

11.

IMPLEMENTATION Strategy

“ These recommendations can be implemented in several ways, including: integration with the capital planning process; securing newer partnered funding sources; integration with the County’s Code of Ordinances and Land Development Regulations; integration with flood mitigation policies, and other mechanisms.”

Though the County has already put in place several policies and programs to improve sustainability and help the County mitigate climate change and sea level rise impacts, the recommendations provided in GreenKeys! exceed the scale of existing efforts. Implementation of the recommendations in GreenKeys! is critical to ensuring that real improvements are made. The recommendations provided within this document can be implemented in several ways, including: integration with the capital planning process; securing newer partnered funding sources; integration with the County’s Code of Ordinances and Land Development Regulations and integration with flood mitigation policies; and other mechanisms. The Implementation Matrix provided in Appendix G illustrates specific methods of implementation for each individual recommendation per Focus Area, as does the narrative below.

A. Integration with Capital Planning Process

i) Monroe County

One strategy for implementing some of the recommendations outlined in GreenKeys! includes identification of annual public infrastructure expenditures within the Monroe County Fiscal Year 2016 Proposed Annual Operating & Capital Budget (“Budget”) to identify which investments could be adapted to increase sustainability efforts associated with rising sea levels (budget partially included in Appendix L).

For Fiscal Year (“FY”) 2016, the County has allocated \$115,204,597 for capital improvement projects related to public facilities and infrastructure. Monroe County’s capital improvements are developed in concert with the Monroe County Year 2010

Comprehensive Plan which was recently updated (out to 2030). The County designs its capital improvements in a report entitled Capital Projects Plan. Capital projects are those projects that the County initiates to maintain existing infrastructure and accommodate future growth within the County. Capital projects include construction and rehabilitation of public buildings, major street improvements, parks and recreation projects, canal restoration projects, and maintenance and acquisition of fleet vehicles.

The Capital Projects Plan is a multiyear (4 year) plan that identifies each proposed capital project to be undertaken, the year in which it will be started, and the proposed method of financing the expenditures. The Capital Projects Plan is designed to guide Monroe County's capital planning process in order to promote financial stability and limit the need for dramatic tax increases or diversions of resources from other programs to make unanticipated capital expenditures. Major capital outlays, such as the acquisition or construction of capital facilities and other capital assets are funded from many funding sources, including Road & Bridge Fund, Impact Fees Fund (Roadways, Parks & Recreation, Libraries, Solid Waste, Police Facilities, Fires & EMS), and the One Cent Infrastructure Sales Tax.

As discussed in the vulnerability analysis completed as part of this project, several County-owned and maintained facilities appear to be vulnerable to sea level rise under the modeled scenarios. While not necessary for incorporation into the capital planning or budgeting process in the near term cycles, it is important to consider that the projected impacts of 2030 vulnerability are only fifteen (15) years out. To put this in perspective, the tidal flooding model predicts stormwater impacts and potential nuisance

Crawl Key Training Academy Capital Project

PHOTO SOURCE: Monroe County Emergency Management



flooding for between 2.3 miles (low sea level rise scenario) and 3.2 miles (high sea level rise scenario) along U.S. Highway 1 by 2030.

The following are points on guidance provided for implementing new capital budget items.

Specific Facility Improvements

Some of the new capital budget items recommended include:

- 1) For the Monroe County Animal Shelter in Key West, which shows access concerns and first floor flooding under the 2060 scenario, consider potential relocation to a more elevated site as part of any future plans to renovate the Animal Shelter facilities (Recommendation GO 2.5).
- 2) For the Marathon electric substation, which shows vulnerability to an extreme storm surge by 2060 under a high sea level rise scenario, coordinate with Florida Keys Electric Cooperative to determine true risk exposure and alternatives to reduce that risk (Recommendation GO 2.10).
- 3) For the Roth Building (50 High Point Road), Radio Transmission Shop (88770 U.S. Highway 1) and County Offices (MM 88.5, U.S. Highway 1), which show potential risk to an extreme flooding event by 2060, take into account both the rate of sea level rise over the next two decades and the overall lifecycle of the buildings in making flood adaptation decisions to reduce risk (Recommendation GO 2.11).
- 4) For Clarence Higgs Beach, which shows risk of current or future flooding from a Wilma-sized event, incorporate appropriate hazard mitigation design features into any retrofits or upgrade projects

(Recommendation GO 2.12).

