Comprehensive Growth Management Plan and Code always provide an opportunity to incorporate resilience planning goals, objectives and policies. It is important to incorporate the SLR Plan recommendations into these documents where appropriate because they provide the decision-making structure for existing and new development projects as well as for County capital improvement and design. Continued

coordination between the overall Resilient Martin program, the Comprehensive Plan and the Code activities will facilitate project reviews that include the best available information related to future climate risk.

► **Funding Strategy.** Funding for resilience is likely to be based on a “layered” approach of traditional and new sources of revenue. Grants have already served an important role in the resilience planning process. Pre- and post-disaster recovery funding sources are also available and many now prioritize resilience planning. Other communities’ funding strategies include general obligation or revenue bonding, user fees, non-disaster related grants, State Revolving Loan Funds and incentive-based funding strategies to achieve resilience outcomes. Assessments are also a strategy that is becoming popular because they can capture the differences in the level of adaptation projects necessary, which may fluctuate neighborhood to neighborhood based on exposure and risk. Tax increment financing can be another useful tool, especially in the redevelopment context whereby the increase in assessed property value caused by development is used to repay the cost. Impact fees can also be assessed to generate revenue to meet local infrastructure and public facility demands rising as a result of new development. These demands may include stormwater system upgrades, flood control improvements, road elevation, green infrastructure or open space features that have resilience co-benefits. Finally, pay as you go financing will occur as resiliency concepts are integrated into the traditional capital planning process.

► **Outreach.** As discussed throughout this report, continued outreach is an essential component of a successful resilience effort. The two-way exchange of information allows the County to inform the community of upcoming projects and establish a dialogue in

the early planning stages. Information exchanges with the community will provide a better understanding of their priorities and the perceived impact of projects. This information should be incorporated into project planning and construction.

► **Coordination with the Business Community.** All stakeholders must be involved in this resilience conversation, including the business community. Information should be easily accessible by current business owners as well as those contemplating a move to the County. Business owners must be aware that Martin County is preparing for a resilient future, understand the value and become part of that process. The importance of this planning, including the strong linkages between resilience and disaster planning, should clearly show how this strategy can achieve multiple goals simultaneously. According to FEMA, nearly 40% of small businesses never reopen their doors following a flood disaster.

► **Inclusive Adaptation Planning.** Resilience communication by Martin County must include its diverse population. It is important to identify the most effective ways to connect with vulnerable communities and businesses about climate change preparedness and to identify the resources that would provide the best benefit. Recommendations include an increased emphasis on education, training and resources as a resilience strategy. Communication should be multi-lingual and include faith-based organizations and community centers. Outreach can also include more accessible hazard data through presentations, web portals, brochures, social media, radio and MCTV broadcasts and other channels. This work can be coordinated with Emergency Management’s ongoing public outreach program.



► **Intergovernmental Coordination.** The County should maintain and expand the lines of communication that have been developed with other municipalities and other resilience actors in the South Florida region. Since the County also owns, maintains and operates infrastructure and assets within municipal boundaries, discussion and agreement on SLR planning will be important to these partnerships. Joint efforts could include data collection, project planning, funding, grants and overall implementation.

► **Government Partnerships.** It will be in the County's best interest to continue and enhance its relationships with federal, state and regional partners and track the evolving landscape of governance structures, new rules and policies and funding opportunities. As these agencies develop new tools to collect and model data, they enhance the County's efforts in planning and outreach, policy and regulatory development. As the state's climate response and governance structure evolves, the County can continue to benefit from its work products and grant opportunities. The process of developing and implementing the SLR Plan will put the County in a leadership position to take advantage of these relationships and opportunities.

► **Responsibilities, Structure and Staffing.** As the process of implementing the SLR Plan begins, it will be important to assess the County's financial, organizational and staffing structure to achieve success. Responsibility for implementation will need to be a cross-departmental collaborative process. The internal collaboration that has occurred thus far has been extensive and must continue through regularly scheduled meetings. Not all recommendations will require new, dedicated funding mechanisms, instead many recommendations can be implemented

through work that is planned but can be modified to incorporate SLR assumptions into the design for new projects. Capital project and asset management information should be generated in a way that can be incorporated into future analysis related to vulnerability. This effort has shown that the County's data sets are far ahead of many other local governments in Florida, however there is always room for improvement.

