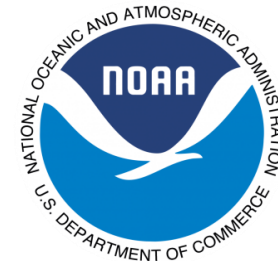


# East Central Florida Regional Resiliency Action Plan



December 2018 | Prepared for Brevard and Volusia Counties by the East Central Florida Regional Planning Council

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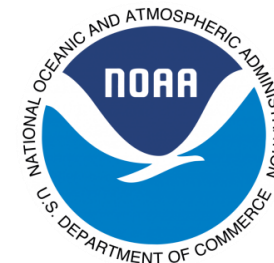
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# Acknowledgements

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The East Central Florida Regional Planning Council (ECFRPC) would like to thank the Florida Department of Environmental Protection and the National Ocean and Atmospheric Administration for providing the funding to develop the East Central Florida Regional Resiliency Action Plan (ECF RRAP) and engage stakeholders in the resilience conversation across Brevard and Volusia Counties.



Stakeholder and public engagement were a critical and large component of the plan development. The ECFRPC recognizes and thanks all agency, jurisdictional, NGO, educational and business sector representatives, elected officials, and public for your participation in the workshops held in 2018 that provided a forum for resilience education and discussion to formulate the action plan and efforts to move resilience strategies forward across the region.

The ECF RRAP steering committee comprised of agencies listed in the table below were instrumental in helping to guide the process and development the action plan including a regional approach to sea level rise and the engagement of stakeholders across the region. A special thank you goes out to all agency and jurisdictional representatives who served on the committee.

## East Central Florida Regional Resiliency Action Plan Steering Committee

Brevard County GIS	Indian River Lagoon National Estuary Program
Brevard County Planning & Development	League of Women Voters Sustainability Committee
Brevard County Public Works	NASA Kennedy Space Center
Brevard Emergency Management	NOAA Office for Coastal Management
Brevard Natural Resource Management	Patrick Air Force Base
Canaveral Port Authority	River to Sea Transportation Planning Organization
City of Cape Canaveral	RWParkinson Consulting, Inc.
City of New Smyrna Beach	Florida Sea Grant
City of Port Orange	St. Johns River Water Management District
City of Rockledge	Space Coast Transportation Planning Organization
City of Satellite Beach	Stetson University
Erin L. Deady, PA	University of Florida GeoPlan Center
East Central Florida Regional Planning Council	UF IFAS Extension Volusia and Brevard
FEMA	U.S. Army Corps of Engineers
Florida Department of Economic Opportunity	U.S. Department of Agriculture
Florida Department of Environmental Protection	Volusia County Emergency Management
Florida Department of Health in Brevard	Volusia County Growth and Resource Management
Florida Department of Health in Volusia	Volusia County Stormwater
Florida Department of Transportation	Volusia County Environmental Management
Florida Fish and Wildlife Conservation Commission	Volusia County Traffic Engineering
Sustainability Program, Florida Institute of Technology	Volusia County Water Resources and Utilities



# Executive Summary

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The ECFRPC was awarded a Florida Department of Environmental Protection (FDEP) Grant in 2017 to work with stakeholders in Brevard and Volusia Counties to develop the East Central Florida Regional Resiliency Action Plan (ECF RRAP) with the goal to increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines. The plan development process revolved around guidance from a cross-disciplined steering committee and extensive stakeholder engagement and best practice research.

The Framework for the ECF RRAP was based on the 100 Resilient Cities program of the Rockefeller Foundation which works with cities around the world to help them “become more resilient to the physical, social and economic challenges that are a growing part of the 21<sup>st</sup> Century”. The action plan incorporates a five-year planning horizon based around four main focus areas of the 100 Resilient Cities program: Leadership and Strategy, Economic and Society, Infrastructure and Environment, and Health and Wellbeing. It is important to note that this action plan encompasses a variety of resiliency aspects and aims to incorporate discussion on infrastructure (water, energy, waste, etc.), health, planning, emergency preparedness, economics and leadership as they revolve around a more environmental “shock and stressor” approach. However, this framework allows for the replicability and refinement of the plan on a local or agency level to incorporate additional actions to address resilience to more shocks and stressors.

The Action Plan not only provides a matrix of actions for various levels of government from local to federal, but also includes actions for partnerships across agencies, not-for-profits, the business sector and other stakeholders. The report provides an in-depth discussion of the plan development process, stakeholder engagement and efforts across the region to implement resilience and sustainability measures and policies.

To guide the development of the RRAP, a steering committee was developed comprised of federal, state, regional and local agencies and institutions, local communities and subject matter experts. The first steering committee meeting, held in October of

2017, resulted in goals and direction for the plan and process. The committee met monthly (virtual and face-to-face) through December 2018. Additionally, two subcommittees were created: Sea Level Rise and Stakeholder Engagement. The subcommittees and steering committee assisted in the development of a regional approach to sea level rise planning and the subsequent technical and guidance section of this plan, developed workshop goals and processes, and provided oversight and development of the action plan itself, especially the goals, objectives and activity items. This East Central Florida Regional Resilience Action Plan is the result of 6 workshops, 11 Steering Committee calls and meetings, 7 Public Engagement Sub-Committee calls, 4 Sea Level Rise Sub-Committee calls and numerous agency interviews and feedback sessions.

In addition to best practice research across Florida and the nation and steering committee expertise, stakeholder engagement was a driving force behind the development of the RRAP. RRAP Listening Sessions took place on May 7th in Volusia County and on May 8th in Brevard County with two workshops occurring in each county: “Collaborating for Resilience” and “Building Economic and Social Resilience”. Additional workshops for Elected Officials, citizen advisory groups and other interested public, were held on August 20th and 21st. Findings from the workshop were incorporated into the ECF RRAP as appropriate. While some actions were outside the immediate scope of the RRAP, they are highlighted in this report to aid in their advancement. Additionally, some resilience gaps identified through stakeholder engagement were addressed by the ECFRPC through collaboration with and connection of appropriate agencies and departments and providing access to various available resources.

A “Plan and Policy Resiliency Integration” survey was conducted to provide insight into the progress of integrating resiliency into various local and regional plans and policies. The survey results facilitated the identification of gaps, needs and actionable items aimed at supporting resilient and sustainable coastal communities in the region. One of the principle conclusions of the survey was a lack of resources in order to conduct the analysis, planning and implementation of resilience strategies and policies across jurisdictions and agencies.

Information on the action plan and its process can be found here: <https://www.perilofflood.net/ecfresiliency>

# Introduction

The Framework for the ECF RRAP was based on the 100 Resilient Cities program of the Rockefeller Foundation which works with cities around the world to help them “become more resilient to the physical, social and economic challenges that are a growing part of the 21<sup>st</sup> Century”. Focusing the ECF RRAP around the four main focus areas of the program, Leadership and Strategy, Economic and Society, Infrastructure and Environment, and Health & Wellbeing, allows the region and local governments to advance a variety of actions, initiatives and programs that promote resilience through these four broad areas that create a cohesive and resilient community. It should be noted that while the main focus of the ECF RRAP revolved around a more environmental “shock and stressor” approach, this framework allows for the replicability and refinement of the plan on a local or agency level to incorporate additional actions to address resilience to more shocks and stressors individual to that specific community.



In order to facilitate the implementation of the action plan within agencies and jurisdictions, a template resolution for adoption of the ECF RRAP has been developed and can be found in Appendix A of this report. A presentation for use by local governments and agencies has also been developed and can be found at: <https://www.perilofflood.net/ecfresiliency>

The pages that follow include the definition of *Resilience* the ECF RRAP adapted from 100 Resilient Cities in order to provide a truly regional approach to the definition for the purpose of the action plan. The goals and objectives developed for each area of focus are also included and guide the formulation of the action plan.



## RESILIENCE DEFINITION

The capacity of individuals, communities, institutions, businesses, and systems within a region to plan, sustain, adapt, recover, improve and grow collaboratively – regardless what kind of chronic stresses and acute shocks they experience – through specific actions and implementation strategies geared to address specific vulnerabilities. *Adapted from the 100 Resilient Cities Definition*

*Resilient Cities Definition*

## GOALS AND OBJECTIVES

### EAST CENTRAL FLORIDA REGIONAL RESILIENCY ACTION PLAN GOAL

Increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines.

### FOCUS AREAS

#### Leadership and Strategy

Promote leadership, education and empowerment both in government, and public and private sectors to foster the implementation of resiliency strategies across disciplines and communities.

#### Objectives

- Incorporate resiliency into local and regional plans, policies and objectives.

### Chronic Stresses

Continuous or re-occurring issues or events that impact or “weaken the fabric of a community on a day to day or cyclical basis”. Examples:

- Water and Food Shortages
- Endemic Violence
- Homelessness
- Aging Infrastructure
- Poor Air Quality

### Acute Shocks

“Single, sharp events that threaten a community”. Examples:

- Flooding
- Heat wave
- Severe Storms and Extreme Rainfall
- Infrastructure Failure
- Disease Outbreak

*Source: 100 Resilient Cities*

- Plan fiscally to implement resilient and sustainable solutions to long-term impacts.
- Implement strategies to promote adaptive measures that keep people and property safe from natural hazards.
- Engage and educate private sector stakeholders, elected officials and other members of the community about strategies to increase resilience in the built, natural, and social environment.

### Economic and Society

Provide opportunities and strategies to foster economic prosperity and improve social equity and justice in preparation for and recovery from stressors and shocks.

#### **Objectives**

- Protect high-value assets from natural hazards.
- Educate businesses about access to funding and financing services related to resiliency and sustainability.
- Facilitate and support the efficient recovery of business operations after an event.
- Increase skilled labor force.
- Improve social equity and justice in decision making process.

### Infrastructure and Environment

Encourage development of cross-disciplinary plans, policies and strategies to protect the health, safety and economic welfare of residents, businesses and visitors through recognition that natural disasters, changes to climate, and human manipulation require careful consideration of when and how to develop infrastructure, natural resources and a built environment that can withstand and adapt to these changes.

## Objectives

- Prioritize the use of Green Infrastructure as a first line of defense.
- Promote interconnectivity of natural lands for habitat migration.
- Enhance stormwater systems to be more resilient.
- Improve water quality in surface water bodies.
- Incorporate resiliency into local and regional plans, policies, processes and objectives.
- Preserve and adapt the built environment to keep people safe from and mitigate current and future natural hazards.
- Improve community mobility while improving vulnerable transportation infrastructure.

## Health and Wellbeing

Create resilient communities by facilitating programs, opportunities, and community-wide education pertaining to local sustainability, disaster response, and climate change mitigation strategies.

## Objectives

- Improve capacity of jurisdictions to better respond to hazard events.
- Improve capacity of medical facility operations to prepare for and recover from natural disasters and future conditions.
- Promote sustainable practices in government owned facilities.
- Engage residents and business owners with locally relevant information about expected future changes in natural hazards and sustainable practices.
- Improve access to resources for the homeless, special needs, elderly, low income, and English-limited residents.

# Socio-Economic Profile

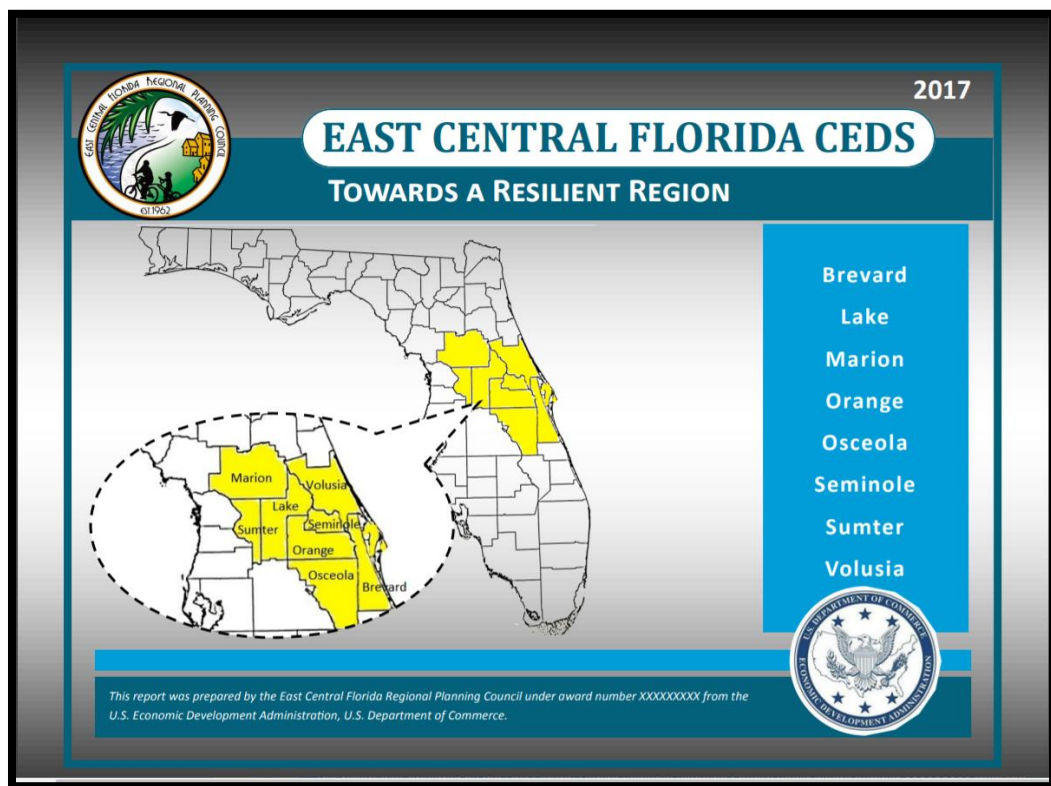
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Resilience reaches beyond the vulnerabilities of the built and natural environment and must include the perspective of social and economic vulnerabilities of a community and region. The people who live in a community and make it thrive, combined with the economic profile and opportunities available to the community, are the key to addressing resilience and creating a better position for the community to withstand and recover from shocks and stressors.



Centers for Disease Control (CDC) describes social vulnerability as the “resilience of communities when confronted by external stressors”. A community’s social vulnerability may determine how well it prepares for and responds to a disaster, as well as properly planning for future conditions such as increasing flooding and sea level rise. A number of factors weaken a community’s ability to secure human welfare and reduce economic loss from shocks and stressors, including poverty, inefficient housing and transportation, and prevalence of high-risk populations.

According to the U.S. Economic Development Administration, “economic resilience becomes inclusive of three primary attributes: the ability to recover quickly from a shock, the ability to withstand a shock, and the ability to avoid the shock altogether.” It necessitates both a local and regional perspective and involves the assessment of risks, evaluation of the risk impacts to key economic assets and plan appropriately with measures and capacity. The role of economic development organizations, and others such as Chambers of Commerce, is essential in helping to build the capacity of economic resilience in a community and region through coordination and education, information dissemination and funding opportunities. The EDA breaks down these roles and activities into *steady-state* and *responsive* initiatives. As the EDA Comprehensive Economic Development Strategy Program is a function of the ECFRPC, and as the “CEDS provides a critical mechanism to help identify regional vulnerabilities and prevent and/or respond to economic disruptions” (EDA), the ECFRPC and the CEDS document and steering committee are dedicated to work with communities, and regionally, to implement steady-state and responsive strategies focused on economic resilience.



## Steady-State

Long-term efforts that seek to bolster the community or region’s ability to withstand or avoid a shock (or stressor).

Example Strategies:

- Engaging in comprehensive planning efforts
- Diversify and broaden industry base
- Adapt programs to assist with economic recovery post-disruption
- Promoting business continuity and preparedness
- Resilient development strategies such as locating structures outside vulnerable areas and using green infrastructure

## Responsive

Establishing capabilities for the economic development organization to be responsive to the region’s recovery needs following an incident.

Example Strategies:

- Pre-Disaster Recovery Planning
- Coordinate business sector needs and impact assessment efforts
- Coordination and leadership succession plans for short, intermediate, and long-term recovery needs.

Source: US EDA



## Socio-Economic Demographics Brevard County Profile

Brevard County is located along the Atlantic coast in Central FL. As a coastal community, the population is subject to environmental vulnerabilities. The *East Central Florida Regional Resiliency Action Plan* developed by ECFRPC and stakeholders across the state provides a framework for the counties of Brevard and Volusia to mitigate the effects of climate change and sea level rise in the areas of business/economic development, emergency response and transportation planning, growth management, health and natural resources.

Table 1: General Demographics - Brevard County

<b>Total Population:</b>	<b>560,683</b>
Change in Population (Census 2000–2010)	+67,146
Expected Population (BEBR 2045)	711,100
<sup>1</sup> Median Home Value (ACS 2012–2016)	\$164,722.20
Median Household Income (ACS 2012–2016)	\$49,914
Number of Jurisdictions	16

Table 2: Potential Vulnerable Populations - Brevard County

<b>Total Population:</b>	<b>560,683</b>
Families Below Poverty Level (ACS 2012–2016)	14,963
People Below Poverty Level (ACS 2012–2016)	80,126 (14.2%)
Population Age 65 and Over (ACS 2012–2016)	126,104 (22.5%)
<sup>2</sup> Individuals who speak English less than Very Well (ACS)	18,246 (3.25%)
<sup>3</sup> Total Persons Unemployed (ACS 2012–2016)	19,355
Unemployment Rate (ACS 2012–2016)	6.38
Occupied Household with No Vehicle (ACS 2012–2016)	11,174



[https://img.bestplaces.net/images/county/FL\\_Brevard%20county.png](https://img.bestplaces.net/images/county/FL_Brevard%20county.png)

<sup>1</sup> The Census Bureau defines value as the "estimate of how much the property (house and lot, mobile home and lot, or condominium unit) would sell for if it were for sale. For vacant units, value was the price asked for the property"

<sup>2</sup> Individuals age 5 and older who speak a language other than English at home and who speak English less than very well.

<sup>3</sup> The Census Bureau defines the civilian unemployed population as "civilians 16 years old and over are classified as unemployed if they (1) were neither "at work" nor "with a job but not at work" during the reference week, and (2) were actively looking for work during the last 4 weeks, and (3) were available to accept a job.

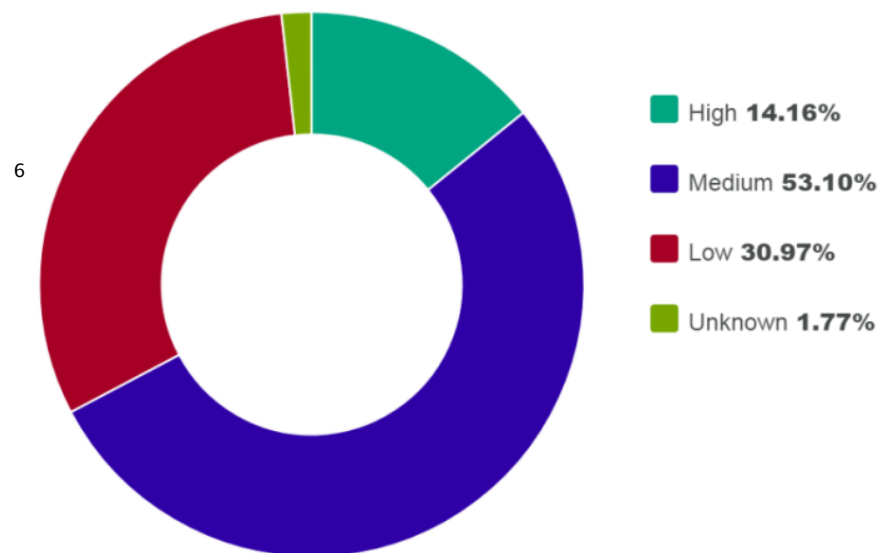
Table 3: Environmental Parameters- Brevard County

Average Annual Brevard County Losses to Natural Hazards	\$37.6 Million
<sup>4</sup> Air Quality- Respiratory Hazard Index	*1.36
Potential Number of Businesses Affected by Hurricane Irma (Dun and Bradstreet)	53,590
<sup>5</sup> Repetitive Loss Areas (BCEM 2015)	33

Figure 1: Social Vulnerability to Environmental Hazards - Brevard County

**Social Vulnerability to Environmental Hazards (by count of Census Tracts)**

Brevard County, FL



<sup>4</sup> \*Respiratory Hazard Index of 1 or above means further monitoring is needed to determine if the pollutant levels will cause non-cancer adverse health effects.

<sup>5</sup> A repetitive loss area is a portion (or portions) of a community that includes buildings on FEMA's list of repetitive losses and also any nearby properties that are subject to the same or similar flooding conditions.

<sup>6</sup> This social vulnerability index measures the social vulnerability to environmental hazards in coastal states. SoVI numerical score is calculated by adding together social and demographic data components at the census tract level. The SoVI scores were then apportioned to other geographies using weighted block apportionment. High SoVI scores are areas with high social vulnerability to environmental hazards while low SoVI scores are areas with low social vulnerability to environmental hazards. (Riskfinder)

Business and economic vulnerabilities and resilience is essential for a community to understand the full picture of how to take steps to create a resilient community. The economic profile in Brevard County that follows details the most vulnerable industries to sea level rise by 2070 using the USACE High projection rate curve, an intermediate planning horizon. Businesses within the vulnerability buffer were located and categorized using the North American Industry Classification System (NAICS). The majority of the affected establishments belong to three economic subsectors: Ambulatory Health Care Services, Professional, Scientific, and Technical Services, and Real Estate. *Ambulatory Health Care Services* provide services such as consultation, intervention, and rehabilitation; *Professional, Scientific, and Technical Services* are establishments engaged in processes where human capital is the major input and have production processes that are almost wholly dependent on worker skills. *Real Estate* firms are primarily engaged in renting or leasing real estate to others; managing real estate for others; selling, buying, or renting real estate for others; and providing other real estate related services, such as appraisal services.