5) For East Martello Tower, which shows risk of current or future flooding from a Wilma-sized event, consider flood adaptation measures (more mid to long-term because of fort construction and historic nature) (Recommendation GO 2.13).

6) For the Monroe County Sheriff's Office Freeman substation structure on Cudjoe Key, which shows moderate risk concern, develop adaptation strategies as a likely priority for flood mitigation and emergency preparedness (Recommendation GO 2.14).

Funding for these budget items can potentially be obtained from several sources, including: FEMA's Pre-Disaster Mitigation Grant Program; FEMA's Hazard Mitigation Grant Program (after disaster only) and FEMA's Flood Mitigation Assistance Program. See Section 11(d) and the Implementation Matrix in Appendix G for additional information on funding specific recommendations in GreenKeys!

Assessments and Investigations

Site-level assessments and investigations are also recommended to ensure that the County makes capital planning decisions based on facility-specific information, including:

- 1) Develop site level assessments that characterize resistance of above ground structures and associated electrical components to damage from extreme event flooding (Recommendation GO 1.1).
- 2) Create detailed site investigations to better resolve the extreme event flood risks of all critical infrastructure within defined special flood hazard areas (Recommendation GO 1.9).

3) Enhance monitoring of County buildings and create a database for flood risk to detect potential access and structural issues associated with increased tidal flooding exposure (Recommendation GO 1.10).

4) Conduct site-specific analyses of particularly vulnerable wastewater infrastructure that include survey quality elevation data of sensitive components and engineering assessments of potential floodwaters to determine the present and future vulnerability to extreme flood events (Recommendation GO 2.9).

5) Develop and maintain recording protocols and, as necessary, engineering assessments to assess resilience of below-grade pipes and pump infrastructure to increased saltwater incursion associated with sea level rise (coordination with FCAA) (Recommendation GO 1.2).

In 2014, the Environmental Protection Agency ("EPA") released a guidance document for auditing site-level flood resilience of wastewater infrastructure.³⁵ Following this guide, the Team specifically recommends that Monroe County's Floodplain Coordinators be supplied with site-level assessments that characterize resistance of above-ground structures and associated electrical components to damages from extreme event flooding consistent with EPA audit guidance.

From a long-term planning perspective, it is critical to note that flood hazards from a high sea-level rise scenario would be expected to alter current patterns of resident population settlement and the magnitude of visitor travel within the Florida Keys.³⁶ Future siting and capacity decisions for the County's wastewater treatment facilities under a high sea level rise scenario therefore should not account

Clarence Higgs Memorial Beach

PHOTO SOURCE: Monroe County Proposed FY2016 Budget



Cudjoe Wastewater Treatment Plant

PHOTO SOURCE: Monroe County Proposed FY2016 Budget

for the flood risks at the site of wastewater treatment facilities themselves, but also associated changes in the resident population and economic activity of wastewater service areas.

There may also be the need for the development of recording protocols and/or engineering assessments to further address resilience of other infrastructure associated with the most vulnerable facilities. Funding for these budget items can potentially be obtained from several sources, including: FEMA's Pre-Disaster Mitigation Grant Program; FEMA's Hazard Mitigation Grant Program (after disaster only) and FEMA's Flood Mitigation Assistance Program. See Section 11(d) and the Implementation Matrix in Appendix G for additional information on funding specific recommendations in GreenKeys!

ii) Other Capital Planning Efforts

Besides maintaining focus on adaptation expenditures through capital planning efforts, Monroe County should not lose sight of other assets within the County's geographic boundaries vulnerable to climate change and sea level rise but outside the regulatory and proprietary jurisdiction of the County. For example, the FDOT manages several key public roadways within Monroe County, most significantly U.S. Highway 1. U.S. Highway 1 is the sole road transport and emergency evacuation route in the Keys portion of Monroe County.