► **Monitoring/Reporting/Updating.** The SLR Plan includes 48 recommendations, some of which require new data or information for implementation. The subsequent analysis can help the County identify and implement the best future actions. Successful SLR Plan implementation will require monitoring and reporting to County administration, the County Commissioners and the public. The County's new Resilient Martin website provides an excellent opportunity to track and monitor implementation of the SLR Plan. Additionally, internal collaboration prior to the launch of the annual budgeting process will help align capital project review. An update on adaptation activities should be provided to the County Commission prior to the beginning of the annual budget process. This will help manage the SLR Plan's implementation and keep completion of the recommendations on track. Finally, the vulnerability assessment should be updated or expanded as needed to address new resilience attributes not previously considered. This should occur no less than every 3 to 5 years.



## ► RECOMMENDATIONS

### COUNTY ASSETS & INFRASTRUCTURE: TECHNICAL VULNERABILITY ANALYSIS

1. Add vulnerability or flood risk factor into capital projects.
2. Consider project life and relationship to sea level rise and flood risk in capital projects.
3. Expand overall vulnerability assessment to include erosion rates, shoreline elevation, impacted stormwater discharge and commercial area metrics.
4. Make infrastructure retrofits and maintenance projects more resilient.
5. Improve stormwater vulnerability analysis to factor in more data about structures, drainage basins, storage capacity and rainfall.
6. Enhance sea level rise modeling to link surge from hurricanes, precipitation and shorelines.
7. Undertake modeling that relates surface water, groundwater and impacts to septic tanks and water supply wells.
8. Complete property level risk analysis with NFIP data.
9. Expand information and coordination on sea level risk impacts to transportation systems.
10. Use more detailed information related to elevations to determine road impacts from sea level rise.
11. Analyze individual at-risk facilities and assets to prioritize adaptation measures.
12. Incorporate property level building elevations into vulnerability analysis.
13. Use vulnerability information in emergency management planning and project priorities.

14. Collaborate with SFWMD to understand their coastal structure adaptation projects and relationship to County drainage.
15. Create complete dataset on hazardous materials use or storage impacts by future flood risk.
16. Use “pilot” projects to help inform feasibility of adaptation measures.
17. Link CRA stormwater planning with vulnerability information.
18. Determine if public open spaces can accommodate enhanced stormwater management benefits
19. Link ongoing sanitary sewer conversions with sea level rise vulnerability analysis.

### COUNTY ASSETS & INFRASTRUCTURE: ECONOMIC ANALYSIS

20. Analyze future flood damage and economic impact to properties.
21. Update previous economic analysis related to adaptation strategies.
22. Determine costs and funding sources for adaptation.

### COUNTY ASSETS & INFRASTRUCTURE: POLICY DEVELOPMENT

23. Review Comprehensive Plan and Code for linkages with recommendations in the Resilient Martin Plan.
24. Integrate sea level rise projections into Comprehensive Plan and Design elements of Code.

## COUNTY ASSETS & INFRASTRUCTURE: AGENCY OR STAKEHOLDER COORDINATION

- 25. Update the BOCC annually on Resilient Martin.
- 26. Coordinate vulnerability work with the municipalities.

## COUNTY ASSETS & INFRASTRUCTURE: CRS IMPROVEMENT

- 27. Track citizen Request for Service (RFS) related to alleviating flood impacts and achieve CRS credits.
- 28. Adopt Watershed Management Plan for CRS submittal.
- 29. Complete repetitive loss analysis for CRS submittal.
- 30. Determine if analysis in CRS for levee or dam structures is beneficial.

## LAND DEVELOPMENT

- 31. Ensure debris management policies reduce impacts to stormwater functions.
- 32. Increase stormwater management requirements on parcels.
- 33. Develop a list of feasible property owner adaptation strategies and revise Code, if necessary, to facilitate implementation.
- 34. Better link building elevation information and inundation mapping for property owners to reduce risk in new construction and retrofits.
- 35. Review, update or develop policies to protect historic structures from future flood risk.
- 36. Increase the minimum elevation of buildings (freeboard) in at risk locations.
- 37. Pursue and develop programs that help property owners adapt their properties to mitigate future flood risk.