*Table 4: Most Vulnerable Economic Subsectors by Number of Establishments- Brevard County*

Most Vulnerable Economic Subsectors by Number of Establishments	
Industry Description	Total # of Businesses
Ambulatory Health Care Services	1,482
Professional, Scientific, and Technical Services	1,295
Real Estate	757
All Other 3-Digit NAICS	9,012

*Source: referenceusagov.com*

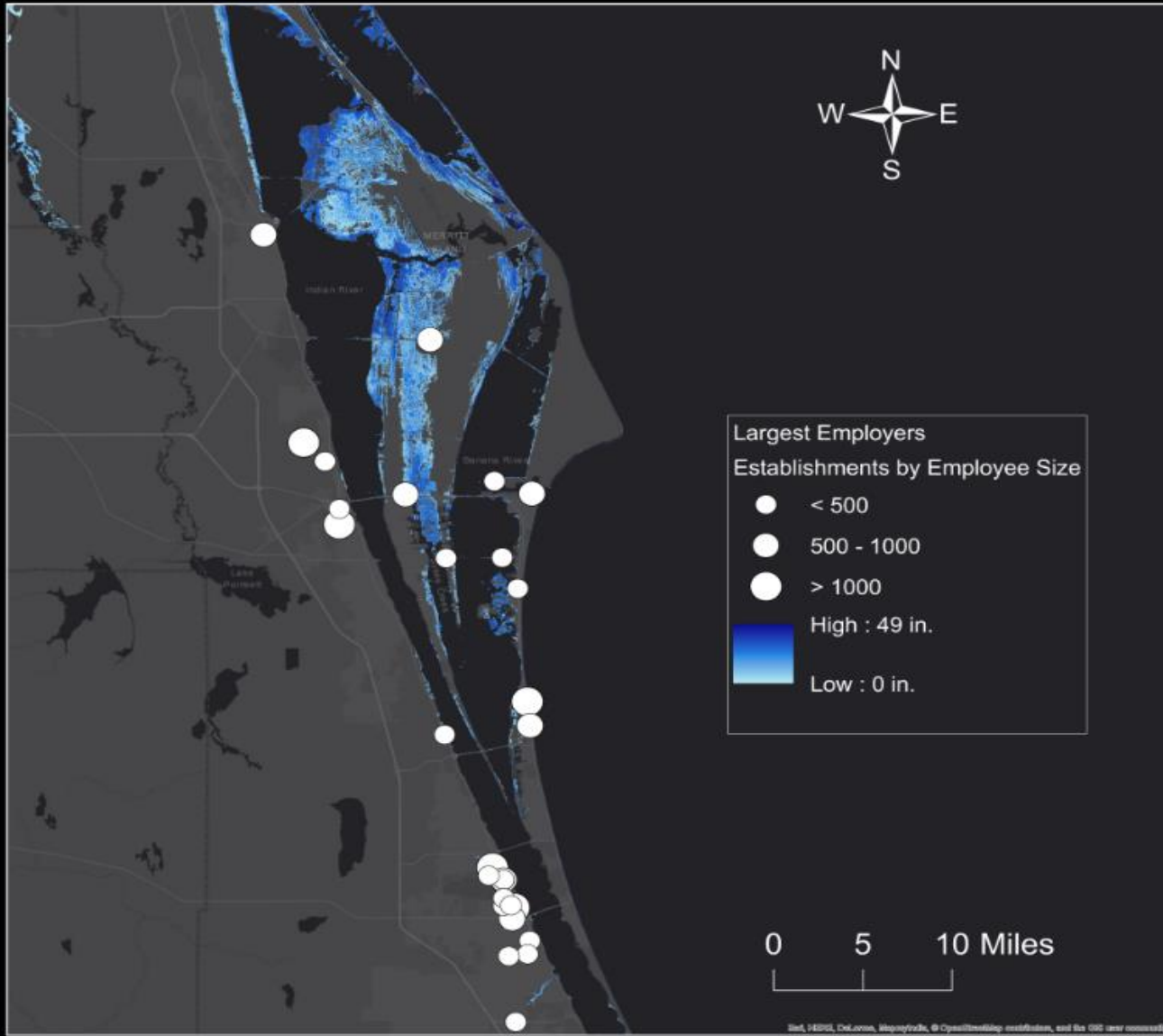
Six of these establishments employ roughly 1,000 individuals or more (Table 5). The City of Melbourne has the densest cluster of large employers with 14 out of the 32 largest vulnerable companies located in the city. These 14 companies have over 5,000 employees. By far, the largest employer in the study area is Patrick Air Force Base, located on Merritt Island with over 2,500 employees. The Holmes Regional Medical Center in Melbourne is the second largest employer with close to 2,000 employees. The hospital is managed by Health First which operates three not-for-profit hospitals in Cocoa Beach, Palm Bay, and Melbourne.

*Table 5: Largest Employers Located within Inundation Area - Brevard County*

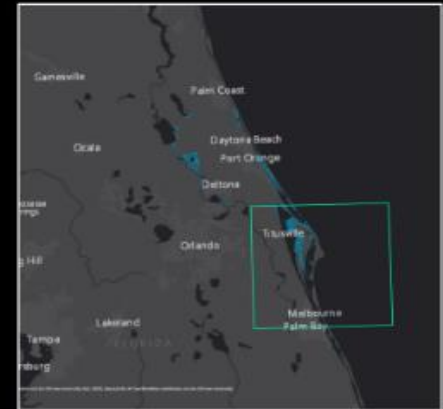
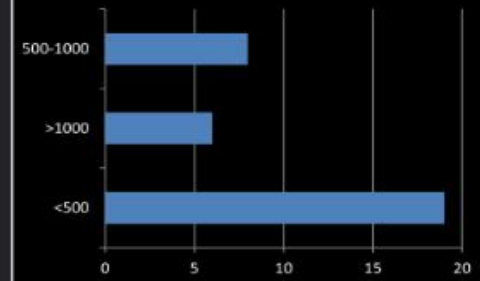
Largest Employers Located within Inundation Area		
Business	Description	Employees
Patrick Air Force Base	Air Force Base	2,508
Holmes Regional Medical Center	General Medical and Surgical Hospitals	1,946
Spectrum	Cable & Other Subscription Services	1,700
Eastern Florida State College	Colleges, Universities & Professional Schools	1,700
Brevard County Sheriffs Dept	Police Protection	1,200
DRS Advanced Industries	Industrial Process Variable Instruments	900

The map on the following page represents the areas anticipated to be impacted by 2.85 feet of sea level rise by 2070 (U.S. Army Corps of Engineers) and vulnerable employer establishments by number of employees. The table illustrates the top 32 largest vulnerable employers. The majority of the vulnerable employers have less than 500 employees.

# Brevard County 2070 Inundation



## Largest Employers by Size



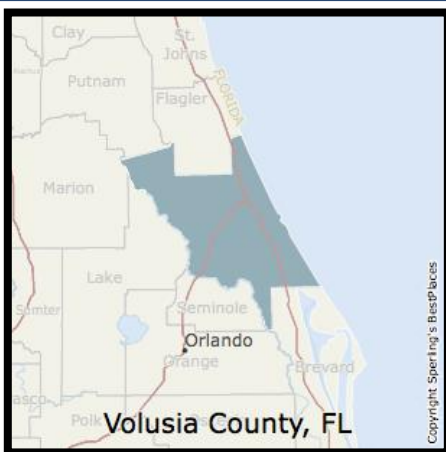
Sources: InfoGroup, University of Florida GeoPlan Center, ECFRPC

All provided GIS data is to be considered a generalized spatial representation which is subject to revision. The data is provided as is with no implied warranty of liability. The data used for this application were downloaded from various sources and scales. The map information is not a survey. ECFRPC makes no warranties, explicit or implied, regarding the accuracy or use of this information. Use at your own risk. The features here represented are not to be used to establish legal boundaries or measurements. For specific information, contact the appropriate department or agency. This information is provided as a visual representation only and is not intended to be used as a legal or official representation of legal boundaries or establishments. The user assumes all responsibility for determining whether this file is appropriate for a particular purpose. These environmental data and related items of information have not been formally disseminated by NOAA and do not represent and should not be construed to represent any agency endorsement, view or policy.



## Socio-Economic Demographics-Volusia County

Volusia County is located along the Atlantic coast in Central FL. As a coastal community, the population is subject to environmental vulnerabilities. The *East Central Florida Regional Resiliency Action Plan* developed by ECFRPC and stakeholders across the state provides a framework for the counties of Brevard and Volusia to mitigate the effects of climate change and sea level rise in the areas of business/economic development, emergency response and transportation planning, growth management, health and natural resources.



[https://img.bestplaces.net/images/county/FL\\_Volusia%20county.png](https://img.bestplaces.net/images/county/FL_Volusia%20county.png)

*Table 6: General Demographics - Volusia County*

<b>Total Population:</b>	<b>510,806</b>
Change in Population (Census 2000–2010)	+ 51,250
Expected Population (BEBR 2045)	642,400
<sup>7</sup> Median Home Value (ACS 2012–2016)	\$141,627.68
Median Household Income (ACS 2014)	\$44,037.12
Number of Jurisdictions	16

*Table 7: Potential Vulnerable Populations - Volusia County*

<b>Total Population:</b>	<b>510,806</b>
Families Below Poverty Level (ACS 2012–2016)	13,872
People Below Poverty Level (ACS 2012–2016)	83,166 (16.3%)
Population Age 65 and Over (ACS 2012–2016)	118,514 (23.2%)
<sup>8</sup> Individuals who speak English less than Very Well (ACS)	20,372 (3.99%)
<sup>9</sup> Total Persons Unemployed (ACS 2012–2016)	17,261
Unemployment Rate (ACS 2012–2016)	5.23
Occupied Household with No Vehicle (ACS 2012–2016)	13,012

<sup>7</sup> The Census Bureau defines value as the "estimate of how much the property (house and lot, mobile home and lot, or condominium unit) would sell for if it were for sale. For vacant units, value was the price asked for the property"

<sup>8</sup> Individuals age 5 and older who speak a language other than English at home and who speak English less than very well.

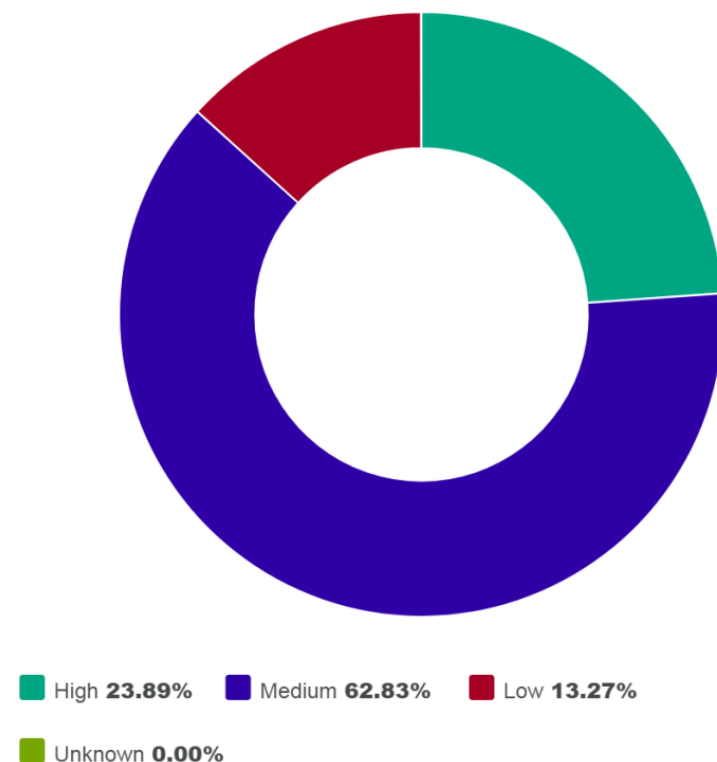
<sup>9</sup> The Census Bureau defines the civilian unemployed population as "civilians 16 years old and over are classified as unemployed if they (1) were neither "at work" nor "with a job but not at work" during the reference week, and (2) were actively looking for work during the last 4 weeks, and (3) were available to accept a job.

Table 8: Environmental Parameters- Volusia County

Average Annual Volusia County Losses to Natural Hazards (Volusia County 2018)	\$30.9 Million
<sup>10</sup> Air Quality- Respiratory Hazard Index	*1.48
Potential Number of Businesses Affected by Hurricane Irma (Dun and Bradstreet)	50,720
<sup>11</sup> Repetitive Loss Areas (VCEM 2018)	59

**Social Vulnerability to Environmental Hazards (by count of Census Tracts)**

ZIP Codes Visible Within Volusia County, FL<sup>12</sup>



mySidewalk.com · HVRI USC

<sup>10</sup> \*Respiratory Hazard Index of 1 or above means further monitoring is needed to determine if the pollutant levels will cause non-cancer adverse health effects.

<sup>11</sup> A repetitive loss area is a portion (or portions) of a community that includes buildings on FEMA's list of repetitive losses and also any nearby properties that are subject to the same or similar flooding conditions.

<sup>12</sup> This social vulnerability index measures the social vulnerability to environmental hazards in coastal states. SoVI numerical score is calculated by adding together social and demographic data components at the census tract level. The SoVI scores were then apportioned to other geographies using weighted block apportionment. High SoVI scores are areas with high social vulnerability to environmental hazards while low SoVI scores are areas with low social vulnerability to environmental hazards.

Business and economic vulnerabilities and resilience is essential for a community to understand the full picture of how to take steps to create a resilient community. The economic profile of Volusia County that follows details the most vulnerable industries to sea level rise by 2070 using the USACE High projection rate curve, an intermediate planning horizon. Businesses within the vulnerability buffer were located and categorized using the North American Industry Classification System (NAICS).

The ECFRPC developed an economic profile that details the most affected industries; Businesses within the buffer were located and categorized using the North American Industry Classification System (NAICS). The majority of the affected establishments belong to three economic subsectors (Table 9): Ambulatory Health Care Services, Professional, Scientific, and Technical Services, and Real Estate. *Ambulatory Health Care Services* provide services such as consultation, intervention, and rehabilitation; *Professional, Scientific, and Technical Services* are establishments engaged in processes where human capital is the major input and have production processes that are almost wholly dependent on worker skills. *Real Estate firms* are primarily engaged in renting or leasing real estate to others; managing real estate for others; selling, buying, or renting real estate for others; and providing other real estate related services, such as appraisal services.

*Table 9: Most Vulnerable Economic Subsectors by Number of Establishments- Volusia County*

Most Vulnerable Economic Subsectors by Number of Establishments	
Industry Description	Total # of Businesses
Ambulatory Health Care Services	761
Professional, Scientific, and Technical Services	749
Real Estate	641
All Other 3 Digit NAICS	5,226

*Source: referenceusagov.com*

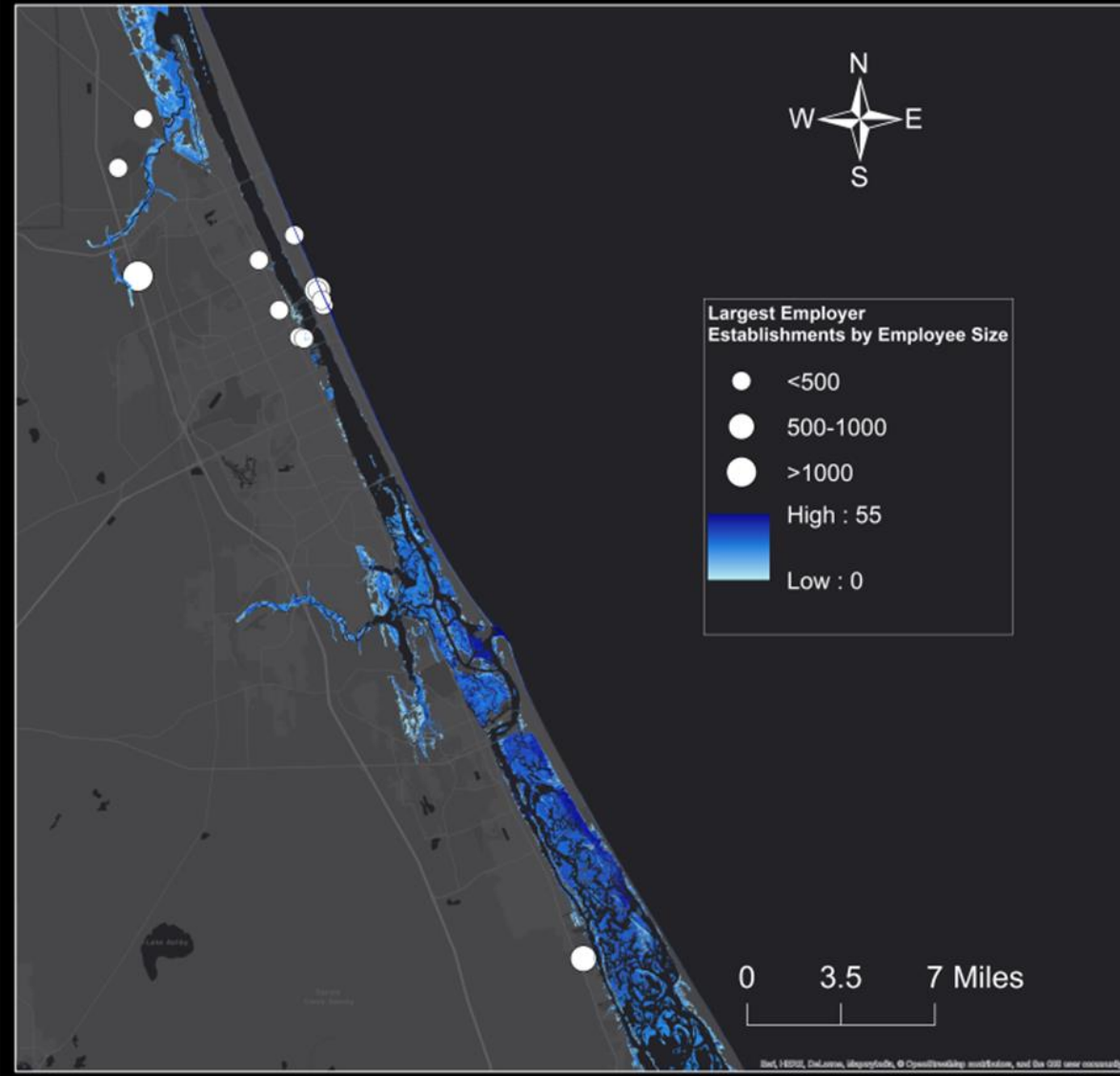
According to InfoGroup's industry analysis, 7,000 businesses were found within the search-boundary. Six employers in the search-boundary have over 400 employees (Table 10). Two of the area's largest employers are medical facilities. The Florida Hospital Memorial Medical Center is the largest employer with nearly 1,800 individuals (Table 10).

*Table 10: Largest Employers Located within Inundation Area - Volusia County*

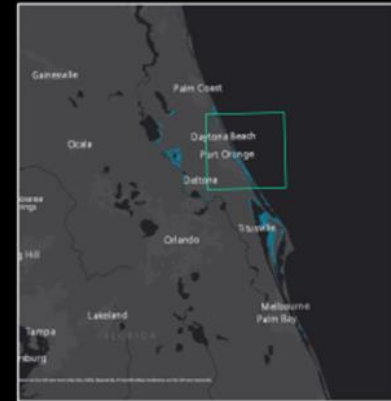
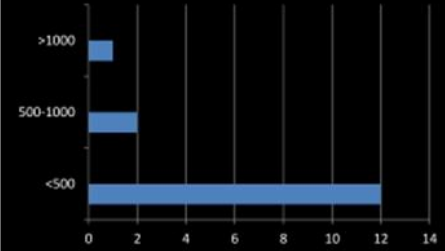
Largest Employers Located within Inundation Area		
Name	Description	Estimated Employees
Florida Memorial Hospital	General Medical and Surgical Hospitals	1,755
Florida Hospital New Smyrna	General Medical and Surgical Hospitals	700
Boston Whaler	Boat Manufacturer	500
Oceans Water Spa	Beauty Salon	500
Department of Child and Families	Public Administration	430
Florida Health Care Plans	Office Physicians	400

The map on the following page represents the areas anticipated to be impacted by 2.85 feet of sea level rise by 2070 (U.S. Army Corps of Engineers) and vulnerable employer establishments by number of employees. The table illustrates the top 15 largest vulnerable employers. The majority of the vulnerable employers have less than 500 employees.

# Volusia County 2070 Inundation



## Largest Employers by Size



Sources: InfoGroup, University of Florida GeoPlan Center, ECFRPC

All provided GIS data is to be considered a general informational representation which is subject to change. The data is provided as is with no implied warranty for usability. The data used for this application was developed from various sources and scales. The map information is not a survey. ECFRPC makes no warranty, explicit or implied, regarding the accuracy or use of this information. Use at your own risk. The features here represented are not to be used to establish legal boundaries or easements. For specific information, contact the appropriate department or agency. This information is provided as a visual representation only and is not intended to be used as a legal or official representation of local boundaries or easements. The user assumes all responsibility for determining whether this file is appropriate for a particular purpose. These environmental data and related forms of information have not been formally disseminated by NOAA and do not represent and should not be construed to represent any agency determination, view or policy.