For low level or nuisance flooding, such concerns include decreased traffic flow due to flooding of traffic lanes, increased risk of traffic accidents due to the hazard of tidal flooding conditions, and the likelihood of higher long-term maintenance costs due to saltwater overwash and saturation that may together accelerate degradation of the road bed.³⁷

As sea levels rise, what is now seen as nuisance flooding from tidal fluctuations will become more extensive causing longer lasting transportation disruptions and damage. In cases of major storm events, emergency situations and evacuations, the longer lasting tidal flooding could cause flood blockage of low-lying sections of U.S. Highway 1 and would therefore be highly problematic for public health, safety, and welfare for the County's residents and visitors.

As discussed in Section 8(d) above, the loss of use of roadways has the potential to create similar disputes as was litigated in St. Johns County in early 2005. The difference in the St. Johns County case and U.S. Highway 1 is that the level of service provided by U.S. Highway 1 serving the entire County is much more intense than a small portion of A1A serving only several residents.

The FDOT plans its maintenance responsibilities in five year advance efforts through its

State Transportation Five-Year Work Program ("Transportation Program").³⁸ The Transportation Program implements FDOT's mission, goals and objectives of the broader and long range Florida Transportation Plan.³⁹ The Transportation Program is the tentative list of projects that will be funded and carried out in District 6, which includes Miami-Dade and Monroe counties, during the next five (5) years.

It is developed through extensive coordination with local governments, Metropolitan Planning Organizations ("MPOs"), regional planning groups and the public through a series of public hearings. For Monroe County projects, FDOT submits the final draft of the Program to the MPO and Monroe County BOCC following the public hearings. This provides the BOCC with another opportunity to have input on the Program to ensure consistency with GreenKeys! initiatives. The FDOT then submits the tentative work program to the governor's office and Legislature, as well as the Florida Transportation Commission and the FDEO. After review and

approval of the Program and appropriations by the Governor's office and the Legislature, the Program is formally adopted by the FDOT.

Monroe County projects listed in the Tentative Transportation Program Fiscal Years 2016/2017 through 2020/2021 are provided in graphic at the bottom of the page.⁴⁰

The Florida Transportation Plan ("Transportation Plan") establishes long range goals to provide a policy framework for the expenditure of federal and state transportation funds in the state of Florida. Every five (5) years, the FDOT takes the lead in updating the plan to respond to new trends and challenges to meet the future mobility needs of Florida's residents, visitors and businesses. The Transportation Plan is currently in the process of being updated. Given the importance of U.S. Highway 1 on the economy, but also on the health, safety and welfare of the County's residents and visitors, the County should collaborate with FDOT