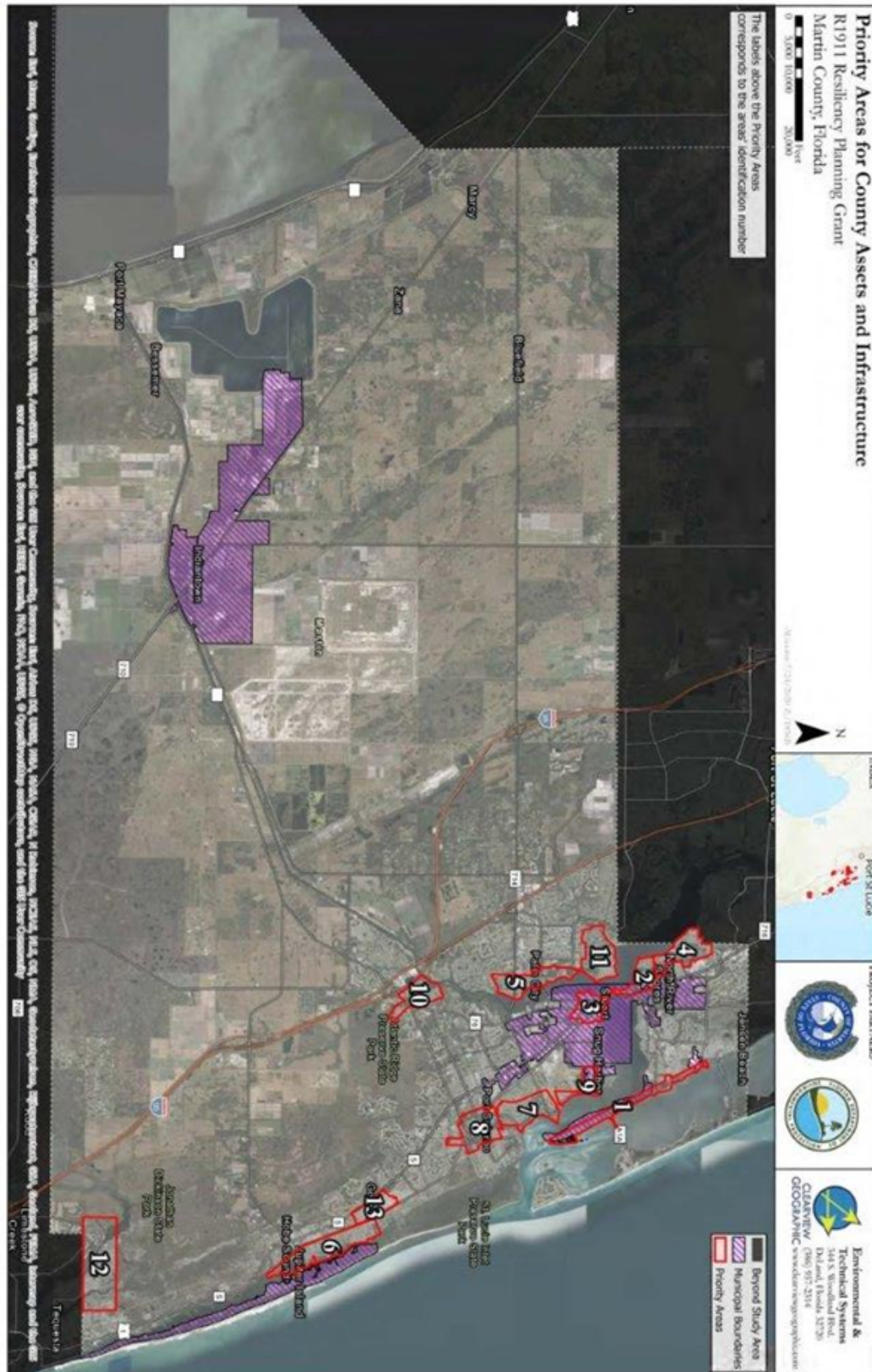
## NATURAL RESOURCES

- 38. Promote rainwater harvesting to increase on site retention of flood water for beneficial reuse.
- 39. Increase utilization of passive green infrastructure projects (such as swales and retention areas) by partnering to develop list of project types and feasible implementation through permits and Code.
- 40. Contribute vulnerability information to regional discussions on land and water resource protection.
- 41. Model sea level rise impacts to changing habitats.
- 42. Integrate coastal information into vulnerability assessment.

## SOCIOECONOMIC

- 43. Increase communications with the business community on Resilient Martin.
- 44. Improve community discussions on the projected impacts of climate change on the County.
- 45. Exchange vulnerability information with asset owners throughout the County such as hospitals and the Martin County School District.
- 46. Specifically target socially and economically vulnerable populations in community outreach activities.
- 47. Coordinate vulnerability information with Department of Health.
- 48. Enhance regional vulnerability discussions through providing vulnerability data to the Regional Planning Council.

The priority areas identified in this map represent locations that are predicted to experience multiple SLR impacts in the next 20 years, and some areas may already be experiencing them. The information is not meant to represent any specific impacts to individual parcels, but shows general trends within the areas. The identification of these areas will help the County focus in on potential solutions and identify funding sources for future work.







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