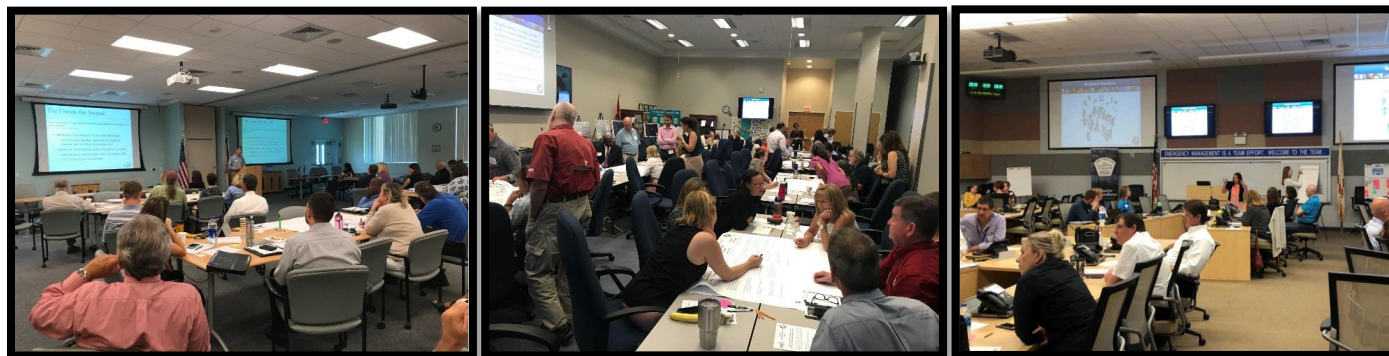


# Stakeholder Engagement Findings

The East Central Florida Regional Planning Council with direction and oversight from the East Central Regional Resiliency Action Plan Steering Committee and Stakeholder Engagement Sub-Committee conducted a policy integration survey and hosted six stakeholder engagement workshops between May and August of 2018.

A “Plan and Policy Resiliency Integration” survey was conducted to provide insight into the progress of integrating resiliency into various local and regional plans and policies. The survey results facilitated the identification of gaps, needs and actionable items aimed at supporting resilient and sustainable coastal communities in the region. One of the principle conclusions of the survey was a lack of resources in order to conduct the analysis, planning and implementation of resilience strategies and policies across jurisdictions and agencies. The full “Plan and Policy Resiliency Integration” survey report can be found in Appendix B.

The six workshops resulted in a total of 200 stakeholders participating in the workshops. The workshops not only focused on educating attendees about the overall project, laws pertaining to resilience, case studies of adaptation measures, and legal cases associated with resilience, but were designed to solicit input from the stakeholders to increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines. The results of the six workshops helped to create the objectives and action items in the East Central Florida Regional Resiliency Action Plan – Brevard and Volusia Counties. A full detailed report highlighting the findings associated with the workshops can be found in the Appendix B.



# Regional Planning for Sea-Level Rise Recommendation

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A regional, coordinated approach to planning for sea level rise is important as agencies and communities identify potential risks to infrastructure, plan for future land uses, and determine appropriate mitigation and adaptation measures to minimize the risks of future flooding and inundation. One way that local governments can collaborate is to create sea level rise projections that are jointly developed and utilized across a defined area. Two examples of successful Florida regional coordinated sea level rise adaptation workgroups that have undertaken such efforts include:

- The *Southeast Florida Regional Climate Change Compact* which was established in 2010 by Broward, Miami-Dade, Monroe, and Palm Beach Counties as a mechanism for coordinating climate change mitigation, adaptation, and associate policy development across the four counties. The Compact's Technical Ad Hoc Working group comprised of experts from local universities, scientists from NOAA and the U.S. Geological Survey, and civil engineers in public service, worked together with the USACE to create 2011, and later, the [2015 Unified Sea Level Rise Projection](#) which establishes a single baseline for regional adaptation planning and provided the foundation for the [Southeast Florida Regional Climate Change Action Plan 2.0](#).
- The Tampa Bay Climate Science Advisory Panel, an ad hoc network of scientists and resource managers in the Tampa Bay region (Pinellas, Hillsborough, Manatee, and Pasco counties) formed in 2014, with the goal of developing recommendations for local governments and regional agencies addressing climate change mitigation strategies associated with sea level rise in the Tampa Bay Region. The [Recommended Projection of Sea Level Rise in the Tampa Bay Region](#) was developed by the Panel in 2015. The projection model is used as guidance for the Tampa Bay Regional Planning Council One Bay Resilient Communities workgroup and provided foundation for [The Cost of Doing Nothing Report](#) in 2017.

It is important to note that the unified sea level rise projections reached by both groups are regionally specific and rely on tidal gauge data sourced from within each region.

Based upon the latest updates to the NOAA projection rate curves, the 2017 FEMA Community Rating System (CRS) Manual update, and the past sea level rise vulnerability assessments, as well as the findings from [NOAA Technical Report NOS CO-OPS 083](#) concerning the current and future occurrence of nuisance flooding, the ECF RRAP sub-

committee developed an approach to integrating these projections into planning processes and plans. The formal recommendation of the sub-committee is described below. The full Regional Planning for Sea Level Rise report is located in the Appendix C.

### **Formal Recommendation**

The East Central Florida Regional Resiliency Action Plan's sea level rise projection sub-committee provides the following recommendation for the east central Florida region for planning for sea level rise:

*No one projection rate curve should be used for planning purposes across all projects and programs. Instead, a range of rise should be considered based upon the vulnerability, allowable risk, and project service life and the forecast project "in-service" date of a facility or development. The range should include a minimum rise of 5.15 feet by 2100 (2013 USACE High) with an upper range of 8.48 feet by 2100 (2017 NOAA High). Short-term planning should consider impacts out to 2040 (20-year planning horizon), medium-term planning should consider impacts out to 2070 (50-year planning horizon), and long-term planning should extend out to 2100 (80-year planning horizon). Adaptation plans of the community should also be taken into consideration when planning, engineering and constructing infrastructure relative to sea level rise and flooding to ensure consistency with community development plans.*

#### Upper Bound Description

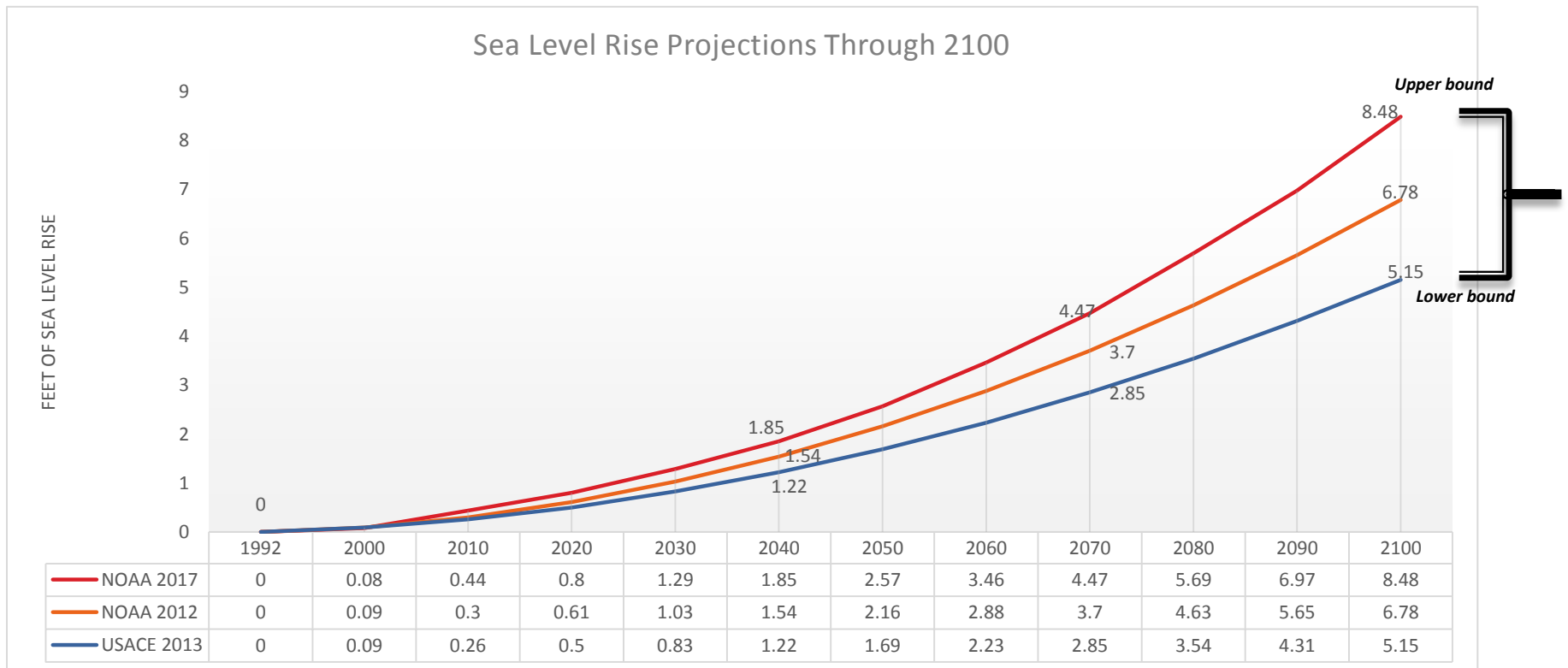
The sea level rise estimates associated with the NOAA 2017 high rate curve are recommended as the upper bound of the planning scenario. These data are recommended for assessment and adaptation, mitigation and minimization planning of those facilities that have little risk tolerance and long functional life span, as well as new/proposed (re)development or significant intensification on previously minimally developed land that may be on future fringes of vulnerable areas. The upper bound of sea level rise planning should consider the local estimate for the forecasted year of facility life expectancy based on in-service date. USACE guidance requires a 100-year potential service life of large infrastructure projects. These projects along with new community development projects should include an approved adaptation strategy prior to construction consistent with the community's adaptation plan. It is recommended that facilities necessitating an upper bound of sea level rise planning are recommended to plan for a minimum rise in sea level of 1.85 feet by 2040, 4.47 feet by 2070 and 8.48 feet by 2100.

Lower Bound Description

The recommended minimal or lower bound of planning level for consideration is the USACE 2013 High Rate Curve or a minimum planning of 5.15 feet of rise by 2100 (1.22 ft. by 2040 and 2.85 ft. by 2070). This minimal planning level would be recommended for facilities that are less vulnerable, have a greater risk tolerance to flooding, are of little impact in terms of the health, safety and welfare of the community, facilities with a short time-frame of functionality or facilities that are easily relocated or planned for relocation. Using the USACE 2013 High Rate Curve as a minimum ensures that CRS activities applying even this lower bound are eligible for CRS credits under the 2017 CRS manual.

*The following figure illustrates the recommended range for sea level rise planning and includes the projected rise in sea level by decade. The 2012 NOAA High projection is included for reference to illustrate the change in projection for this rate curve since the initial 2012 assessment.*

Figure 2: ECF Regional Resiliency Action Plan Recommended Bounds for Planning for Sea Level Rise



# Action Plan Matrix

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The Framework for the ECF RRAP was based on the 100 Resilient Cities program of the Rockefeller Foundation which works with cities around the world to help them “become more resilient to the physical, social and economic challenges that are a growing part of the 21<sup>st</sup> Century”. The action plan, which focuses on a five-year planning horizon, is based around the four main focus of the 100 Resilient Cities program: Leadership and Strategy, Economic and Society, Infrastructure and Environment, and Health and Wellbeing. It is important to note that this action plan encompasses a variety of resiliency aspects and aims to incorporate discussion on infrastructure (water, energy, waste, etc.), health, planning, emergency preparedness, economics and leadership as they revolve around a more environmental “shock and stressor” approach. However, this framework allows for the replicability and refinement of the plan on a local or agency level to incorporate additional actions to address resilience to additional localized shocks and stressors. The Action Plan not only provides a matrix of actions for various levels of government from local to federal, but also includes actions for partnerships across agencies, not-for-profits, the business sector and other stakeholders.

The following pages include the ECF RRAP Matrix which is broken into the four main focus areas and the subsequent objectives associated with each area. Action items to address the objectives have been arranged based upon the suggested year (1-5) of implementation or “on-going” for tasks that should be conducted every year or continuously. Each action item has been “assigned” an agency or jurisdictional department where appropriate to complete or lead the task. Where applicable, an existing or future plan has been identified that may be impacted or developed as a result of the action item. It is important to note that, as this is a regional plan, the department nomenclature may not be applicable to all jurisdictions and it is recommended to identify those items that would fit appropriately within various jurisdictional departments. It should be also noted that while all jurisdictions (or agencies) have required plans such as the comprehensive plan, other plans or documents may be considered a best practice of another community or agency. Finally, this action plan provides opportunity replicability and refinement of the plan on a local or agency level to incorporate additional actions to address local resilience to more shocks and stressors and assign tasks more specifically unique to that particular community. The electronic version of this action plan (excel) can be found here: <https://www.perilofflood.net/ecfresiliency>

**Goal 1: Leadership & Strategy** - *Promote leadership, education and empowerment both in government, and public and private sectors to foster the implementation of resiliency strategies across disciplines and communities.*

- LS1: Incorporate resiliency into local and regional plans, policies and objectives.
- LS2: Plan fiscally to implement resilient and sustainable solutions to long-term impacts.
- LS3: Implement strategies to promote adaptive measures that keep people and property safe from natural hazards.
- LS4: Engage and educate private sector stakeholders, elected officials and other members of the community about strategies to increase resilience in the built, natural, and social environment

**Goal 2: Economic & Society** - *Provide opportunities and strategies to foster economic prosperity and improve social equity and justice in preparation for and recovery from stressors and shocks.*

- ES1: Protect high-value assets from natural hazards.
- ES2: Educate business about access to funding and financing services related to resiliency and sustainability.
- ES3: Facilitate and support the efficient recovery of business operations after an event.
- ES4: Increase skilled labor force.
- ES5: Improve social equity and justice in decision making process.

**Goal 3: Infrastructure & Environment** - *Encourage development of cross-disciplinary plans, policies and strategies to protect the health, safety and economic welfare of residents, businesses and visitors through recognition that natural disasters, changes to climate, and human manipulation require careful consideration of when and how to develop infrastructure, natural resources and a built environment that can withstand and adapt to these changes.*

- IE1: Prioritize the use of Green Infrastructure as a first line of defense.
- IE2: Promote interconnectivity of natural lands for habitat migration.
- IE3: Enhance stormwater systems to be more resilient.
- IE4: Improve water quality in surface water bodies.
- IE5: Incorporate resiliency into local and regional plan, policies and objectives.
- IE6: Preserve and adapt the built environment to keep people safe from and mitigate current and future natural hazards.
- IE7: Improve community mobility while improving vulnerable transportation infrastructure.

**Goal 4: Health & Well Being** - *Create resilient communities by facilitating programs, opportunities, and community-wide education pertaining to local sustainability, disaster response, and climate change mitigation strategies.*

- HW1: Improve capacity of jurisdictions to better respond to hazard events.
- HW2: Improve capacity of medical facility operations to prepare for and recover from natural disasters and future conditions.
- HW3: Promote sustainable practices in government owned facilities.
- HW4: Engage residents and business owners with locally relevant information about expected future changes in natural hazards and sustainable practices.
- HW5: Improve access to resources for the homeless, special needs, elderly, low income, and English-limited residents.

Goal	Objective	Action	Agency or Department	Task	Year	Related Plans
Leadership & Strategy	LS1: Incorporate resiliency into local and regional plans, policies and objectives.	LS1.1	ECFRPC All Jurisdictions	Work with experts, agencies, public, stakeholders and elected officials across the region to develop the framework of a regional collaborative to focus on resilience.	1	
		LS1.2	ECFRPC	Evaluate existing programs as related to regional resilience action programs and plans.	1	
		LS1.3	Planning Department Sustainability Board Brevard County Sustainability Working Group	Create a jurisdiction-wide Sustainability/Resiliency Plan through the recommendations of the Sustainability Board, if applicable.	2	Sustainability Plan
		LS1.4	ECFRPC All Jurisdictions	Formalize the framework of the regional resilience collaborative through resolution.	2	
		LS1.5	All Jurisdictions	Secure a Chief Resiliency and/or Sustainability Officer to coordinate with private and public sectors.	2	
		LS1.6	All Jurisdictions All Agencies	Prioritize the review of all plans, policies and procedures to assess inclusion of resilience strategies or impediments, if not already completed.	3	
		LS1.7	All Jurisdictions All Agencies	Participate in a county-wide workshop to share best practices, needs and progress of local planning in regards to implementing the action plan and other resilience strategies (local level).	4	
		LS1.8	ECFRPC All Jurisdictions	Reassess existing framework and goals of the regional resilience collaborative.	5	
		LS1.9	All Jurisdictions	Reassess indicators established in the local Sustainability/Resiliency Plan.	5	

*Leadership & Strategy: Incorporate resiliency into local and regional plans, policies and objectives.*



Goal	Objective	Action	Agency or Department	Task	Year	Related Plans
Leadership & Strategy	LS2: Plan fiscally to implement resilient and sustainable solutions to long-term impacts.	LS2.1	All Local Government Commission All Jurisdictional Departments Public	Assess CIP to ensure inclusion of sustainable and resilient projects.	1	Capital Improvement Plan/Element
		LS2.2	Public Works Department All Local Government Commission	Procure funding and staff/contractor to update all stormwater system facilities in a master GIS database.	1	
		LS2.3	Local Government Commission Jurisdictional Departments Public Natural Resources Department Watershed Management Program	Conduct budgeting workshops and surveys to determine appropriate ways to build reserves and adjust budgets to include specific line items to be proactive in creating and maintaining sustainable and resilient communities.	2	
		LS2.4	All Local Government Commission All Jurisdictional Departments Public	Conduct survey of stakeholders to assess priority and funding of conservation lands and green infrastructure.	3	
		LS2.5	All Local Government Commission	Investigate and develop innovative long-term funding and revenue generators.	4	
		LS2.6	All Local Government Commission	Implement reserve building strategies incrementally to be proactive in creating sustainable and resilient communities.	4	
		LS2.7	All Local Government Commission All Jurisdictional Departments	Reassess budgeting and CIP involving resilient and sustainable projects to ensure continuing inclusion.	5	Capital Improvement Plan/Element
		LS2.8	SJRWMD Natural Lands Programs Natural Resource Department FDEP 1000 Friends of Florida NGOs	Evaluate strategies and alternative analysis for longer term funding for acquisition / management program.	5	

*Leadership & Strategy Plan fiscally to implement resilient and sustainable solutions to long-term impacts.*

Goal	Objective	Action	Agency or Department	Task	Year	Related Plans
Leadership & Strategy	LS3: Implement strategies to promote adaptive measures that keep people and property safe from natural hazards.	LS3.1	Natural Resources Department Planning Department SJRWMD UF IFAS Extension Natural Resources Conservation Service (USDA)	Assess and update LDC as necessary to allow private land owners to implement native vegetation programs, or other efforts that allow water to be treated on site.	1	
		LS3.2	Planning Department	Research appropriate parking standards for the community, and identify parking lots that can potentially be downsized to include green infrastructure and permeable surfaces as well as strategies to mitigate the heat island effect.	1	
		LS3.3	Natural Resources Department Planning Department	Streamline the permit process in order to allow private land owners to implement native vegetation programs, or other efforts that allow water to be treated on site.	2	Department Permitting Handbook
		LS3.4	Sustainability Boards All Jurisdictions ECFRPC	Ensure passing of information and infographic templates to and from agencies and jurisdictions through websites to better relay information.	2	
		LS3.5	Planning Department	Update parking standards within Land Development Regulations to allow for additional space to include green infrastructure, permeable surfaces and other strategies that mitigate the heat island effect.	2	Land Development Regulations
		LS3.6	Planning Department Public Works Department	Prioritize public and private parking lots that can be retrofitted to include more permeable surface to reduce stormwater loads and treat water on-site.	3	
		LS3.7	Utilities Department Emergency Management Public Works Department	Add stormwater mitigation efforts in parking lots to the stormwater management plan, LDRs, CIE where necessary and find best areas for retrofitting opportunities.	4	Stormwater Management Plan Comprehensive Plan Land Development Regulations
		LS3.8	Utilities Department Public Works Department	Reassess improvements to stormwater run-off and quality in areas of new projects.	5	

*Leadership & Strategy: Implement strategies to promote adaptive measures that keep people and property safe from natural hazards.*

Goal	Objective	Action	Agency or Department	Task	Year	Related Plans
Leadership & Strategy	LS4: Engage and educate private sector stakeholders, elected officials and other members of the community about strategies to increase resilience in the built, natural, and social environment.	LS4.1	ECFRPC All Jurisdictions	Find champions and strong advocates both elected and non-elected to participate in the regional resilience collaborative and locally.	Ongoing	
		LS4.2	All Local Government Commission All Jurisdictional Departments ECFRPC Florida Sea Grant	Conduct new leadership orientation.	Ongoing	
		LS4.3	ECFRPC	Create a regional education plan/tool box for use across the region for all levels and sectors both private and public as well as citizens.	1	
		LS4.4	Sustainability Board Planning Department Economic Development Commission UF IFAS Extension	Hold workshops or one-on-one meetings with private sector stakeholders to educate and train them on sustainable practices.	1	
		LS4.5	All Local Government Commission	Assess applicability of a Sustainability Board and develop goals for the board with a diverse group of stakeholders.	1	
		LS4.6	Sustainability Board	Create a social media account for the Sustainability Board.	1	
		LS4.7	Sustainability Board Planning Department UF IFAS Extension	Develop sustainability trainings for elected officials, boards, and staff that includes information on hazard mitigation and sustainability principles.	1	Sustainability Plan

*Leadership & Strategy: Engage and educate private sector stakeholders, elected officials and other members of the community about strategies to increase resilience in the built, natural, and social environment.*

Goal	Objective	Action	Agency or Department	Task	Year	Related Plans
		LS4.8	Sustainability Board Planning Department Economic Development Commission UF IFAS Extension	Hold workshops or one-on-one meetings with elected officials to inform them on sustainable practices.	1	
		LS4.9	Natural Resource Department UF IFAS Extension	Create workshops and info graphics to educate the public and elected officials about economic and mitigation benefits of ecosystem services.	2	
		LS4.10	RAPP Steering Committee ECFRPC	Host a Regional Climate Summit.	2	
		LS4.11	Sustainability Board Planning Department Economic Dev't Commission Natural Resource Department UF IFAS Extension	Develop an educational outreach plan with all appropriate departments to ensure stakeholders and elected officials are continuously engaged and educated about resilience at important junctures.	3/ on- goi ng	
		LS4.12	Natural Resource Departments Sustainability Boards UF IFAS Extension	Conduct the series of natural resource workshops for the public and elected officials to educate them about economic and mitigation benefits of conservation lands etc.	3	
		LS4.13	Planning Department Sustainability Board RRAP Steering Committee ECFRPC UF IFAS Extension Regional Stakeholders	Provide outreach and educational opportunities to residents to learn about the importance of developing away from the natural hazard zones.	3	
		LS4.14	Sustainability Board Planning Department UF IFAS Extension	Develop volunteer initiatives based off of the educational opportunities in order to continue learning through hands-on activity.	4	