Repair/Rehabilitation	Resurfacing	Landscaping	Bike Path/Trail	Other
<ul style="list-style-type: none"> U.S. Highway 1 over Channel 2 (2017) U.S. Highway 1 over Channel 5 (2019, 2020) Tea Table Channel Bridge (2016) Seven Mile Bridge over Moser Channel (2016) U.S. Highway 1 over Niles Channel Bridge (2017) Card Sound Rd. Bridge (2017) Garrison Bight Bridge at Palm Ave. and North Roosevelt Blvd (2017) 	<ul style="list-style-type: none"> U.S. Highway 1 MM 38.647 – 39.993 (2018) U.S. Highway 1 MM 19.794 – 20.664 (2018, 2019) U.S. Highway 1 MM 77.5 – 81.42 (2017) U.S. Highway 1 MM 48.70 – 49.03 (2017) U.S. Highway 1 Seven Mile Bridge to south end of Knight Key Boulevard (2017) U.S. Highway 1 MM 23.121 – 25.396 (2017) 	<ul style="list-style-type: none"> U.S. Highway 1 MM 20.42 – 23.48 (2019) U.S. Highway 1 MM 15.46 – 20.14 (2019) U.S. Highway 1 MM 23.69 – 25.40 (2017) U.S. Highway 1 MM 77.47 – 81.44 (2019) U.S. Highway 1 MM 28.75 – 32.98 (2017) 	<ul style="list-style-type: none"> Overseas Heritage Trail & Scenic Highway Vista at various locations (2017) Overseas Heritage Trail & Scenic Highway MM 54.5 – 60 (2018) City of Marathon Aviation Boulevard Bicycle Path Improvements Phase I (2019) City of Marathon Aviation Boulevard Bicycle Path Improvements Phase II 2021 	<ul style="list-style-type: none"> County-wide Drainage Improvements (2017-2020) County Traffic Operations Improvements (2017, 2019) Old 7-Mile Bridge Water Taxi/ Ferry Service (2017-2019) Old 7 Mile Bridge from Knights Key to Pigeon Key (2017-2018) Snake Creek Bridge Painting (2019) U.S. Highway MM 50 – 54.6 traffic signals (2017)

in its planning processes to ensure consistency with the County's implementation efforts to adapt, reduce and mitigate the effects of climate change and sea level rise.

B. Integration with Comprehensive Plan & Code Recommendations

In addition to the implementation of GreenKeys! recommendations through Capital Project expenditures, these recommendations can also be implemented by incorporating recommendations into Policies in the Comprehensive Plan and Code.

The Implementation Matrix, attached as Appendix G, outlines the methodology to integrate many of the 165 recommendations of GreenKeys! within its existing long-term and short-term policy structures where appropriate. The Implementation Matrix provides specific policy and Code sections recommended for revision or update based on the recommendations made in GreenKeys!.

Recommended Comprehensive Plan updates and amendments can be implemented over future amendment cycles to ensure that the next iteration of the Comprehensive Plan continues to integrate sea level rise and future flood risk. Additionally, future updates to the County's Comprehensive Plan should continue the process of more fully integrating sea level rise and resiliency. It should be noted that Section 4 discusses new requirements for including future flood strategies into Coastal Management Elements of Comprehensive Plans. This integration can be accomplished through several options:

- Creating core values around the general safety of citizens and the community with a need to plan for future threats;

- Including sea level rise and natural hazards data in the background information, making sure to specifically call out impacts already experienced by the County, as well as the future flood threats;

- Encouraging the use of best practices development and redevelopment principles, strategies and engineering solutions that will result in the removal of coastal real property from flood zone designations by FEMA;

- Identifying site development techniques and best practices that may reduce losses due to flooding; and

- Being consistent with, or more stringent than, the flood-resistant construction requirements in the Florida Building Code and floodplain management regulations set forth in 40 C.F.R. Part 60.

Similarly, Code additions and amendments should be adopted in accordance with the timeline provided in the Implementation Matrix. Comprehensive Plan and Code revisions can likely be implemented with existing staff resources or additional outside resources if needed.

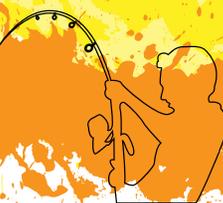
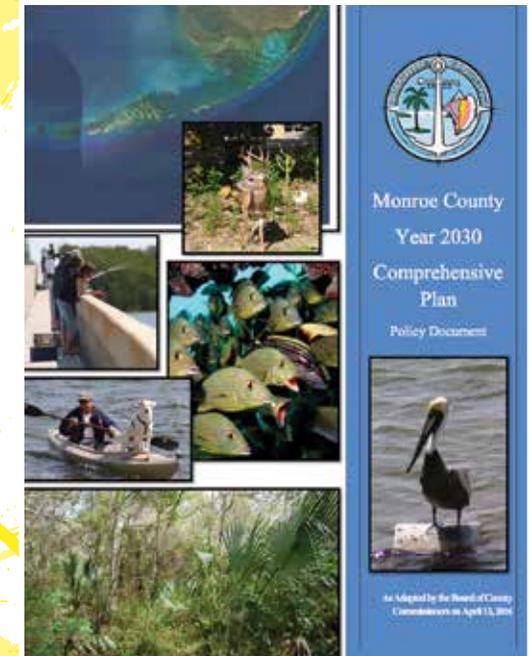
C. Integration with Community Rating System

Implementing the recommendations of GreenKeys! will help the County meet several self-initiated goals, including becoming a more resilient community.

Meeting the various criteria for good standing within the Community Rating System ("CRS") program compliments many of the recommendations provided in GreenKeys!, including managing development in areas that are vulnerable to flooding and preserving areas of the natural floodplain.

Monroe County is currently in the process of making application to the CRS. After the County obtains its first formal rating, it will be required to

Monroe County 2030 Comprehensive Plan





FEMA

undergo recertification to verify that it is continuing to perform the activities that are being credited by the CRS. During each recertification process, the County will have the opportunity to continue to improve its Class rating by undertaking new mitigation and floodplain management activities that earn even more points.

Communities can get additional points in the CRS program by undertaking various activities not already credited. FEMA will also review activities not listed in the Coordinator’s Manual for credit based upon how well those activities increase public safety, reduce property damage, avoid economic disruption and loss, and protect the environment. A community can work with FEMA upfront on any of these additional activities to assure they will translate into scored points and result in actual improvement in the rating process.⁴¹

The 2013 Coordinator’s Manual (“Manual”) includes new provisions related to credit for sea level rise and future flood risk planning. This recognizes that the future of how floodplains will look and be managed is an important consideration in planning. Factors listed affecting future flood risk are included in the Manual, such as increased impervious surfaces in developing watersheds, beach nourishment projects, new fill in floodways, rising sea levels, and changes in natural functions of floodplains. While Flood Insurance Rate Maps (“FIRM”) do not consider these future impacts on the regulatory side, CRS incentivizes their consideration for credits in the following ways:

- Credit is provided under Section 322.c for communities that provide information about areas (not mapped on the FIRM) that are predicted to be susceptible to flooding in the future *because of climate change or sea level rise*;

CRS Class	Credit Points (cT)	Premium Reduction	
		In SFHA	Outside SFHA
1	4,500+	45%	10%
2	4,000–4,499	40%	10%
3	3,500–3,999	35%	10%
4	3,000–3,499	30%	10%
5	2,500–2,999	25%	10%
6	2,000–2,499	20%	10%
7	1,500–1,999	15%	5%
8	1,000–1,499	10%	5%
9	500–999	5%	5%
10	0–499	0	0

SFHA: Zones A, AE, A1–A30, V, V1–V30, AO, and AH
 Outside the SFHA: Zones X, B, C, A99, AR, and D
 Preferred Risk Policies are not eligible for CRS premium discounts because they already have premiums lower than other policies. Preferred Risk Policies are available only in B, C, and X Zones for properties that are shown to have a minimal risk of flood damage.
 Some minus-rated policies may not be eligible for CRS premium discounts.
 Premium discounts are subject to change.