*Leadership & Strategy: Engage and educate private sector stakeholders, elected officials and other members of the community about strategies to increase resilience in the built, natural, and social environment.*

Goal	Objective	Action	Agency or Department	Task	Year	Related Plans
		LS4.15	Sustainability Board Planning Department Economic Dev't Commission Natural Resource Department UF IFAS Extension	Re-evaluate workshops and educational materials to determine gaps and lessons learned.	4	
		LS4.16	Sustainability Board Planning Department Economic Development Commission UF IFAS Extension Natural Resource Department	Using findings from LS4.15, update educational outreach plan, programs and materials.	5	
		LS4.17	Sustainability Board UF IFAS Extension Planning Department	Reassess engagement techniques and areas that would benefit from more participation/education of the community.	5	

*Leadership & Strategy: Engage and educate private sector stakeholders, elected officials and other members of the community about strategies to increase resilience in the built, natural, and social environment.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Health & Well Being	HW1: Improve capacity of jurisdictions to better respond to hazard events.	HW1.1	Emergency Management Votran SCAT	Update evacuation plans to represent newest data of areas that are transportation dependent that will need assistance in evacuation and re-entry.	on-going	Evacuation Plans Special Needs Registry
		HW1.2	Emergency Management Votran SCAT	Identify/update, within the countywide COOP and transit plans, a listing of priority transit routes for operation after a natural hazard event - as needed.	on-going	County Post-Disaster Recovery Plans CEMP Annex
		HW1.3	Emergency Management	Identify staging areas for fueling trucks pre and post disaster for efficient evacuation and re-entry.	on-going	County COOP Plans
		HW1.4	Public Works Department Emergency Management Planning Department	Assess potable water supplies and infrastructure from natural disaster impacts such as sewage infiltration.	on-going	
		HW1.5	Emergency Management All Jurisdictional Departments	Update plans to include information gathered from Hurricane Irma After Action Reports.	1	
		HW1.6	Emergency Management	Identify and prioritize critical facilities, including storm/wastewater, waste management, transportation, etc. with generator needs and add to the appropriate funding list (i.e. LMS, CIP, etc.).	1	LMS CEMP COOP
		HW1.7	Public Works Department Emergency Management CERT	Investigate the feasibility of and needs associated with alternative energy fleet vehicles for emergency response use.	2	County COOP Plans Capital Improvement Plan/Element

*Health & Wellbeing: Improve capacity of jurisdictions to better respond to hazard events.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		HW1.8	Emergency Management USDA Florida Department of Agriculture	Work with ranchers and farmers to determine gaps and needs associated with livestock and farming preparedness and recovery, especially, excessive long-term flooding.	2	
		HW1.9	ECFRPC Economic Development Commission Chambers of Commerce	Assess economic development plans, CRA plans, etc. for diversification and identify adaptive measures to economic vulnerabilities. (CDBG)	3	
		HW1.10	Emergency Management Department of Health United Way IFAS DACS Food Pantries Faith Based Organizations	Assess food insecurity in vulnerable populations to prepare for hazard events.	3	
		HW1.11	Emergency Management ECFRPC	Develop/Re-convene long-term care working group with the goal to create a county-wide model for preparedness and recovery and coordinate and determine an agency responsible.	4	
		HW1.12	Emergency Management	Identify funding to secure generators for facilities identified in HW1.7.	4	LMS CEMP COOP

Health & Wellbeing: Improve capacity of jurisdictions to better respond to hazard events.



Goal	Objective	Action	Agency	Task	Year	Related Plans
		HW1.13	Emergency Management Department of Health United Way IFAS DACS Food Pantries Faith Based Organizations	Work with food pantries and other resources to close the gaps identified in analysis HW1.10.	4	
		HW1.14	Public Works Department Emergency Management Planning Department	Reassess gaps in response to hazard events and address those gaps in future plans.	5	

Goal	Objective	Action	Agency	Task	Year	Related Plans
Health & Well Being	HW2: Improve capacity of medical facility operations to prepare for and recover from natural disasters and future conditions.	HW2.1	Emergency Management Medical Facilities	Hold training workshops at medical facilities that test response and evacuations from a hazard event.	on-going	Facility COOP plans Facility Evacuation/Response Plans
		HW2.2	Emergency Management Planning Department Medical Facilities	Assess vulnerability to medical facilities (hospitals, hospices, dialysis centers, assisted living facilities, nursing homes, etc.), helicopter pads and access points from sea level rise, flooding and storm surge impacts.	1	TPO and Local Vulnerability Analyses
		HW2.3	Emergency Management Medical Facilities	Develop or update plans for natural disasters such as strong hurricanes and tornadoes.	2	Facility COOP plans Facility Evacuation/Response Plans
		HW2.4	Emergency Management Medical Facilities	Provide county and City emergency management with current response and evacuation plans (and as updated).	3	
		HW2.5	Planning Department Medical Facilities	Determine mitigation/adaptation strategies for identified vulnerabilities to medical facilities and develop implementation plan.	3	
		HW2.6	Planning Department Building/Zoning Department Sustainability Board	Assess and update future land use and zoning codes to limit or mitigate the placement of medical facilities in vulnerable areas.	4	
		HW2.7	Emergency Management Medical Facilities	Reassess/update COOP and other plans with findings from the workshop in Action HW2.1	5	Facility COOP plans Facility Evacuation/Response Plans

*Health & Wellbeing: Improve capacity of medical facility operations to prepare for and recover from natural disasters and future conditions.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Health & Well Being	HW3: Promote sustainable practices in government owned facilities.	HW3.1	Planning Department	Reassess budgets to determine for proactive resiliency and sustainability funding.	on-going	
		HW3.2	Planning Department	Assess feasibility of a sustainability program within the City and audit existing programs in other Cities as well as incentive programs such as Florida Green Building Coalition and the LEED program.	1	
		HW3.3	Planning Department	Develop priorities, actions and goals in a local government section of a Sustainability Plan to include a focus on government owned facilities. (where applicable)	2	
		HW3.4	Planning Department	Identify locations for electric charging stations, especially near/at publicly-owned properties and high employment areas.	2	
		HW3.5	Planning Department	Update local codes and policies to promote sustainable and Low Impact Development practices for government owned facilities.	3	Comprehensive Plans Land Development Codes
		HW3.6	Planning Department Building/Zoning Department Sustainability Board	Develop programs to install community gardens and green roofs on public buildings and on buildings within the community (where applicable).	3	Sustainability Plan
		HW3.7	GIS Department Sustainability Board	Conduct energy audit within jurisdiction and develop strategies to mitigate the effects.	3	Sustainability Plan
		HW3.8	School Board Planning Department	Work with the school board to maximize the use of green building techniques and sustainable practices to support the local government Sustainability Plan and to provide hazard mitigation opportunities.	3	Sustainability Plan

*Health & Wellbeing: Promote sustainable practices in government owned facilities.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		HW3.9	Planning Department Building/Zoning Department Sustainability Board	Assess and update future land use and zoning codes to limit or mitigate the placement of government buildings in vulnerable areas, including areas projected to be significant impacted by sea level rise by 2100.	4	
		HW3.10	Planning Department Building/Zoning Department Sustainability Board	Reassess sustainability plan and metrics associated with the implementation of sustainable building practices in government facilities.	5	

*Health & Wellbeing: Promote sustainable practices in government owned facilities.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Health and Wellbeing	HW4: Engage residents and business owners with locally relevant information about expected future changes in natural hazards and sustainable practices.	HW4.1	Emergency Management All Jurisdictions	Develop and implement campaign to include in hurricane preparedness season to communicate dangers of do-it-yourself tasks and home generators with residents.	on-going	CEMP
		HW4.2	Planning Department Building Department Sustainability Board	Evaluate existing programs in other jurisdictions and agencies aimed at educating residents and business owners about imminent natural hazards and sustainable practices, such as the City of Orlando Greenworks, FGBC, PACE.	on-going	Sustainability Plan
		HW4.3	Sustainability Boards IFAS Non-profits	Work with volunteers like religious institutions, clubs, schools etc. for beach clean-up, tree planting, bioswale creation, urban farming and other hands-on events.	ongoing	
		HW4.4	FEMA Sustainability Boards Emergency Management	Conduct in-depth community outreach events outside of the storm season to identify needs and barriers associated with resource accessibility and disaster response.	on-going	CEMP
		HW4.5	Planning Department Building Department Sustainability Programs Public Schools PIO's PIN Joint Info Center	Create a working group of staff and sustainability board to collaborate on the best approach for educating residents and business owners about imminent natural hazards, sustainable practices, and the heat island effect.	1	Sustainability Plan

*Health & Wellbeing: Engage residents and business owners with locally relevant information about expected future changes in natural hazards and sustainable practices.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		HW4.6	Planning Department Building Department Sustainability Board Chambers of Commerce	Develop a "Resilient Homes" program or encourage participation in an existing program based on findings from program evaluation in HW4.2.	2	Sustainability Plan
		HW4.7	Emergency Management	Education about early warning systems that inform residents via reverse-911 and social media outlets of high tide or coastal flooding events.	2	County COOP Plan
		HW4.8	Health Departments	Engage in public outreach related to the heat island effect and the risks associated with heat exhaustion and increased local temperatures.	2	
		HW4.9	Planning Department Building/Zoning Department Sustainability Board	Develop indicators and begin tracking data to develop a baseline for future assessments.	3	Sustainability Plan
		HW4.10	Planning Department Building Department Sustainability Board Chambers of Commerce	Develop or utilize existing incentives to increase the energy efficiency and resilience of homes and businesses.	3	Sustainability Plan

*Health & Wellbeing: Engage residents and business owners with locally relevant information about expected future changes in natural hazards and sustainable practices.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		HW4.11	Planning Departments Sustainability Board	Educate and engage community in improving tree canopy through plantings on residential properties as well as events (Florida Friendly Landscaping / Energy Efficiency).	4	Sustainability Plan
		HW4.12	Planning Department Building Department Sustainability Board	Develop "Return on Investment" Infographic on various resilient and sustainable strategies for homeowners and businesses.	4	Sustainability Plan
		HW4.13	Planning Department Building Department Sustainability Board	Distribute infographic via website, social, board/committees, etc.	4	Sustainability Plan
		HW4.14	Planning Department Building/Zoning Department Sustainability Board	Reassess sustainability plan and metrics associated with the implementation of sustainable and resilient programs and incentives in the community.	5	Sustainability Plan

*Health & Wellbeing: Engage residents and business owners with locally relevant information about expected future changes in natural hazards and sustainable practices.*



Goal	Objective	Action	Agency	Task	Year	Related Plans
Health & Well Being	HW5: Improve access to resources for the homeless, special needs, elderly, low income, and English-limited residents.	HW5.1	Emergency Management	Continue to provide preparedness and storm-related information/alerts for English-limited populations including spanish and creole in all formats (in compliance with Title VI and ADA guidelines).	on-going	CEMP
		HW5.2	Emergency Management PIN and JINC	Continue “primary” social media account relays all disaster-related information.	on-going	CEMP
		HW5.3	Emergency Management Faith based organizations Non-profits	Continue to utilize pre-registration to identify shelters for special needs and seniors within the community.	on-going	
		HW5.4	Emergency Management Faith based organizations Non-profits	Prioritize and utilize the Idignity Program to ensure residents have essential documents before disasters.	on-going	
		HW5.5	Emergency Management Faith based organizations	Conduct in-depth community outreach events outside of the storm season to identify needs and barriers associated with resource accessibility and disaster response.	on-going	
		HW5.6	Emergency Management	Reassess marketing and registration process for special needs registration and determine how to fill gaps and better reach the special needs community.	1	
		HW5.7	Transit Agencies	Reassess transit routes and stops based on new development, resources, jobs, and transit dependent communities.	2	

*Health & Wellbeing: Improve access to resources for the homeless, special needs, elderly, low income, and English-limited residents.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		HW5.8	Emergency Management	Implement improvements to the marketing and registration process for special needs registration as found in HW 5.6.	2	
		HW5.8	Planning Department Housing and Human Services Zoning Department	Identify areas outside vulnerabilities to encourage/incentivize the development of affordable housing.	2	Comprehensive Plan
		HW5.9	Planning Department Housing and Human Services	Assess plans and policies to encourage development of future affordable housing choices outside of vulnerable areas and with access to transit, jobs, and resources.	3	Comprehensive Plan
		HW5.10	All Jurisdictional Departments	Reassess plans and procedures to determine remaining gaps and success of implemented procedures.	5	

*Health & Wellbeing: Improve access to resources for the homeless, special needs, elderly, low income, and English-limited residents.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Economic & Society	ES1: Protect high-value assets from natural hazards.	ES1.1	NASA Port Canaveral Patrick Air Force Base All Jurisdictions FDOT	Conduct assessment of land use and facilities to determine vulnerabilities to sea level rise, storm surge, coastal erosion and flooding. Reassess existing assessments to new RRAP sea level rise recommendations if NOAA 2017 was not included.	1	
		ES1.2	Emergency Management Economic Dev't Commission Chambers of Commerce	Identify local businesses such as gas stations, food suppliers or others that provide specific services or resources vital for recovery, thus classify them as critical facilities.	1	Business Resiliency Action Plan County COOP Plan
		ES1.3	Port Canaveral	Assess vulnerabilities and capabilities of service and access points for critical post-storm services such as fuel tanker fill stations and discernment. Find highest risk/ short term vulnerabilities for 2040.	1	
		ES1.4	Port Canaveral	Model changes in future water main pressure from the potential impacts of sea level rise to ensure that fuel stations will function properly after storm events in the long term.	2	
		ES1.5	NASA Port Canaveral Patrick Air Force Base All Jurisdictions FDOT	Update plans, policies, and procedures to implement the RRAP sea level rise to be included in asset development and mitigation efforts to include timeframes relevant to long-lasting, critical infrastructure.	2	
		ES1.6	Economic Development Agencies	Using vulnerability analysis findings, identify vulnerable areas of economic significance.	2	
		ES1.7	Planning Department	Develop and adopt policy language that prohibits the development of high value assets in vulnerable areas or if necessary, are mitigated to the greatest extent possible.	2	
		ES1.8	NASA Port Canaveral Patrick Air Force Base Planning Department Emergency Management FDOT	identify strategies and policies related to resilient rebuilding in identified vulnerable areas such as how to build back better, risk informed construction standards, streamlined processes for post disaster reconstruction, debris removal / pre-identified debris management resources, and a guide regeneration.	3	

Goal	Objective	Action	Agency	Task	Year	Related Plans
		ES1.9	NASA Port Canaveral Patrick Air Force Base Planning Department FDOT	Conduct an assessment of policy language and find existing case studies that direct high value assets away from vulnerable areas and test feasibility of those policies locally.	3	
		ES1.10	NASA Port Canaveral Patrick Air Force Base All Jurisdictions FDOT	Develop possible mitigation strategies of at-risk public infrastructure identified as part of the natural hazard vulnerability assessment.	3	
		ES1.11	ECFRPC	Conduct a region wide workshop focused on the financial side of resilience.	3	
		ES1.12	Emergency Management Economic Development Agencies Chambers of Commerce	Work with business identified in ES1.2 to determine needs and continuity plans to aid in disaster recovery efforts.	3	Business Resiliency Action Plan County COOP Plan
		ES1.13	NASA Port Canaveral Patrick Air Force Base All Jurisdictions FDOT	Conduct a risk-based cost-benefit analysis for mitigation strategies of at-risk structures identified as part of the natural hazard vulnerability assessment. Identify the assets with the highest short-term risk for inundation. Develop a prioritization process to address mitigation/adaptation strategies for vulnerable assets.	4	
		ES1.14	Economic Development Agencies	Develop a long-term financial plan for loss of or restructure of tax base in highly vulnerable areas.	4	
		ES1.15	NASA Port Canaveral Patrick Air Force Base All Jurisdictions FDOT	Finalize action plan to implement adaptation/mitigation strategies of at-risk assets identified as part of the natural hazard vulnerability assessment.	5	

*Economic & Society: Protect high-value assets from natural hazards.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Economic & Society	ES2: Educate business about access to funding and financing services related to resiliency and sustainability.	ES2.1	Sustainability Board Chambers of Commerce	Research funding and financing services for pre/post disaster needs and sustainable practices. Determine role of jurisdiction in the implementation of financing mechanisms.	1	
		ES2.2	Sustainability Board Chambers of Commerce UF IFAS Extension Florida Sea Grant	Conduct a workshop with business owners to determine needs, wants and constraints as related to implementing resilient and sustainable practices.	1	
		ES2.3	Emergency Management Economic Dev't Commission Chambers of Commerce	Create/update disseminate an educational infographic for businesses with funding and financing services for pre/post-disaster needs and sustainable practices.	2	Business Resiliency Action Plan County COOP Plan
		ES2.4	Chambers of Commerce	Determine the feasibility and functionality of a program to help impacted businesses with rent deferment.	3	
		ES2.5	Sustainability Board Chambers of Commerce Brevard County Sustainability Working Group	Include in a sustainability plan actions to help community businesses implement sustainable practices.	3	
		ES2.6	Sustainability Board Chambers of Commerce	Reassess efforts and programs to fill identified gaps.	4	

*Economic & Society: Educate business about access to funding and financing services related to resiliency and sustainability.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Economic & Society	ES3: Facilitate and support the efficient recovery of business operations after an event.	ES3.1	Emergency Management Economic Development Commission Chambers of Commerce Port Canaveral	Develop a process for businesses to coordinate with the EOC for review and execution of Business Continuity Plans.	1	Business Resiliency Action Plan County COOP Plan
		ES3.2	Chambers of Commerce Workforce Agencies	Research available templates for business and employee preparedness plans and create outreach proposal for businesses to update these templates.	1	
		ES3.3	Economic Development Commission Tourism Development Council	Create a tourism marketing program to implement after a disaster event to bring tourists back by showcasing that the area is "Open for Business". Create PSA's and other materials.	1	
		ES3.4	Economic Development commission	Identify "point person" in local government to act as a liaison between the business community and the local government for resiliency.	1	
		ES3.5	Chambers of Commerce Emergency Management EOC	Develop a section on agency website focused on disaster preparedness and include links to business continuity plan and employee disaster plan templates.	2	
		ES3.6	Emergency Management Chambers of Commerce Workforce Agencies	Develop "one-pager" with best practices and links for responding to and preparing for hazard events. Create/update and disseminate an educational infographic for businesses with emergency information to access for post disaster needs.	2	
		ES3.7	Emergency Management Economic Development Commission Chambers of Commerce	Begin to work with businesses and partners to develop Business Continuity Plans and provide to the EOC for exercising review.	2	Business Resiliency Action Plan County COOP Plan

*Economic & Society: Facilitate and support the efficient recovery of business operations after an event.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		ES3.8	Emergency Management	Work with the identified local critical facility businesses to determine resources needed to aid in timely recovery efforts such as generators, mitigation projects, etc.	2	
		ES3.9	Florida Department of Children Services School Districts Childcare Centers	Hold a workshop with day cares and school districts to determine a feasible approach to share resources for care for children under the age of 12 after a disaster.	3	
		ES3.10	Incubator Facilities	Add "Business Continuity" to programs at incubator facilities.	3	
		ES3.11	Florida Department of Children Services School Districts Childcare Centers	If deemed feasible, develop a plan to provide child care services when schools are closed for longer than a week.	4	
		ES3.12	Chambers of Commerce	Reassess efforts and update plans and programs to fill identified gaps.	5	
		ES3.13	Chambers of Commerce	Consider implementing a long-term recovery plan for businesses to retain employees as soon as possible following a storm event.	5	

*Economic & Society: Facilitate and support the efficient recovery of business operations after an event.*



Goal	Objective	Action	Agency	Task	Year	Related Plans
Economic & Society	ES4: Increase skilled labor force.	ES4.1	Workforce Agencies Community Colleges School Districts Economic Development Commissions	Collaborate with workforce and educational stakeholders to create a working group to facilitate the sustainable training of high school and tech school students in skilled labor.	1	
		ES4.2	Workforce Agencies Community Colleges School Districts Economic Development Commissions	Implement/expand apprenticeship programs in high schools with partner businesses.	2	
		ES4.3	ECFRPC Economic Development Commission Chambers of Commerce	Assess economic development plans, CRA plans, etc. for diversification and identify adaptive measures to economic vulnerabilities.	2	
		ES4.4	ECFRPC Economic Development Commission Chambers of Commerce	Create/update and disseminate an educational infographic for businesses with emergency information to access for post disaster needs.	2	Business Continuity of Operations Plan County COOP Plan
		ES4.5	Workforce Agencies School Districts Higher Education/Tech Schools Community Colleges Economic Development Commissions	Work with local colleges and tech schools to create programs to cross train manufacturing and installation sectors to create streamlined, sustainable job sectors with new titles.	3	

*Economic & Society: Increase skilled labor force.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		ES4.6	Workforce Agencies School Districts Higher Education/Tech Schools Community Colleges Economic Development Commissions	Develop baseline data and benchmarks to assess success of approach and growth in skilled labor force.	3	
		ES4.7	Workforce Agencies School Districts Community Colleges Higher Education/Tech Schools Economic Development Commissions	Reassess efforts and update plans and programs to fill identified gaps.	4	
		ES4.8	Workforce Agencies School Districts community Colleges Higher Education/Tech Schools Economic Development Commissions	Implement/increase activities to fill gaps identified in task ES4.7.	5	
		ES4.9	Workforce Agencies School Districts Economic Development Commissions	Add "makerspace" facilities based on identified needs.	5	

*Economic & Society: Increase skilled labor force.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Economic & Society	ES5: Improve social equity and justice in decision making process.	ES5.1	All Jurisdictions	Host community meetings in underserved, low income communities to discuss projects within and just outside the community.	on-going	
		ES5.2	All Jurisdictions	Partner with local organizations and faith-based organizations to provide feedback concerning needs and opportunities specific to a project or program.	on-going	
		ES5.3	All Jurisdictions	Conduct health impact assessments when considering projects that may affect underserved, low income communities, and determine benchmark health outcomes.	on-going	
		ES5.4	Emergency Management All Jurisdictions	Host specific community meetings in underserved, low income communities to discuss resilience and disaster response.	1	
		ES5.5	Planning Departments UF IFAS Extension Communications Departments	Engage with communities to identify gaps and priorities in the decision making process to improve social equity and justice.	1	
		ES5.6	Economic Development Chambers of Commerce Small Businesses	Connect communities with non-profit and faith-based organizations to address post-disaster issues such as the ability to return to the workforce after hazard events.	2	
		ES5.7	Planning Departments Communications Departments UF IFAS Extension	Create an outreach plan to involve all communities in an engaging opportunity to be a part of local decisions. Utilize priorities and findings from ES5.5.	3	
		ES5.8	Economic Development Chambers of Commerce Small Businesses UF IFAS Extension	Work with employers and employees to implement findings, processes, etc. determined from ES5.5.	3	

*Economic & Society: Improve social equity and justice in decision making process.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		ES5.9	Planning Departments Communications Departments	Implement the outreach plan.	4	
		ES5.10	Communications Department	Reassess the gaps that remain in community involvement outcomes.	5	

*Economic & Society: Improve social equity and justice in decision making process.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Infrastructure & Environment	IE1: Prioritize the use of Green Infrastructure as a first line of defense.	IE1.1	Public Works Department Natural Resource Department Environmental Department SJRWMD FDEP	Conduct an audit of coastal areas to identify locations for living shorelines and prioritize areas for implementation. (Example: UCF Study in Brevard, Gulf of Mexico Alliance Living Shoreline Study for Tampa Bay Region)	1	
		IE1.2	Transportation Department Engineering Department Public Works Department TPO FDOT	Include narrative to include use of green infrastructure to create "green streets" to mitigate stormwater impacts where feasible in project prioritization and programming.	1	Long Range Transportation Plan TPO Priority Project Listing
		IE1.3	Public Works Department Natural Resource Department SJRWMD FDEP Florida Sea Grant	Create/implement/expand a program or partnership to educate property owners about the benefits of living shorelines and assist with installation.	2	
		IE1.4	Planning Department Sustainability Board	Conduct an audit to improve urban tree canopy cover in jurisdiction and develop an Urban Canopy Plan.	2	Sustainability Plan
		IE1.5	Planning Department Natural Resource Department Environmental Department	Assess comprehensive plan, LDRs and process applications for barriers to implementing green infrastructure and to prioritize natural solutions versus engineered engineering projects.	2	Comprehensive Plan Land Development Regulations
		IE1.6	FDEP SJRWMD Natural Resource Department Environmental Department NEE	Develop a Restoration Plan(s) to prioritize the restoration of tidal wetlands, dunes and salt marshes and create living shorelines to soften the impacts of wave-induced erosion in high risk areas. Include indicators to measure success and return on investment.	3	Restoration Paln

*Infrastructure & Environment: Prioritize the use of Green Infrastructure as a first line of defense.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE1.7	Planning Department Sustainability Board	Prioritize areas to improve urban tree canopy and develop action plan for implementation.	3	Sustainability Plan
		IE1.8	Planning Department Natural Resource Department Environmental Department	Update comprehensive plans, LDRs and process to address barriers to implementing green infrastructure and make it a priority to assess natural solutions as a first step prior to engineering solutions based on findings in IE1.5.	3	Comprehensive Plan Land Development Regulations
		IE1.9	Planning Department Natural Resource Department Environmental Department	Develop incentives for residents, businesses, and developers to use living shorelines and other green infrastructure techniques as a priority.	4	
		IE1.10	Natural Resource Department Environmental Department	Create partnerships with colleges, NGOs, contractors and others to install and maintain green infrastructure.	4	
		IE1.11	Planning Department Natural Resource Department Environmental Department	Analyze funding sources to move projects and programs forward that focus on Green Infrastructure. (ex: Brevard Living Shoreline Program)	5	
		IE1.12	Planning Department Natural Resource Department Environmental Department	Conduct assessment on green infrastructure projects based on indicators established in the plan to measure success and ROI.	5	
		IE1.13	Planning Department Natural Resource Department Environmental Department	Reassess plans, procedures, programs and policies to improve on any lessons learned.	5	Comprehensive Plan Land Development Regulations Sustainability Plan Restoration Plan

*Infrastructure & Environment: Prioritize the use of Green Infrastructure as a first line of defense.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Infrastructure & Environment	IE2: Promote interconnectivity of natural lands for habitat migration.	IE2.1	SJRWMD Natural Lands Program Natural Resource Department FFWCC FDEP 1000 Friends of Florida	Work continuously with advocacy groups to inform the public on development strategies that support biodiversity and interconnectivity.	on-going	
		IE2.2	SJRWMD Natural Lands Program Natural Resource Department FFWCC FDEP USACE 1000 Friends of Florida	Assess coastal nesting areas based on future conditions to develop preservation strategies viability of these areas.	1	
		IE2.3	Natural Lands Program ECFRPC SJRWMD FFWCC FDACS USDA Natural Resource Department FDEP 1000 Friends of Florida	Assess undeveloped lands, agricultural lands, natural lands and migrating habitats to determine future priority corridors and properties for acquisition based on future conditions. Utilize the SLAMM model or other models as appropriate.	1	
		IE2.4	SJRWMD Natural Lands Program Natural Resource Department FFWCC FDEP USACE 1000 Friends of Florida	Further develop preservation strategies for coastal nests (birds, turtles, etc.) to ensure the ecological and economic viability of the coastline and incorporate into related plans.	2	

*Infrastructure & Environment: Promote interconnectivity of natural lands for habitat migration.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE2.5	Natural Lands Program ECFRPC SJRWMD FFWCC FDACS USDA Natural Resource Department FDEP 1000 Friends of Florida	Conduct a regional exercise with stakeholders to discuss the findings of IE2.3 and work to establish a regional plan to protect the priority corridors.	3	Conservation and Acquisition Plan Regional Natural Lands Corridor Plan
		IE2.6	Local Government Commission Jurisdictional Departments Public FFWC FWS	Conduct survey of stakeholders to assess priority and funding of conservation lands for acquisition and maintenance.	3	
		IE2.7	Natural Resource Department FDEP SJRWMD FWC FWS	Re-evaluate and update conservation and acquisition plans to implement findings from future corridor assessment and prioritization plan.	4	Conservation and Acquisition Plan
		IE2.8	Planning Departments	Update comprehensive plan and other plans/codes with appropriate language to prevent future development from infringing on these priority corridors.	4	Comprehensive Plan Land Development Regulations
		IE2.9	SJRWMD Natural Lands Program Natural Resource Department FDEP 1000 Friends of Florida NGOs FFWCC	Evaluate strategies and alternative analysis for longer term funding for acquisition / management program.	5	

Infrastructure & Environment: Promote interconnectivity of natural lands for habitat migration.



Goal	Objective	Action	Agency	Task	Year	Related Plans
Infrastructure & Environment	IE3: Enhance stormwater systems to be more resilient.	IE3.1	Planning Department Public Works Department Natural Resources Stormwater Management	Consider stormwater master plan designs that utilizes an interconnected system of green infrastructure to reduce stormwater impacts.	on-going	Stormwater Master Plan Mobility Master Plan
		IE3.2	Public Works Department All Local Government Commission ECFRPC	Procure funding and staff/contractor to update all stormwater system facilities in a master GIS database.	1	
		IE3.3	Transportation Department Engineering Department Public Works Department TPO FDOT	Consider future inundation and nuisance flooding to determine areas of flood impacts to roadway stormwater infrastructure.	1	Long Range Transportation Plan TPO Priority Listing
		IE3.4	Public Works Department Environmental Department Natural Resource Department	Evaluate existing green space for stormwater retention and evaluate findings based on future conditions.	1	
		IE3.5	Public Works Department Stormwater Management Department	Develop strategies to prioritize and implement the use of green space in stormwater management.	2	
		IE3.6	Public Works Department Stormwater Management Department	Assess stormwater system facilities to vulnerabilities to future inundation and erosion including elevations of outfalls into surface water bodies.	2	Stormwater Master Plan Vulnerability Analysis Studies
		IE3.7	Public Works Department Stormwater Management Department	Prioritize areas of critical vulnerable stormwater infrastructure. Review other projects to determine if improvement projects can be addressed simultaneously for a greater cost benefit.	3	Stormwater Master Plan

*Infrastructure & Environment: Enhance stormwater systems to be more resilient.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE3.8	Public Works Department Environmental Department Natural Resource Department Stormwater Management Department	Prioritize areas for green space to be utilized in design for stormwater management.	3	
		IE3.9	Planning Department Public Works Department Stormwater Department	Develop prioritization process and funding mechanisms for infrastructure projects in Adaptation Action Areas. Incorporate into Stormwater master plan.	3	Stormwater Master Plan
		IE3.10	Public Works Department Stormwater Management Department	Identify feasible improvements, mitigation or adaptation strategies to address vulnerable stormwater system areas. Update stormwater master plan for implementation and add to Capital Improvement Plan; other project plans; or seek funding to implement the projects.	4	Stormwater Master Plan
		IE3.11	Planning Department Public Works Department Stormwater Department	Conduct a risk-based cost-benefit analysis for mitigation strategies of stormwater infrastructure identified as part of the natural hazard vulnerability assessment.	4	
		IE3.12	Planning Department Public Works Department Stormwater Department	Update stormwater master plan with updated project list based on cost-benefit analysis.	5	
		IE3.13	Public Works Department Stormwater Management Department	Reassess outfall and infrastructure elevation data to determine any gaps in data collection and analysis.	5	
		IE3.14	Planning Department Public Works Department Transportation Engineering Departments FDOT TPO	Identify a process or mechanism to determine what infrastructure/areas may not be upgraded or mitigated at a certain time or impact. Reference previous data/information developed on stormwater and cost/benefit analysis in this analysis in order to help create a legal justification of decisions.	5	All previous vulnerability analysis, master plans and cost benefit studies.

*Infrastructure & Environment: Enhance stormwater systems to be more resilient.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Infrastructure and Environment	IE4: Improve water quality in surface water bodies.	IE4.1	Indian River Lagoon Council All Local Jurisdiction Commission FDEP SJRWMD	Continue financial/staff support of programs and projects to improve water quality.	on-going	
		IE4.2	Indian River Lagoon Council FDEP SJRWMD UF IFAS Extension Public Works Department	Identify and educate communities about best management practices (BMP's) for reducing nutrient loads flowing into surface waters via residential, commercial, industrial and agricultural lands.	on-going	
		IE4.3	FDACS USDA UF IFAS Extension	Educate agriculture land owners on fertilizer best practices as well as the ecological resources their property provides in regards to resilience and mitigation.	on-going	
		IE4.4	FDEP SJRWMD Colleges/Universities ECFRPC	Identify projects and programs aimed at improving water quality and conduct a gaps analysis.	1	
		IE4.5	FDEP SJRWMD Indian River Lagoon Council	Review current total maximum daily load (TMDL) requirements and recommend new targets.	2	
		IE4.6	Marine Resource Council ECFRPC UF IFAS Extension	Evaluate existing fertilizer ordinances and successfulness. Conduct gap analysis to determine a regional approach.	2	
		IE4.7	FDEP SJRWMD Colleges/Universities ECFRPC	Evaluate policies or ordinances for enhancing septic tank standards along waterways.	2	
		IE4.8	Planning Department All Local Jurisdiction Commission	Develop and adopt a fertilizer ordinance.	2	

*Infrastructure & Environment: Improve water quality in surface water bodies.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE4.9	FDACS USDA UF IFAS Extension	Re-assess/prioritize areas of agricultural runoff.	2	
		IE4.10	FDACS USDA UF IFAS Extension	Evaluate existing outreach programs and enhance where necessary to work with property owners to reduce runoff in agriculture priority areas from ES4.9.	3	
		IE4.11	FDOT TPOs	Assess procedures and requirements for design alternatives to promote resilience of natural lands and waterway health.	3	
		IE4.12	Marine Resource Council ECFRPC	Develop and implement steps to promote the adoption of fertilizer ordinances region wide in areas where they do not exist.	4	
		IE4.13	Indian River Lagoon Council FDEP Marine Resource Council Public Works Department Planning Department SJRWMD FDACS Public Works Department	Reassess success of programs and policies aimed to improve water quality in surface water bodies.	5	
		IE4.14	Indian River Lagoon Council FDEP SJRWMD Public Works Department	Investigate financial strategies to continue programs into the future.	5	

*Infrastructure & Environment: Improve water quality in surface water bodies.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Infrastructure & Environment	IE5: Incorporate resiliency into local and regional plans, policies, processes and objectives.	IE5.1	NASA Port Canaveral Patrick Air Force Base All Jurisdictions FDOT TPOs	Utilizing input gathered from the RRAP Sea Level Rise Steering Committee, update policies, plans and procedures with the RRAP recommendation for planning for sea level rise and for use in the geographic delineation of an "Adaptation Action Area" where appropriate.	1	Comprehensive Plan Land Development Regulations Long Range Transportation Plan TPO Priority Project Methodology Local Mitigation Strategy Others
		IE5.2	Planning Department	Determine if Adaptation Action Area designation and policies are appropriate for the jurisdiction. If determined appropriate, develop policies and maps to identify the area, purpose and other related policies.	1	Comprehensive Plan
		IE5.3	All Jurisdictions	Create cross-discipline review committees to assist in the audit of various plan goals policies and strategies as they relate to resilience and review impacts of new projects and developments in regards to resilience.	1	All plans
		IE5.4	All Local Jurisdiction Commission All Jurisdictions	Adopt an "Adaptation Action Area" that includes the 100-year floodplain, the adopted sea level rise hazard zone, and the Coastal High Hazard Zone (Category 1 Storm Surge).	2	Comprehensive Plan Land Development Regulations
		IE5.5	Planning Department	Assess other plans to reference Adaptation Action Areas and incorporate language as appropriate.	2	
		IE5.6	Planning Department Sustainability Board	Audit Comprehensive Plan to ensure that resiliency strategies are adequately addressed and policies are compatible in all applicable sections. Add/adjust appropriate language where needed.	2	Comprehensive Plan

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE5.7	Planning Department Sustainability Board Emergency Management Public Works	Audit Comprehensive plan against other plans (i.e. CRA plans, Downtown Development Plans, Economic Development Plans, LDRs, PDRP) to ensure compatibility of addressing resiliency and future development based on future conditions.	2	Comprehensive Plan CRA plan Downtown Development Plans Economic Development Plans Sustainability Plans Stormwater Plans Post Disaster Redevelopment Plans
		IE5.8	Planning Department Sustainability Board ECFRPC	Develop a Sustainability and/or Resiliency Plan if deemed appropriate by stakeholders and previous efforts.	2	Sustainability Plan Resilience Plan
		IE5.9	Planning Department Sustainability Board ECFRPC UF IFAS Extension FDEP SJRWMD	Adopt changes in all necessary plans to reduce the volume of nutrient loads and fertilizers from public and private property flowing into the Indian River Lagoon utilizing the research developed by FDEP and the SJRWMD derived from action IE4.4.	2	Land Development Regulations Comprehensive Plan
		IE5.10	Emergency Management LMS Working Group ECFRPC	Update the County FMP/LMS to include the future vulnerability analysis of public facilities.	2	
		IE5.11	Emergency Management LMS Working Group	Update mitigation prioritization process to include Adaptation Action Area proximity, future conditions and other criteria identified by the LMS Working Group.	2	
		IE5.12	FDOT TPO	Implement the requirement that alternative analysis of future conditions and consideration for long-term resilience and health of natural systems be included in planning and engineering of projects.	3	

*Infrastructure & Environment: Incorporate resiliency into local and regional plans, policies, processes and objectives.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE5.13	Planning Department Sustainability Board ECFRPC	Add and adopt policies to Comprehensive Plan, and other plans, that result from the recommendations identified in the Resiliency/Sustainability Plan and comp plan audit.	3	Comprehensive Plan Other Plans as appropriate
		IE5.14	Public Works Department	Update stormwater master plan to include future flooding and inundation findings; priorities and projects where possible.	3	Stormwater Master Plan
		IE5.15	Planning Department Sustainability Board ECFRPC	Update/Enhance/Develop Design Guidelines within Land Development Regulations that protect and buffer structures from the impact of hazards. These guidelines should address sea level rise, storm surge, flooding, wind damage, and the urban heat island effect.	3	Land Development Regulations Sustainability Plan
		IE5.16	Planning Department Sustainability Board ECFRPC	Enhance/Develop an energy code to encourage property owners and government facilities to reduce carbon emissions and mitigate the urban heat island effect.	3	Land Development Regulations Sustainability Plan
		IE5.17	Planning Department Sustainability Board ECFRPC	Create Florida Green Building Codes or LEED-accreditation benchmarks for new and existing buildings, including public facilities, within the Land Development Code and Energy Code.	3	Land Development Regulations Sustainability Plan
		IE5.18	Planning Department Sustainability Board ECFRPC	Update Land Development Regulations and the Comprehensive Plan to set new parking and stormwater standards, utilizing the information derived from LS3.2.	3	Comprehensive Plan Land Development Regulations
		IE5.19	Planning Department Sustainability Board ECFRPC	Establish policies and practices for area-wide metrics such as net density requirements that cluster development away from high hazard areas.	4	Comprehensive Plan Land Development Regulations

*Infrastructure & Environment: Incorporate resiliency into local and regional plans, policies, processes and objectives.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE5.20	Planning Department Sustainability Board ECFRPC	Update Land Development Regulations to alter coastal setback codes utilizing the information obtained from vulnerability analysis and task IE1.9 and IE2.4.	4	Land Development Regulations
		IE5.21	Public Works Department Planning Department ECFRPC	Update CIP to implement priority projects identified through vulnerability analysis and appropriate mitigation projects.	5	Comprehensive Plan

*Infrastructure & Environment: Incorporate resiliency into local and regional plans, policies, processes and objectives.*



Goal	Objective	Action	Agency	Task	Year	Related Plans
Infrastructure & Environment	IE6: Preserve and adapt the built environment to keep people safe from and mitigate current and future natural hazards.	IE6.1	Planning Department Public Works Department Natural Resource Department Emergency Management	Conduct assessment to determine vulnerabilities to sea level rise, storm surge, coastal erosion and flooding for the built environment, natural resources and undeveloped properties.	2	Vulnerability Assessment
		IE6.2	Planning Department Public Works Department LMS Working Group TPO	Create (or add where one exists) a checklist for the planning, prioritization and funding of green and gray infrastructure projects to include assessment of vulnerabilities and if/how the project addresses long-term resiliency.	3	
		IE6.3	Planning Department; Building Department; Public Works	Assess community owned vulnerable or damaged coastal properties and determine best long-term approach for each property.	2	
		IE6.4	Planning Department Public Works Department LMS Working Group TPO	Prioritize public infrastructure within Adaptation Action Areas for adaptation/mitigation strategies to the effects of high winds, storm surge, flooding and wave velocity.	2	
		IE6.6	Planning Department Building Department	Review best practices for updating coastal setback and building rebuild codes that mitigate the potential effects of coastal erosion.	2	
		IE6.7	Planning Department	Develop incentives for developers to build outside vulnerable areas or build in a resilient/sustainable way in vulnerable areas.	2	
		IE6.8	Planning Department	Develop policies and strategies to reduce heat island effects through new projects, redevelopment and other opportunities.	2	

*Infrastructure & Environment: Preserve and adapt the built environment to keep people safe from and mitigate current and future natural hazards.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE6.9	Planning Department Building Department	Develop incentives to developers that use methods consistent with Low Impact Development (LID) standards, Florida Green Building Coalition, and techniques to reduce the heat island effect.	2	LDRs Comprehensive Plan
		IE6.10	All Local Jurisdiction Commission Emergency Management	Provide dedicated funding for annual tree maintenance near power lines to help prevent storm damage and allow access for electricity providers to fix broken power lines in an efficient manner following a natural disaster.	2	County COOP Plan City COOP Plan Debris Management Plan
		IE6.11	Planning Department Public Works Department LMS Working Group TPO	Review other projects to determine if improvement projects can be addressed simultaneously for a greater cost benefit.	3	
		IE6.12	Planning Department	Research potential strategies addressing undeveloped parcels located within the Adaptation Action Area.	3	
		IE6.13	FDEP SJRWMD Public Works Department	Develop a risk assessment to determine wellfields, groundwater and underground infrastructure at risk to saltwater intrusion.	3	Groundwater Asset Risk Analysis
		IE6.14	Planning Department Public Works Department LMS Working Group TPO	Develop possible mitigation strategies of at-risk public infrastructure identified as part of the natural hazard vulnerability assessment.	3	
		IE6.15	Planning Department Public Works Department TPO	Develop prioritization process and funding mechanisms for infrastructure projects in Adaptation Action Areas. Incorporate into CIP, stormwater master plan, long range transportation plan, and other appropriate plans and procedures.	4	Comprehensive Plan Stormwater Master Plan LRTP