CRS Classes, FEMA NFIP Coordinator’s Manual

- To become a Class 4 or better community, a community must (among other criteria) demonstrate that it has programs that *minimize increases in future flooding*;
- To achieve CRS Class 1, a community must receive credit for using regulatory flood elevations in the V and coastal A Zones that reflect future conditions, *including sea level rise*;
- Credit is provided under Section 342.d when prospective buyers of a property are advised of the potential for flooding **due to climate changes and/or sea level rise**;
- Credit is provided under Section 412.d when the community’s regulatory map is based on future-conditions hydrology, *including sea level rise*;
- Credit is provided under Section 452.a if a community’s stormwater program regulates runoff from **future development**;

- Credit is provided under Section 452.b for a community whose watershed master plan manages *future peak flows* so that they do not exceed present values; and

- Credit is provided under Section 512.a, Steps 4 and 5, for flood hazard assessment and problem analysis that address areas likely to flood and flood problems that are likely to get worse in the future, including (1) changes in floodplain development and demographics, (2) development in the watershed, and (3) *climate change or sea level rise*.

It should be noted that credit for some of the above CRS activities requires higher standards, such as adopting County-specific maps and regulating more stringently than currently required by FEMA. One way to enhance the County's rating in the future would be to apply for the above listed credits related to future flood risk analysis. Further analysis shows that upwards of 518 points could be available through addressing sea level rise in the CRS process.⁴² Again, these additional 518 points would require higher regulatory standards adopted by the County and enforced by the community, but could be attainable.

Only eighteen (18) out of 235 communities in Florida have achieved a Class Rating of 5 and no communities in Florida as of May 2014 had achieved a Class Rating of 4. Given that these future flood risk criteria are relatively new in the CRS evaluation process, FEMA should be consulted to determine examples of where these points have been awarded and what data was used to achieve them.

D. Funding Opportunities

GreenKeys! has identified the likely impacts from sea level rise on various parts of County infrastruc-



Flooding at the Intersection of Crane Street and Adams Drive

PHOTO SOURCE: John Glista

ture and facilities. The extent of these potential impacts, however, assume no action will be taken to minimize or mitigate the risks from rising seas. As the County continues actions to reduce or mitigate impacts, the Monroe County economy and quality of life can continue to thrive. The fundamental issues for the County, or any government responsible for strengthening resiliency of its infrastructure, are the anticipated costs and how those costs can be funded. Construction costs for meeting resiliency goals are by far the most significant costs for a government. Looking at the price tags for infrastructure improvements, i.e., construction costs, has to be weighed against the probable costs of future property damage and disruptions to the economy. The science is beginning to establish the link between consistently rising seas and the likelihood of increasing severity of flooding from storm surges. Monroe County should therefore weigh these types of potential cost comparisons.

To address the funding needs the County will encounter, the GreenKeys! Team identified several new funding sources outside of the County's Capital Project budgets for the recommendations provided herein. New funding sources include:

- pre-disaster mitigation planning funds;
- impact fees;
- special revenue funds;
- landscape mitigation fees;
- stormwater utility enterprise funds;
- special assessments; and
- grants.

Each potential funding source is described in greater detail in Appendix M. The Implementation Matrix in Appendix G also provides a list of specific funding sources applicable to the individual recommendations in GreenKeys!.

E. Monitoring, Reporting, and Updates

To ensure that the GreenKeys! planning project is successful, implementation progress should be monitored annually to assess efforts and evaluate recommendations yet to be implemented. Monitoring and progress updates should occur before, or in conjunction with, the Capital Planning process. This will provide County staff with an opportunity to determine current implementation priorities and resource allocation, present updates on efforts initiated during the previous year, and report on the progress of larger scale recommendations for tracking purposes.

Another helpful technique is the development of trigger points to ensure that recommendations are implemented appropriately, especially for medium- and long-term recommendations. Essentially, trigger points are monitoring thresholds used to avoid environmental or socioeconomic tipping points, points where the impacts become so severe that they are irreversible. Trigger points can be used to justify and initiate proactive policy changes at the initial onset of a problem or in some instances avoid consequences entirely. This is especially important since many of the adaptation actions recommended in GreenKeys! are designed to address problems associated with the projected rapid sea level rise, not the current slower rate of change. Since sea level rise is expected to accelerate in the future, establishing trigger points for adaptation actions allows the County to balance policies that will preserve the status quo for as long as possible, while making a forward commitment to protect future populations.