*Infrastructure & Environment: Preserve and adapt the built environment to keep people safe from and mitigate current and future natural hazards.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
		IE6.16	Planning Department Public Works Department LMS Working Group TPO	Conduct a risk-based cost-benefit analysis for mitigation strategies of at-risk public infrastructure identified as part of the natural hazard vulnerability assessment.	4	
		IE6.17	Planning Department	Implement incentives to developers to build outside of vulnerable areas.	4	
		IE6.18	Planning Department Building Department	Implement incentives to developers that use methods consistent with Low Impact Development (LID) standards and Florida Green Building Coalition.	4	
		IE6.19	FDOT TPO	Conduct a vulnerability analysis for all vulnerable causeways and bridges identified in the 2017 Sea Level Rise Vulnerability Analysis using high resolution LIDAR data. Prioritize improvements based on the results of this assessment.	4	Long Range Transportation Plan TPO SLR Vulnerability Analysis Causeway Vulnerability Assessment
		IE6.20	FDOT TPO Colleges & Universities	Create a research committee consisting of FDOT, the TPO and a academia and environmental experts to develop standards for causeway designs that use innovative techniques to limit the impacts of sea level rise, flooding and storm surge and improve water quality and natural resource resilience.	4	Causeway Vulnerability Assessment
		IE6.21	Planning Department Public Works Department LMS Working Group TPO Emergency Management	Evaluate success of implemented actions and gaps to be addressed.	5	

*Infrastructure & Environment: Preserve and adapt the built environment to keep people safe from and mitigate current and future natural hazards.*

Goal	Objective	Action	Agency	Task	Year	Related Plans
Infrastructure & Environment	IE7: Improve community mobility while improving vulnerable transportation infrastructure.	IE7.1	Emergency Management Transit Agencies	Update evacuation plans to represent newest data of areas that are transportation dependent that will need assistance in evacuation and re-entry.	1	
		IE7.2	ECFRPC FDOT TPOs	Host a workshop focused on green infrastructure and multi-modal transportation highlighting tools and concepts to accomplish it.	2	
		IE7.3	FDOT TPO Planning Department Public Works Department	Prioritize and implement mitigation efforts on trails within the Adaptation Action Area and other vulnerable areas.	3	L RTP
		IE7.4	TPO Planning Department Public Works Department	Identify areas where bicycle and pedestrian improvements can be included in transportation projects that mitigate roadways vulnerable to natural hazards (green streets). Utilize Safe Routes to School.	4	
		IE7.5	Emergency Management Transit Agencies ECFRPC FDOT TPO Planning Department Public Works Department	Evaluate success of implemented actions and gaps to be addressed.	5	

*Infrastructure & Environment: Improve community mobility while improving vulnerable transportation infrastructure.*

# Appendices

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# Appendix A

## Template Resolution for ECF RRAP Adoption

# Template Resolution for ECF RRAP Adoption

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## Resolution for the Adoption of the East Central Florida Regional Resiliency Action Plan

**WHEREAS**, a changing climate is increasingly causing current and future threats, such as elevated levels of flooding and erosion, changes in storm intensity and frequency, heat impacts, sea level rise, and others, calls for action at every level of government and in the private and not-for-profit sectors; and

**WHEREAS**, fostering resilience is a long-term effort and requires holistic planning and preparation to increase resilience in the built, natural and social environment; and

**WHEREAS**, action, leadership and education of and by local governments and partners to improve resilience across disciplines provide multiple benefits; and

**WHEREAS**, these benefits include the implementation of green and gray infrastructure, protecting the natural environment, improving health and wellbeing and increasing economic and societal opportunities; and

**WHEREAS**, the East Central Florida Regional Resiliency Action Plan (ECF RRAP) was formulated for and by local governments, federal, regional and state agencies, educational institutions, NGOs and other stakeholders; and

**WHEREAS**, the ECF RRAP recognizes the clear relationship between emergency management, planning, health & safety, and economic development and aims to continue to fill gaps within the region and pursue initiatives that will achieve measurable improvements in risk reduction and the building of resilience in the region; and

**WHEREAS**, the success of the ECF RRAP depends on the participation of and collaboration with all local jurisdictions and partners, and a commitment to work together towards common goals.

Now, Therefore, **Be It Resolved** that (name of jurisdiction/agency) agrees to adopt the East Central Florida Regional Resiliency Action Plan to advance the direct implementation of activities aimed to improve safety, long-term resilience and sustainability in (name of jurisdiction/agency) across sectors, expand economic sustainability and response to vulnerabilities within the community; and

**Be It Further Resolved** that (name of jurisdiction/agency) will work to increase the health and resilience of social, natural, and built resources by furthering the following goals:

- Promote leadership, education and empowerment in government, public, and private sectors to foster the implementation of resiliency strategies across disciplines and communities.
- Provide opportunities and strategies to foster economic prosperity and improve social equity and justice in preparation for and recovery from stressors and shocks.
- Encourage development of cross-disciplinary plans, policies and strategies to protect the health, safety and economic welfare of residents, businesses and visitors through recognition that natural disasters, changes to climate, and human manipulation require careful consideration of when and how to develop infrastructure, natural resources and a built environment that can withstand and adapt to these changes.
- Create resilient communities by facilitating programs, opportunities, and community-wide education pertaining to local sustainability, disaster response, and climate change mitigation strategies.

**Be It Further Resolved** that (name of jurisdiction/agency) directs staff to work towards the implementation of relevant actions in the ECF RRAP, over the next five years, to further the following objectives:

- Incorporate resilience into local and regional plans, policies and objectives;
- Plan fiscally to implement resilient and sustainable solutions to long-term impacts;
- Implement strategies to promote adaptive measures that keep people and property safe from natural hazards;
- Engage and educate stakeholders and elected officials about strategies to increase resilience in the built, natural, and social environment;
- Protect high-value assets from natural hazards;
- Educate business about access to funding and financing services related to resiliency and sustainability;
- Facilitate and support the efficient recovery of business operations after an event;
- Increase skilled labor force;
- Improve social equity and justice in decision making process
- Prioritize the use of Green Infrastructure as a first line of defense;
- Promote interconnectivity of natural lands for habitat migration;
- Enhance stormwater systems to be more resilient;
- Improve water quality in surface water bodies;



- Preserve and adapt the built environment to keep people safe from and mitigate current and future natural hazards;
- Improve community mobility while improving vulnerable transportation infrastructure;
- Improve capacity of jurisdictions to better respond to hazard events;
- Improve capacity of medical facility operations to prepare for and recover from natural disasters and future conditions;
- Promote sustainable practices in government-owned facilities;
- Engage residents and business owners with locally relevant information about expected future changes in natural hazards and sustainable practices;
- Improve access to resources for the homeless, special needs, elderly, low income, and English-limited residents.

# Appendix B

## Plan and Policy Resiliency Integration Survey Summary

# Plan and Policy Resiliency Integration Survey Summary

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## Summary:

The ECFRPC is working with local, regional, state, and federal communities, departments and agencies to develop a regional resilience action plan for coastal east central Florida. This survey was developed to provide insight into the progress of integrating resiliency into various local and regional plans and policies.

## Goal:

The goal of the Regional Resilience Action Plan is to increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines. It is important to note that this action plan encompasses a variety of resiliency aspects and aims to incorporate discussion on infrastructure (water, energy, waste, etc.), health, planning, emergency preparedness, economics and leadership.

## Major Finding:

East Central Florida jurisdictions and agencies are working toward resiliency, though as indicated lack of resources may be a hindrance to substantial work and policy development. The majority of staff feels they are prepared and educated to address resiliency. Regional agencies and jurisdictions feel there is a real concern about Sea Level Rise and climate impacts at a community and staff level. Many agencies and communities are engaging stakeholders in “resiliency” conversations and looking at future conditions as a matter responsibility practice not policy.



# Survey Summary Results:

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## Who responded to the survey?

29 respondents

<b>Local Governments</b>
City of Satellite Beach
Volusia County
Volusia County Emergency Management
Volusia County Growth and Resource Management
City of Rockledge
City of Titusville
City of Ormond Beach
City of Cape Canaveral
Brevard County Natural Resources Management Department
Town of Melbourne Beach
City of Cocoa
New Smyrna Beach
City of Indian Harbour Beach
City of Orange City
County of Volusia

<b>Agencies</b>
FDOT
Space Coast TPO
River to Sea TPO
Canaveral Port Authority
SJRWMD
Indian River Lagoon Council
FDOT - District 5
Department of Economic Opportunity
University of Florida IFAS Extension Brevard County
East Central Florida Regional Planning Council
NASA Kennedy Space Center

**Question 5:** Have you adopted required Peril of Flood policies into the most recent version of the Coastal Element of your Comprehensive Plan? (<http://www.adaptationclearinghouse.org/resources/florida-sb-1094-e-an-act-relating-to-the-peril-of-flood-e.html>)

Response Results	
10.71%	It is in draft form and working through the Commission and DEO
50.00%	Not applicable to our jurisdiction/agency.
32.14%	We have not drafted language yet.
7.14%	Yes, it has been adopted.

**Question 6:** Have you identified and adopted Adaptation Action Areas in the most recent version of the Coastal Element of your Comprehensive Plan?

Response Results	
7.14%	Yes, we have adopted AAAs.
0.00%	It is in draft form and working through the Commission and DEO.
28.57%	We intend to consider AAA but have not drafted language yet.
0.00%	We do not intend to adopt AAAs.
21.43%	We are interested but have not yet due to lack of capacity (staff, time, resources, money, etc.).
42.86%	Not applicable to our jurisdiction/agency.

**Question 7:** Please consider the following question in reference to the plans below: Has your agency or jurisdiction implemented future water levels (i.e. sea level rise, nuisance flooding) into the following plans? Leave unchecked if not applicable.

Response Results	Plans
40.00%	Stormwater Master Plan
10.00%	Conservation Plan
25.00%	Floodplain Management Plan
35.00%	Comprehensive Plan
10.00%	Long Range Transportation Plan
5.00%	Local Mitigation Plan
15.00%	Capital Improvement Plan
10.00%	Sustainability Action Plan
10.00%	Building Codes
5.00%	Strategic Regional Policy Plan
5.00%	Sustainability Plan
5.00%	Beach Renourishment/Dune Restoration Plan
30.00%	Other

\*Other (please specify)\*- 30.00%

- “Assessment of future water supplies”; – *SJRWMD*
- “Future water levels are being considered for the 2045 LRTP” – *R2CTPO*
- “State of the System Report (next year's)” – *Space Coast TPO*
- “Comprehensive Emergency Management Plan” – *VCEM*
- “We will begin to include in our Comprehensive Economic Development District Strategy. We work with local communities and agencies to incorporate future water level conditions in various plans and policies. We conduct vulnerability assessments.” - *ECFRPC*

**Question 8:** Please consider the following question in reference to the plans below: Has your agency or jurisdiction implemented future climate conditions and associated impacts (i.e. heat, drought, invasive species, disease, food security, etc.) into the following plans? Leave unchecked if not applicable.

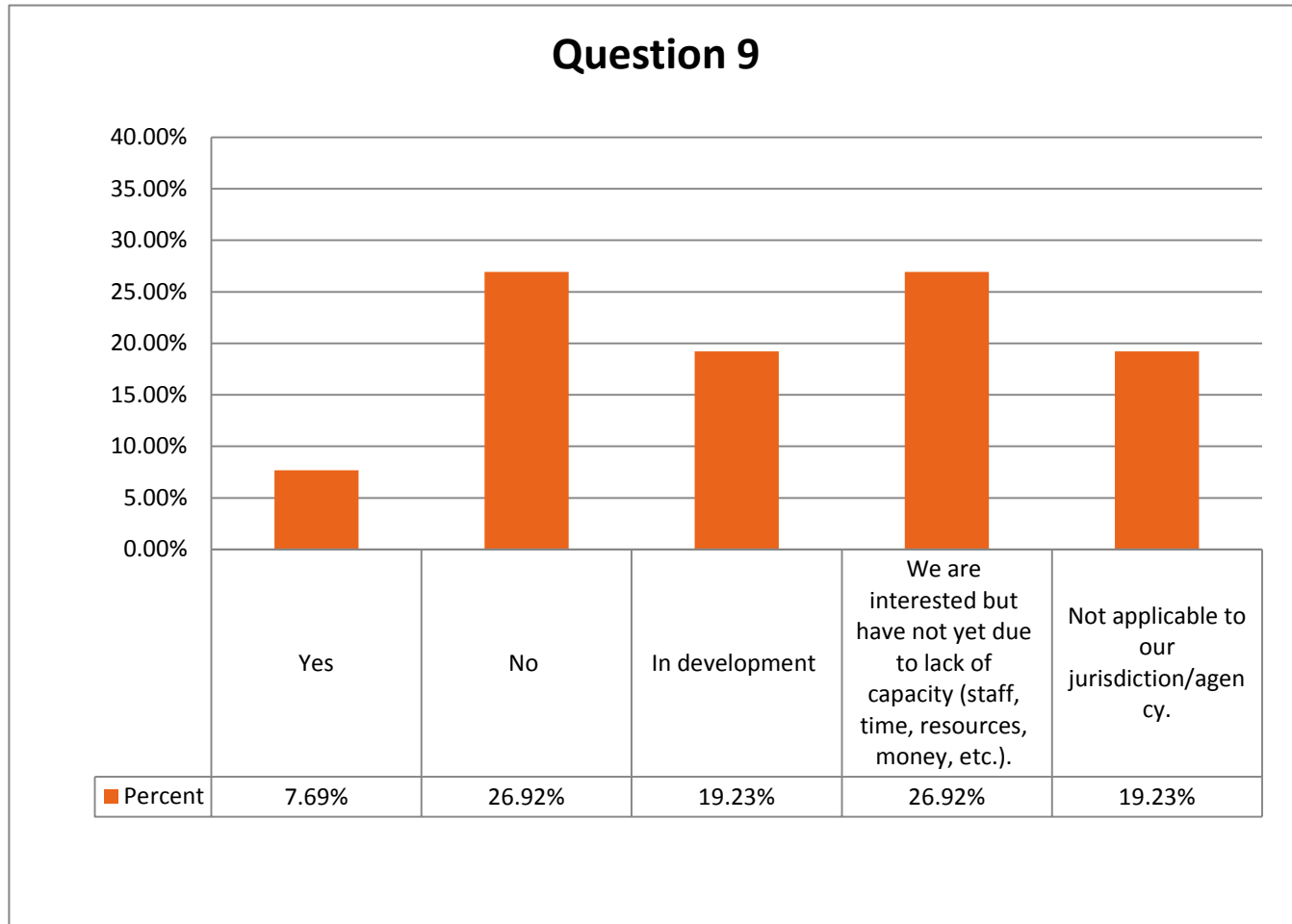
3 respondents implemented future climate conditions and associated impacts into these plans.	Comprehensive Plan
2 respondents implemented future climate conditions and associated impacts into these plans.	Stormwater Master Plan Conservation Plan Floodplain Management Plan Long Range Transportation Plan Sustainability Plan
	Strategic Regional Policy Plan Long Range Transportation Plan Sustainability Action Plan Building Codes Community Rating System Roadway Design Manual
<b>38.46%</b>	*Other (please specify)*

\*Other (please specify)\*- **38.46%**

- “Landscape/Land Clearing Ordinance includes provisions for invasive species, keeping diversity to prevent diseases and measures against heat island effects, but not specifically related to Climate Change”- *Brevard County Natural Resources Management Department*
- “Assessment of future water supplies”- *SJRWMD*
- “We will begin to include in our Comprehensive Economic Development District Strategy.” – *ECFRPC*
- 2 responses “No/ Not yet”

**Question 9:** Does your agency or jurisdiction have an adopted Resiliency Plan?

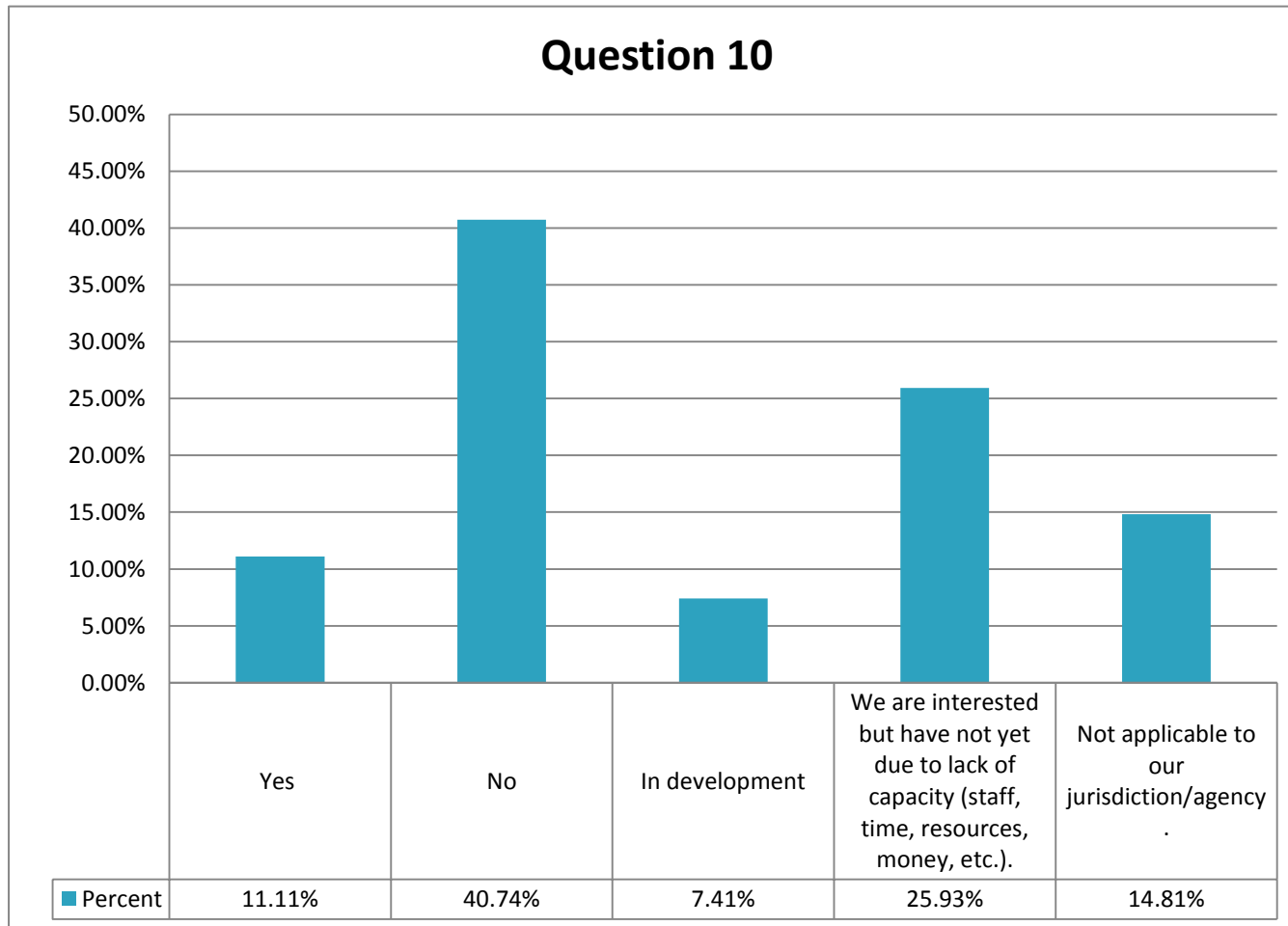
**Yes/In Development-** *City of Satellite beach, Volusia County, City of Ormond Beach, River to Sea TPO, Town of Melbourne Beach, IRL Council.*



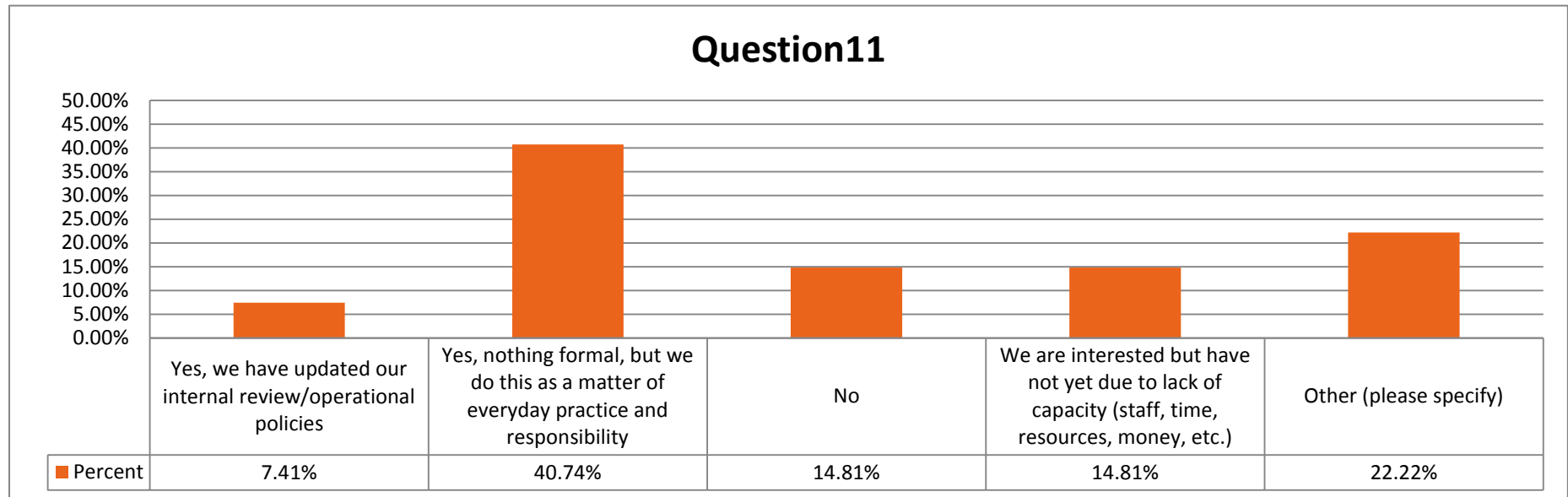


**Question 10:** Does your agency or jurisdiction have an adopted Sustainability Plan?

**Yes/In Development-** *City of Satellite Beach, Volusia County, City of Ormond Beach, Town of Melbourne Beach, NASA Kennedy Space Center.*



**Question 11:** Has your agency or jurisdiction issued policies or direction to assess projects and proposals with a resiliency lens (i.e. future flood conditions, ecosystem migration, and sustainability)?

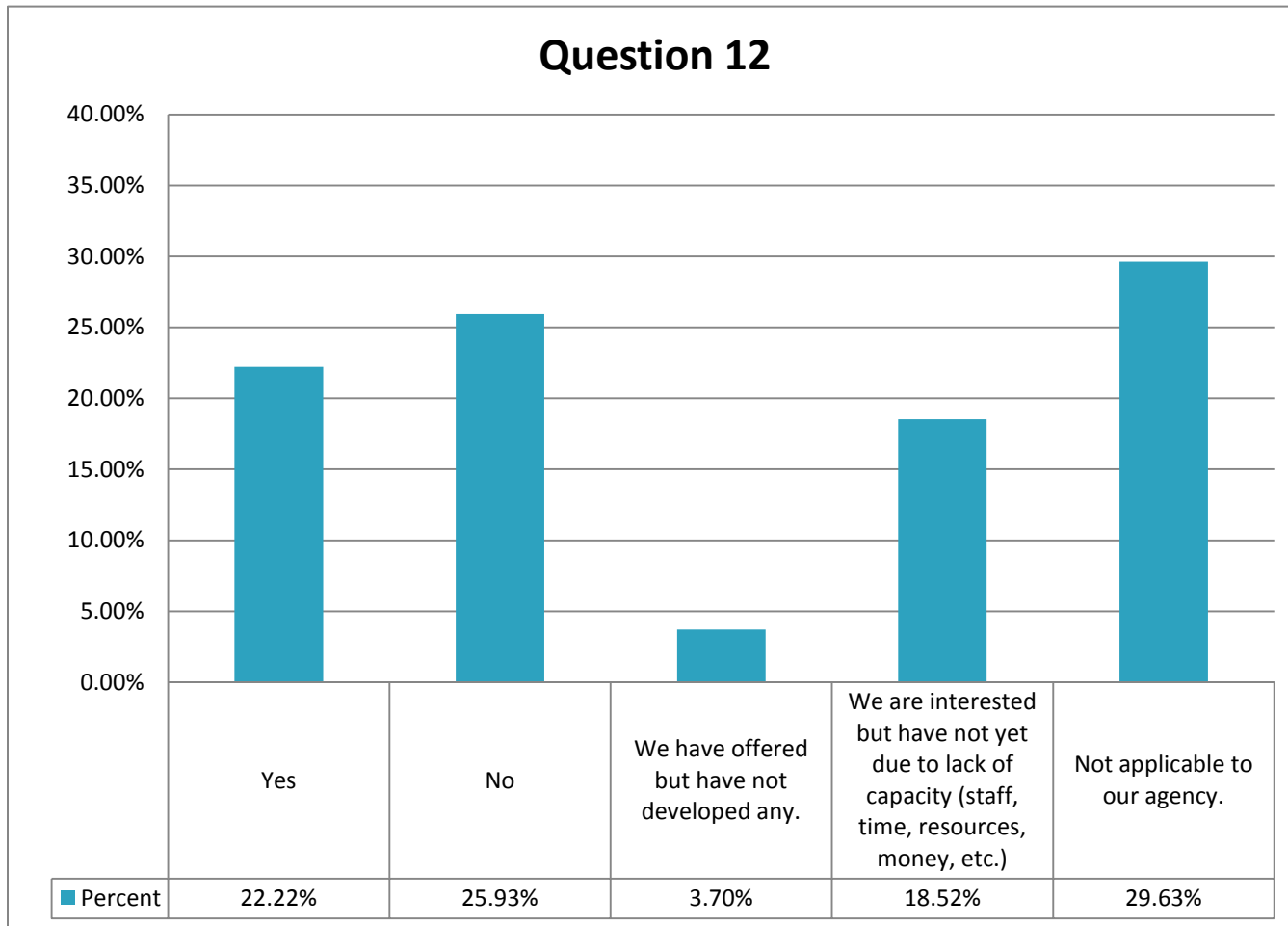


**Yes/Yes, nothing formal-** *City of Satellite Beach, City of Rockledge, Space Coast TPO, FDOT, City of Ormond Beach, Town of Melbourne Beach, IRL Council, FDOT- District 5, Department of Economic Opportunity, City of Cocoa, University of Florida IFAS Extension Brevard County, ECFRPC, NASA Kennedy Space Center.*

**Other (Please Specify)-**

- “Yes, for Federal grant applications to elevate flooded homes.” - *VCCEM*
- “In development.” - *River to Sea TPO*
- “Flood Plain Regulation.” - *Canaveral Port Authority*
- “Started project with ECFRPC.”- *Brevard County Natural Resources Management*
- “Defer to our Drainage/Permitting section” - *FDOT*
- “Resiliency is entering the window of planning”- *SJRWMD*

**Question 12:** Has your agency or jurisdiction worked with small businesses to develop Continuity of Operations Plans (COOP) as disaster or major business interruption can have significant impacts on small businesses?



**Question 13:**

Has your agency or jurisdiction completed a vulnerability assessment in any of the following areas?

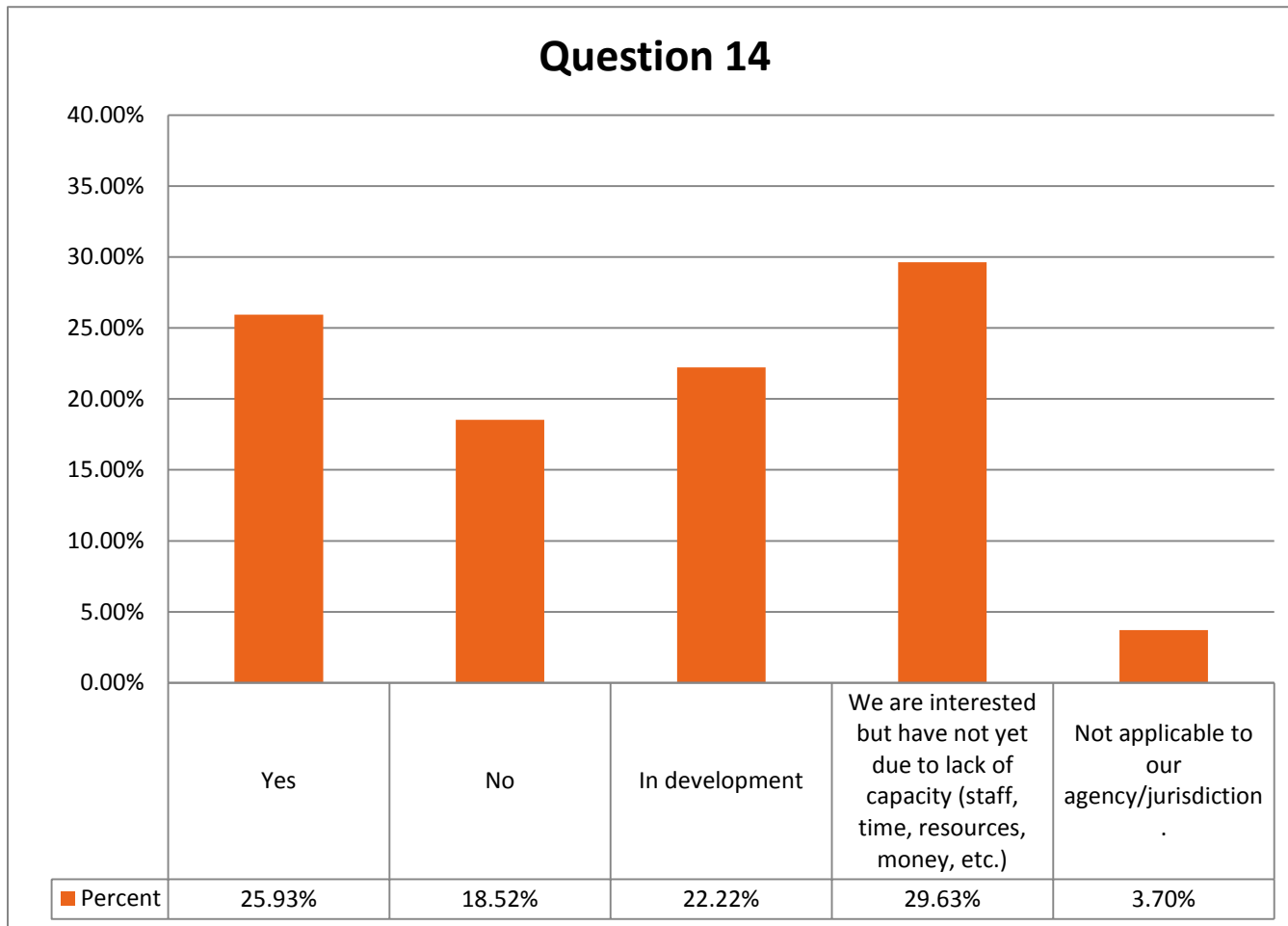
Response Results	Areas
28.00%	Transportation Infrastructure
20.00%	Water Infrastructure (storm, waste, sewer)
12.00%	Social vulnerability
16.00%	Environmental resources/ natural systems
16.00%	General asset and area assessment
0.00%	Groundwater Supply
12.00%	We have not conducted a vulnerability assessment.
24.00%	We are interested but have not yet due to lack of capacity (staff, time, resources, money, etc.)
8.00%	Not applicable to our agency/jurisdiction.
28.00%	*Other (please specify)*

\*Other (please specify)\*- **28.00%**

- “On a project-by-project basis”- *FDOT*
- “We have conducted a variety of vulnerability assessments for TPOs, and Counties and anticipate more this year. To not provide double counting we did not answer for these studies. We are currently doing a high level business and social vulnerability assessment for the RRAP.” - *ECFRPC*
- “Started project with ECFRPC.”- *Brevard County Natural Resources Management Department*
- “Defer to Drainage/Permitting section”- *FDOT District 5*
- “We have examined sea level rise as it may affect natural resources along the coast”- *SJRWMD*
- “Vulnerability and risk assessment in progress”- *IRL Council and IRL National Estuary Program*
- “Another section of FDOT will need to respond on this one.”- *FDOT District 5*

**Question 14:**

Has your agency or jurisdiction conducted an assessment of future climate impacts on particular projects?

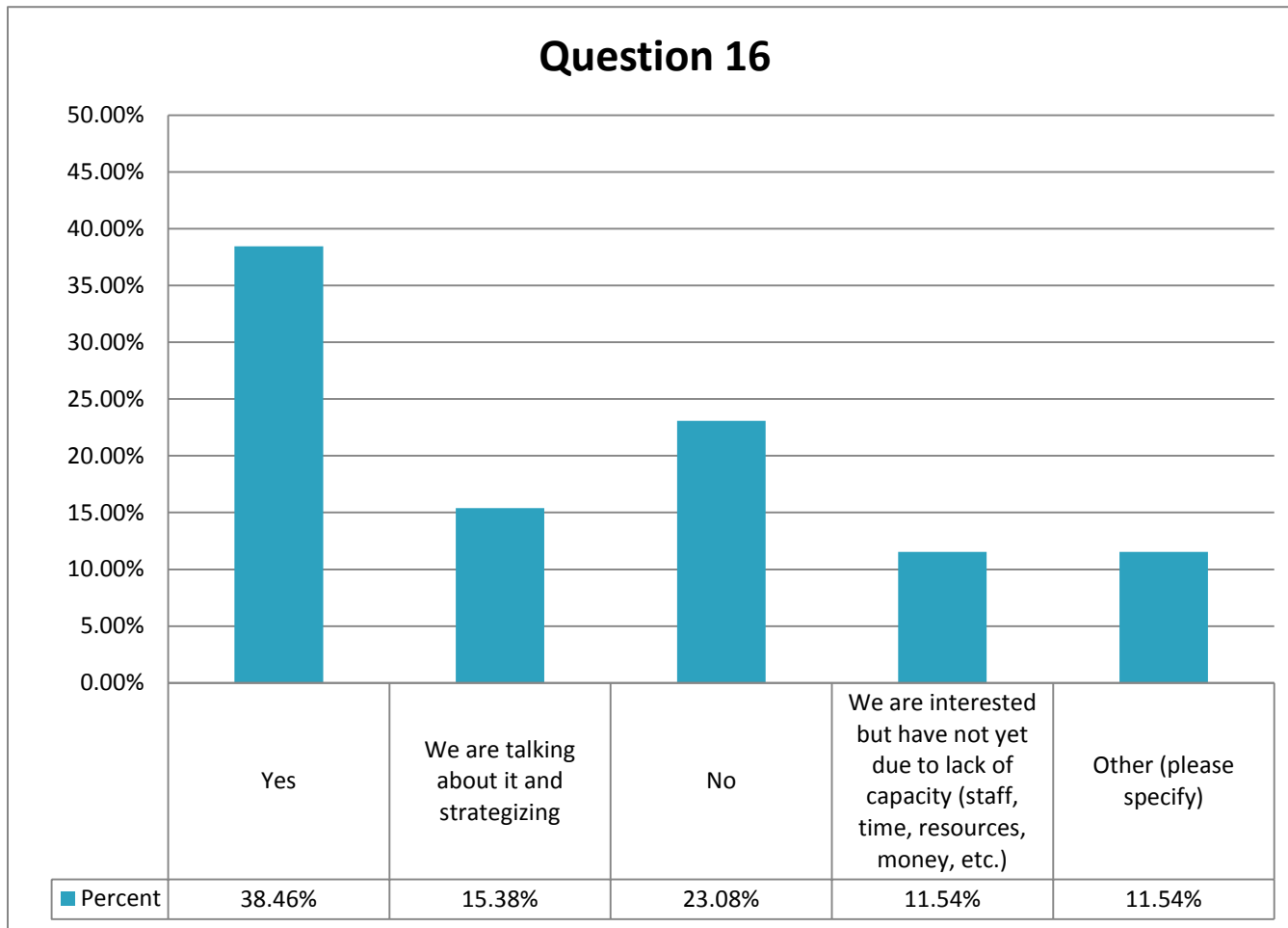


**Question 15:**

Please describe the projects have you assessed future climate impacts and the what impacts were assessed? **15 Responses-** (2 “N/A”):

- “Various high-level research has been conducted assessing vulnerable coastline assets. KSC's Master Plan and its Central Campus Consolidation Strategy identifies the most feasible areas with higher elevations to concentrate future development.” - *NASA Kennedy Space Center*
- “When we reviewed plans for facilities through the facility siting process, we provided comments to consider sea level rise and increased surge on these private critical facilities.” - *ECFRPC*
- “Mitigation projects for home owners in flood prone areas. Also requires home owners to mitigate against all other hazards.” - *Volusia County Growth and Resource Management and Emergency Management*
- “Mitigation projects to elevate flooded homes; sea level rise.” - *VCEM*
- “Stormwater Infrastructure Sanitary Sewer Collection ---Infiltration”-*City of Ormond Beach*
- “Sea Level Rise for evacuation routes and critical facilities.” - *River to Sea TPO*
- “Currently working with ECFRPC.” - *Brevard County Natural Resources Management Department*
- “pertains to south Fla, FDOT District 6” -*FDOT District 5*
- “Water withdrawals from the St. Johns River” - *SJRWMD*
- “Program funded some of Satellite Beach Climate Change Research. Working on revised Comprehensive Conservation and Management Plan for the IRL”- *IRL Council and IRL National Estuary Program*
- “We are currently working on a retro fit and FEMA reimbursement program for rising up to 50 homes within an area impacted by rising seas.” - *City of New Smyrna Beach*
- “Extension as a whole has looked at agriculture practices and health related impacts to climate change. Extension also works with stakeholders on thinking about climate change impacts.” - *University of Florida IFAS Extension Brevard County*

**Question 16:** Has your agency or jurisdiction been actively engaging stakeholders and citizens in the conversation about resiliency?

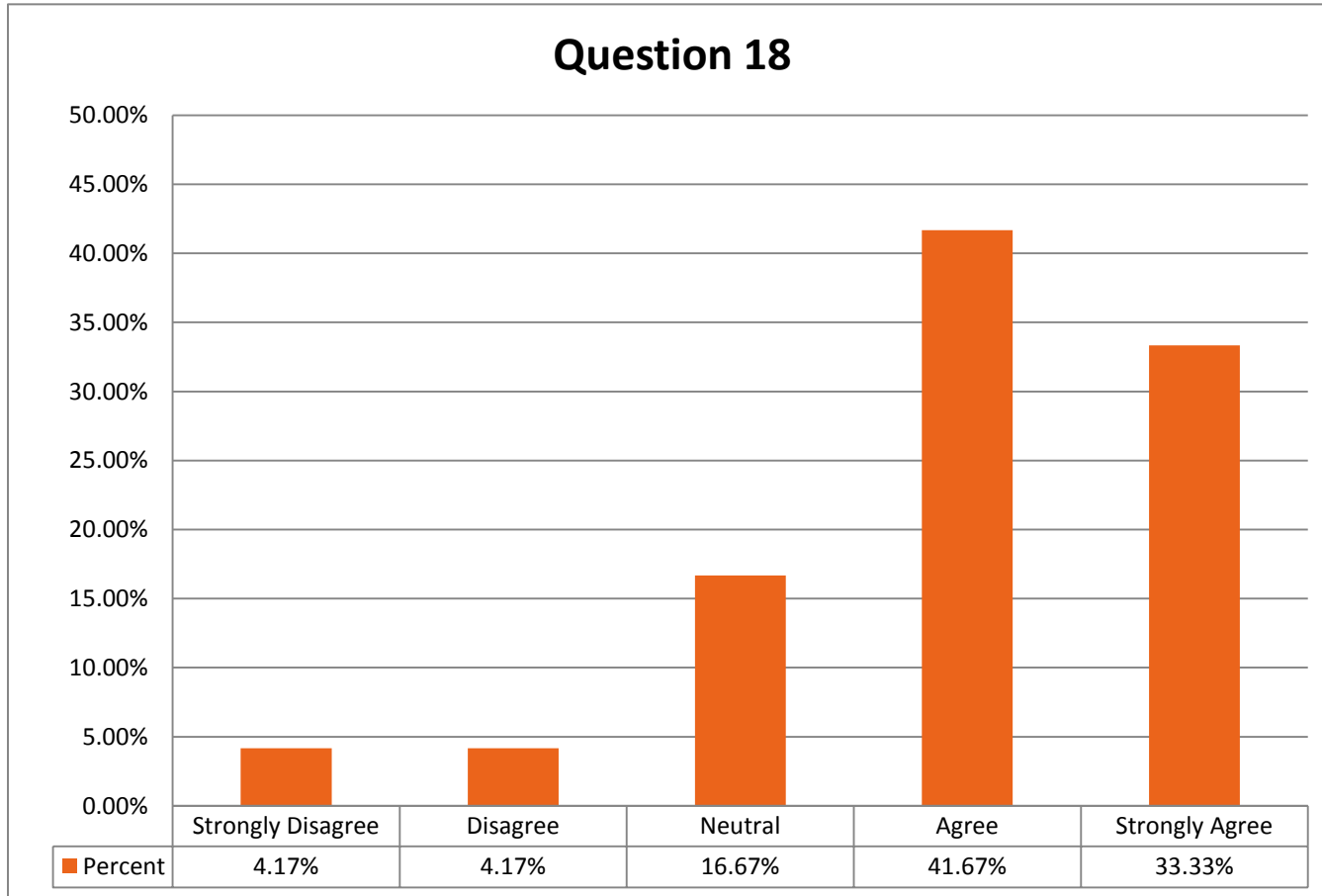


**Question 17:** Please share successes or lessons learned concerning your engagement efforts that the project team and other jurisdictions should be aware of. **16 Responses-** (7 "N/A):

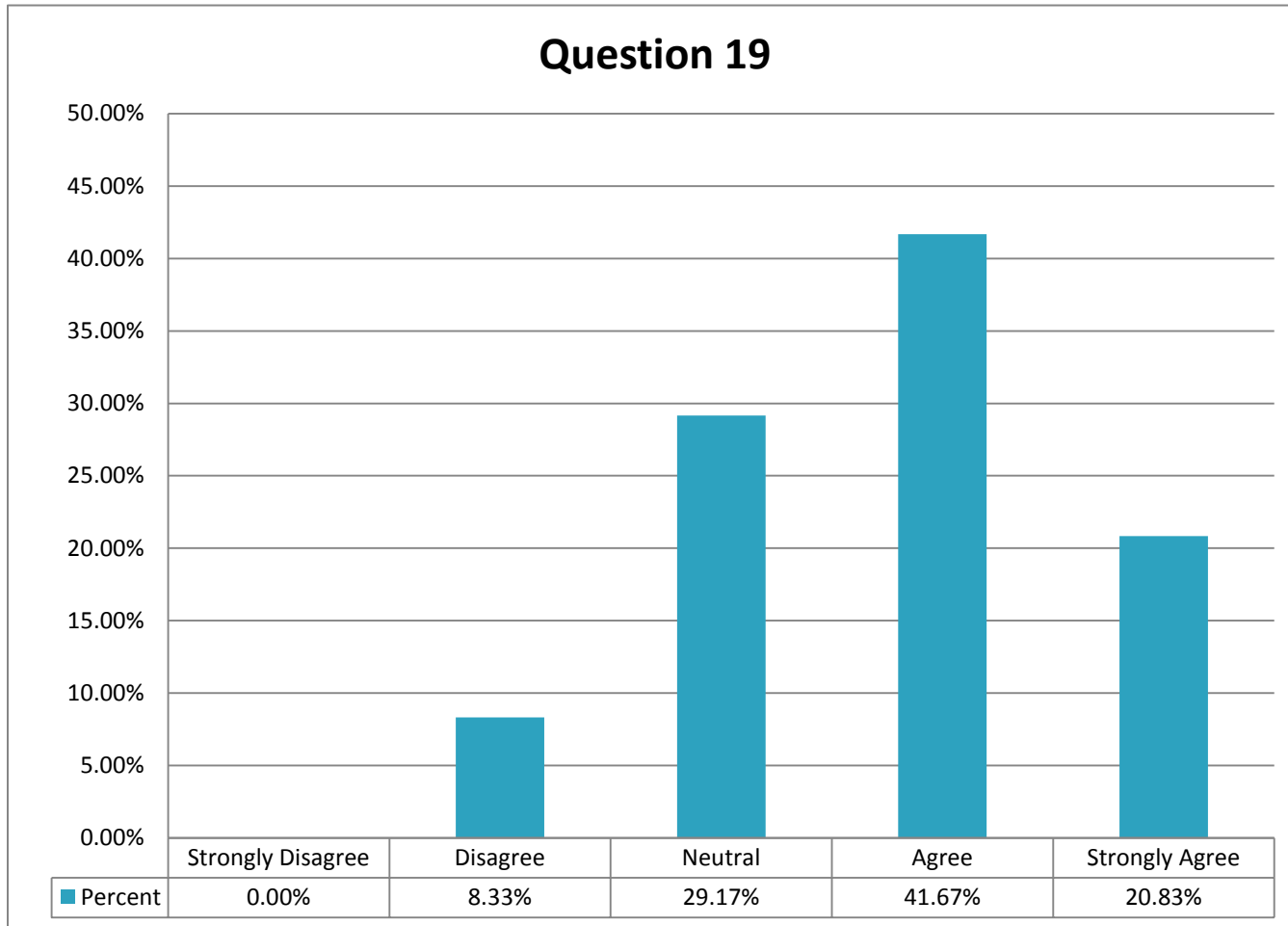
- “KSC has focused significant resources on adaption strategies such as dune restoration to protect valuable launch infrastructure naturally located on the coast. Even if these measures prove successful over time, there are still many questions related to how general transportation access across Center will be impacted, i.e. how will employees and support services be able to reach launch pads on the coast if inland water levels (Banana River & Banana Creek) rise significantly.” - *NASA Kennedy Space Center*
- “Each community is different and discussion needs to be tailored to each specific community.” - *ECFRPC*
- “We discuss resiliency during our public outreach presentations to various groups.” - *VCEM*
- “Elected officials and senior staff from Public Works, Emergency Management and Traffic Engineering must be represented in the stakeholder group.” - *River to Sea TPO*
- “Long-term concerns get overrun by immediate issues” - *SJRWMD*
- “Public confusion and political positioning on climate change can make risk assessment and adaptation planning process more difficult than it needs to be.” - *IRL Council and IRL National Estuary Program*
- “We have pilot studies from three local communities on adaptation action planning, are working with DEP to complete an Adaptation Planning Guidebook and Post Disaster Redevelopment Guidebook update and provide funding and technical assistance to local governments in preparation of Peril of Flood amendments and resilience planning in their comprehensive plans.” - *Department of Economic Opportunity*
- “We are starting a year of CCR community meetings on Jan 16, 2018-covering all areas.” - *City of New Smyrna Beach*
- “Extension often works with stakeholders to discuss sustainability and climate change issues and what stakeholders should think about in regards to these impacts.” - *University of Florida IFAS Extension Brevard County*



**Question 18:** The people in my organization/ agency are concerned about SLR and flooding.



**Question 19:** The people in the community I work for are concerned about SLR and flooding.



**Question 20:** How educated and prepared does your organization’s staff feel to plan for the impacts of SLR and coastal flooding issues?

11.54%	Unprepared and under-educated to appropriately plan for impacts.
61.54%	Somewhat prepared and educated to appropriately plan for impacts
7.69%	Unprepared but sufficiently educated to appropriately plan for impacts.
3.85%	Prepared but under-educated to appropriately plan for impacts.
15.38%	Sufficiently prepared and educated to appropriately plan for impacts.

**Question 21:**

What did we miss that is relevant to your plans, policies and actions that your agency or jurisdiction is undertaking to address resiliency?

**13 Responses-** (9 “N/A”):

- “I will need to investigate actions in other parts of the agency”- *SJRWMD*
- “NEPs follow the EPA workbook guidance on this issue.”- *IRL Council and IRL National Estuary Program*
- “Help local governments implement Peril of Flood statutory requirements in comprehensive plans.”- *Department of Economic Opportunity*
- “We have worked with the RPC to apply for a grant to do the city-wide assessment.”- *City of New Smyrna Beach*



# Appendix C

## Stakeholder Engagement Findings

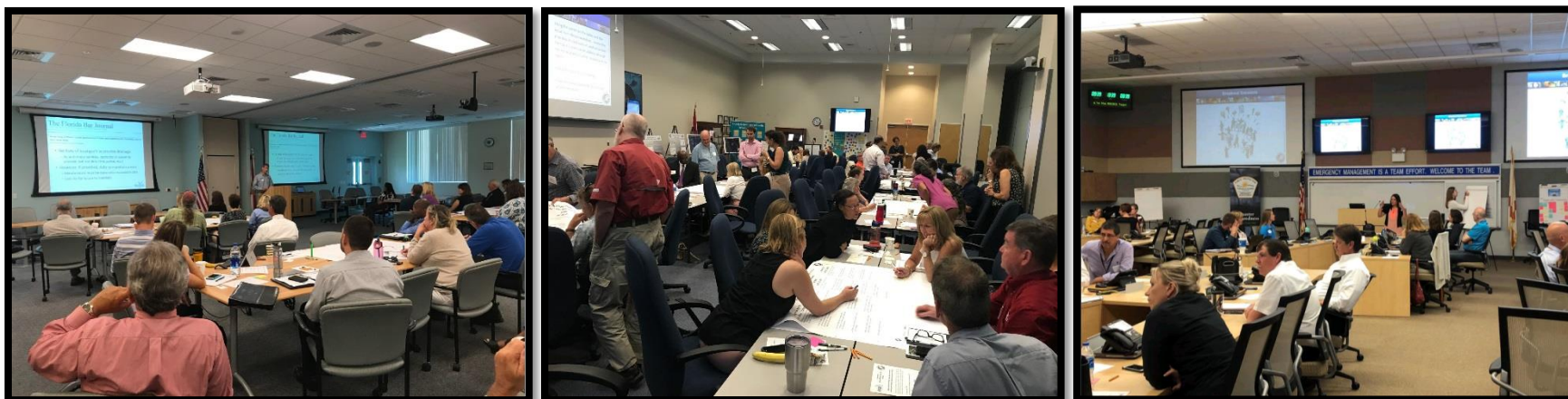
# Stakeholder Engagement Findings

The East Central Florida Regional Planning Council with direction and oversight from the East Central Regional Resiliency Action Plan Steering Committee and Stakeholder Engagement Sub-Committee hosted six stakeholder engagement workshops between May and August of 2018. A total of 200 stakeholders participated in the workshops. The workshops not only focused on educating attendees about the overall project, laws pertaining to resilience, case studies of adaptation measures, and legal cases associated with resilience, but were designed to solicit input from the stakeholders to increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines. The results of the six workshops helped to create the objectives and action items in the East Central Florida Regional Resiliency Action Plan – Brevard and Volusia Counties.

This findings report highlights the findings associated with the engagement process conducted during the workshops noted

Listening Session Workshops: May 7<sup>th</sup>-Volusia; May 8<sup>th</sup>-Brevard

Stakeholder Engagement Workshops: August 20<sup>th</sup>-Brevard; August 21<sup>st</sup>-Volusia



# May Workshops–Introduction:

## Goal of the East Central Florida Regional Resiliency Action Plan:

Increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines.

## East Central Florida Regional Resiliency Action Plan Listening Workshops:

The Listening Sessions took place on May 7<sup>th</sup> in Volusia County and on May 8<sup>th</sup> in Brevard County. Two workshops occurred in each county: “*Collaborating for Resilience*” and “*Building Economic and Social Resilience*”. This report provides an overview of the workshop findings and highlights reoccurring and identified priorities and actions. These findings were then incorporated, where feasible, in the ECF RRAP. While some actions are outside the immediate scope of the RRAP, they are highlighted in this report to aid in their advancement. Additionally, the ECFRPC began to some address some identified gaps after the workshops by connecting various agencies and departments and providing access to various available resources.

## Attendance:

Volusia Collaborating for Resilience	32 attendees
Volusia Building Economic	9 attendees
Brevard Collaborating for Resilience	37 attendees
Brevard Building Economic	25 attendees

**Break-Out Session Groupings:**

Workshop attendees participated in break-out sessions, as listed below, to discuss barriers and opportunities for resiliency and developed priorities and actions based on topics described below. The *Building Economic and Social Resilience* groups were aggregated because some registrants did not attend the workshop. The findings from the breakout sessions in each workshop were categorized into the following groupings to reflect the framework of the RRAP: Leadership and Strategy, Economic and Society, Infrastructure and Environment, Health and Well-Being. The breakout sessions are noted below:

**Collaborating for Resilience Workshop Break-Out Groups:**

1. Grey and Green Infrastructure
2. Health
3. Local Fiscal Perspective
4. Planning
5. Leadership
6. Social Stability, Security and Justice

**Building Economic and Social Resilience Workshop Break-Out Groups:**

1. Leadership
2. Business Resiliency
3. Workforce
4. Infrastructure and Financing/Funding Tools
5. Tourism

## **1. Infrastructure and Environment:**

### **Goal:**

*Create cross-discipline plans, policies and strategies to develop infrastructure, natural resources and a built environment that can withstand and adapt to natural disasters, changes to climate, and human manipulation to protect the health, safety and economic welfare of residents, businesses and visitors.*

### **Priorities:**

- 1) Post Disaster Recovery Plans (PDRP) – revisit and ensure consistency between plans and consider incorporation of green/gray infrastructure
- 2) Educate the public and elected officials about economic and mitigation benefits of conservation lands
- 3) Improve infrastructure for sewage, water, stormwater and address high nutrient loading into natural systems
- 4) Be proactive across all activities
- 5) Conduct assessments and implement code and policy changes
- 6) Engage leaders to get problems recognized and acted upon
- 7) Address issues of flooding (nuisance flooding, storm surge impacts, and sea level rise)
- 8) Plan fiscally for long-term impacts

### **Action Items:**

- 1) Determine locations of all vulnerable infrastructure
- 2) Collaborate with partners to discuss the development of a “Resilient Homes Program”
- 3) Create (or add where one exists) a checklist for the planning, prioritization and funding of infrastructures projects to include assessment of vulnerabilities and if/how the project addresses long-term resiliency
- 4) Create or update stormwater utility inventory database



- 5) Conduct a vulnerability assessment for stormwater infrastructure and prioritize and plan for stormwater infrastructure improvements and mitigation activities including raising outfall infrastructure
- 6) Implement strategies for wastewater level of service improvements
- 7) Assess intersections and assign generator priorities to operate traffic lights
- 8) Assess existing plans for obstruction of resilient goals; diversify and identify adaptive measures to vulnerabilities
- 9) Develop methodology/procedures for inspecting infrastructure (stormwater) after a storm
- 10) Create a one page document for benefits of green infrastructure
- 11) Find funding/partners to look at Return on Investment (ROIs) and benefits for green infrastructure
- 12) Reassess utility/conservation lands plan to integrate stormwater solutions more effectively
- 13) Develop demonstration sites for utilization of green infrastructure on a variety of scales
- 14) Identify program overlaps (Promise Lands, LMS, CRS, WMD, Stormwater, etc.) and identify what is being done that can be used for other planning and to advance resiliency
- 15) Limit or prohibit public infrastructure investment for new developments built in hazard zones
- 16) Create a Chief Resilience Officer a position
- 17) Create a regional education plan/tool box for use across the region for all levels and sectors
- 18) Conduct constant education of elected officials, public, developers, businesses etc. about different aspects of resiliency, natural systems and environmental issues such as current freshwater supply and the current saltwater intrusion problem
- 19) Update evacuation plans to ensure inclusion of transit to address current areas of need, new staging areas and include reentry planning
- 20) Integrate appropriate flood reduction measures on new and improved road facilities
- 21) Update codes and policies to discourage development and high rises along coast and vulnerable areas
- 22) Assess Land Development Codes (LDC)/Land Development Regulations (LDRs) and comprehensive plans, and other plans (stormwater, transportation, open space, etc.) and update as needed to include resiliency measures and ensure they are all compatible
- 23) Address development and population growth in hazardous/vulnerable areas

- 24) Assess existing plans for obstruction of resilient goals
- 25) Prioritize the need to protect natural infrastructure from development pressures
- 26) Create a resiliency checklist for developers and planning staff
- 27) Revisit PDRP for resiliency and how it relates to new/updated plans
- 28) Develop off-shoot of County PDRP to implement on the City-wide scale
- 29) Train county, city and agency staff to respond to disasters or events through emergency exercises



Brevard Collaborating for Resilience Workshop May 8, 2018

# Major Findings:

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## 2. Health and Wellbeing:

### Goal:

*Create sustainable, resilient and healthier communities, programs and opportunities for all to better respond to disaster and adapt to climate and social stressors and shocks.*

### Priorities:

- 1) Communicate with and educate residents
- 2) Protect residents by disallowing development in high-risk areas
- 3) Ensure that the water supply and stormwater infrastructure are protected
- 4) Build reserves and adjust budgets to include specific line items to be proactive in creating sustainable and resilient communities
- 5) Access to Services
- 6) Homeless, Special Needs, Elderly and Low Income

### Action Items:

- 1) Communicate dangers of do-it-yourself tasks and generators with residents
- 2) Ensure that English-limited populations have storm-related information/alerts
- 3) Change future land use and zoning codes in vulnerable areas to promote resilient planning
- 4) Ensure that a “primary” social media account relays all disaster-related information
- 5) Continue to include real-time information on shelters, openings/closings, and resources on County Emergency Management websites and social media
- 6) Include information regarding specific medical supply and other resources available at specific public shelters. Vulnerable populations should know which shelter to report to.

- 7) Train county, city and agency staff to respond to disasters or events through emergency exercises
- 8) Continue efforts for Total Max Daily Load (TMDL) reductions for the Indian River Lagoon
- 9) Protect sources of potable water from sewage and natural hazard infringement
- 10) Purchase portable towers for emergency cell phone services
- 11) Provide tax incentives that would minimize impervious surfaces
- 12) Research the potential of the existing financing programs and the roles they may play in the community (i.e. PACE, CDFI ,IIVA)
- 13) Develop a financial plan to build reserves for a “rainy day/disaster fund”
- 14) Reassess budgets to determine what programs/line items may need additional funding for proactive resiliency funding (i.e. debris management, conservation lands, planning, etc.)
- 15) Advocate for Multiple Listing Service (MLS) standards to include vulnerabilities or scale of vulnerability
- 16) Create a Chief Resilience Officer position
- 17) Address development and population growth in hazardous/vulnerable areas
- 18) Utilize HMP to hardening facilities
- 19) Develop a program and find a funding source to purchase resources (AC, generators, etc.) for fixed and low-income and citizens
- 20) Include transportation to and from shelters in evacuation plans and test it. Take into factor post storm and how tying up the transit system limits availability to those who rely on the services to get to and from work.
- 21) Identify ways to encourage residents that are determined not to evacuate to adhere to warnings
- 22) Continue to utilize pre-registration to identify shelters for special needs and seniors within the community
- 23) Prioritize and Utilize IDignity program as a Disaster Preparedness tool. Develop funding mechanism to provide identification and paperwork
- 24) Identify and develop food pantry collaboration- access funds for development of regional food pantry network disaster plan for activation prior to FEMA arrival

- 25) Explore options for reverse \*211 for consistent social services emergency messaging. (United Way) Use \*211 as pre-registration tool for vulnerable populations
- 26) Discuss, investigate and develop the criteria for setting up mobile post-disaster DRC in affected vulnerable communities
- 27) Coordinate with transportation services to identify communities/locations with high ridership and compare those locations with flood prone evacuation sites
- 28) Utilize existing or develop a single app for efficient communication of resources– (explore the idea of Virtual Business or expanding county app)



Volusia Collaborating for Resilience Workshop May 7, 2018

# Major Findings:

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## **3. Economy and Society:**

### **Goal:**

*Provide opportunities and strategies to foster economic prosperity and improve social equity and justice in preparation for and recovery from stressors and shocks.*

### **Priorities:**

- 1) Business to Business Mentoring and Outreach
- 2) Ensure that small businesses are prepared to deal with hazard events
- 3) Identify “point person” in local government to act as a liaison between the business community and the local government for resiliency
- 4) Communication during disaster situations
- 5) Education for all entities
- 6) Enhance transit access and efficiency especially in transit dependent communities
- 7) Access to funding and finances
- 8) Coordination between jurisdictions and agencies to address financial side of resiliency
- 9) Build financial security to be proactive
- 10) Bridge the gap between expenditures and FEMA reimbursement process
- 11) Affordable Housing
- 12) Special Needs Shelter/Senior Shelters
- 13) Access to Services
- 14) Homeless, Special Needs, Elderly and Low Income

**Action Items:**

- 1) Engage small businesses to ensure they have contingency plans and contingency funds for hazard events.
- 2) Develop “one-pager” from the Chamber of Commerce with best practices and links for responding to and preparing for hazard events
- 3) Develop and facilitate program development of Business Action/Continuity Plans (BCOOP) planning with small businesses and utilize local colleges and universities
- 4) Identify 20+ businesses to assist in development of BCOOPs as a pilot
- 5) Enforce against and educate about price gouging
- 6) Assess existing plans for diversification and identify adaptive measures to economic vulnerabilities
- 7) Develop plans and policies to encourage and develop future affordable housing choices in areas outside vulnerabilities and with access to transit, jobs, and resources. Refocus funding to make more affordable housing
- 8) Develop a program to help impacted businesses with rent deferment
- 9) Research the potential of the existing financing programs and the roles they may play in the community (i.e. PACE, CDFI ,IIVA)
- 10) Develop a financial plan to build reserves for a “rainy day/disaster fund”
- 11) Develop a long-term financial plan for loss of or restructure of tax base in highly vulnerable areas
- 12) Assess reserves and develop a plan to build reserves for disaster preparedness and response – Update charter to build reserves and conduct referendum where necessary
- 13) Promote legislation that increases property taxes in high hazard zones to create a financial avenue for mitigation/adaptation strategies.
- 14) Build reserves and adjust budgets to include specific line items to be proactive regarding vulnerable infrastructure including commercial infrastructure

# Major Findings:

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## 4. Leadership and Strategy:

### Goal:

*Promote leadership, education and empowerment both in government, and public and private sectors to foster the implementation of resiliency strategies across disciplines and communities.*

### Priorities:

- 1) Overcome leadership roadblocks like budgets, political agendas, term limits, lobbyists, and lack of education
- 2) Develop regional and local collaboration through a more formal and continuous format
- 3) Education for everyone, including leadership. Have a succession plan and focus on keeping the end goal in mind
- 4) Build trust between government agencies and between the public and government agencies
- 5) Build financial security to be proactive

### Action Items:

- 1) Replicate the New Smyrna Beach Coastal Community Resiliency Campaign in other communities and update annually
- 2) Develop Positive Public Leadership Relations and Newsletters, Forums, etc.
- 3) Identify vulnerable priorities
- 4) Educate leadership on potential political impacts (Quarterly)
- 5) Conduct new leadership orientation
- 6) Insure municipal guaranteed property tax revenue
- 7) Investigate and develop innovative long-term funding and revenue generators
- 8) Create a Chief Resilience Officer position



- 9) Build reserves and adjust budgets to include specific line items to be proactive regarding vulnerable infrastructure including commercial infrastructure
- 10) Support the update of codes and policies to discourage development and high rises along coast and vulnerable areas
- 11) Find champions and strong advocates for planning for resiliency and natural systems, both elected and non-elected
- 12) Promote legislation that increases property taxes in high hazard zones to create a financial avenue for mitigation/adaptation strategies.
- 13) Create a regional education plan/tool box for use across the region for all levels and sectors both private and public as well as citizens



Volusia Building Economic and Social Resilience Workshop May 7, 2018

## Other Action Plan Items and Take-Aways:

- 1) Work with CareerSource, Chambers, and others to assist in the development of a template for workplace communication pre- and post-disaster
- 2) Review/overlay/consider identified aging infrastructure (public works projects), flood prone areas, vulnerable communities and high use transit stops for “hot spot” evacuation/post storm assistance
- 3) Assist the county and cities through their already established Council in developing and promoting language to encourage affordable housing choices policies with stronger building codes that address/consider resiliency. At the same time have county/cities pre-identify developers. Research Orlando model to mirror
- 4) Work with Brevard EOC on identifying clear path for reviewing Business Continuity of Operations
- 5) Develop/Re-convene long-term care working group with the goal to create a county wide model for preparedness and recovery and coordinate and determine an agency responsible
- 6) Finalize Long-Term Care Model and share with facilities
- 7) Implement Long-Term Care Model at facilities across the county
- 8) Identify and disseminate a clear path after development of private business COOP, what/ where do with the plan/ who reviews them
- 9) Interplanetary species - create resiliency on our own planet before we explore other planets
- 10) Education, funding and political will is key



# August Workshop–Introduction:

## Goal of the East Central Florida Regional Resiliency Action Plan:

Increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines.

## East Central Florida Regional Resiliency Action Plan Stakeholder Workshops:

The East Central Florida Regional Planning Council worked with stakeholders to develop a Regional Resiliency Action Plan for Brevard and Volusia Counties to “Increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines.” These workshops, which took place on August 20<sup>th</sup> and 21<sup>st</sup>, focused on engaging Public Officials, Agencies, and the Public in order to further the development of the plan. Presenters at the workshop included the East Central Florida Regional Planning Council, Florida Sea Grant, and Deady Law to provide an educational opportunity about the overall project, laws pertaining to resilience, case studies of adaptation measures, and legal cases associated with resilience. With the findings from the May workshops and informative presentations, the attendees were able to narrow-down, edit, and add to the priorities and actions that were formulated in May.

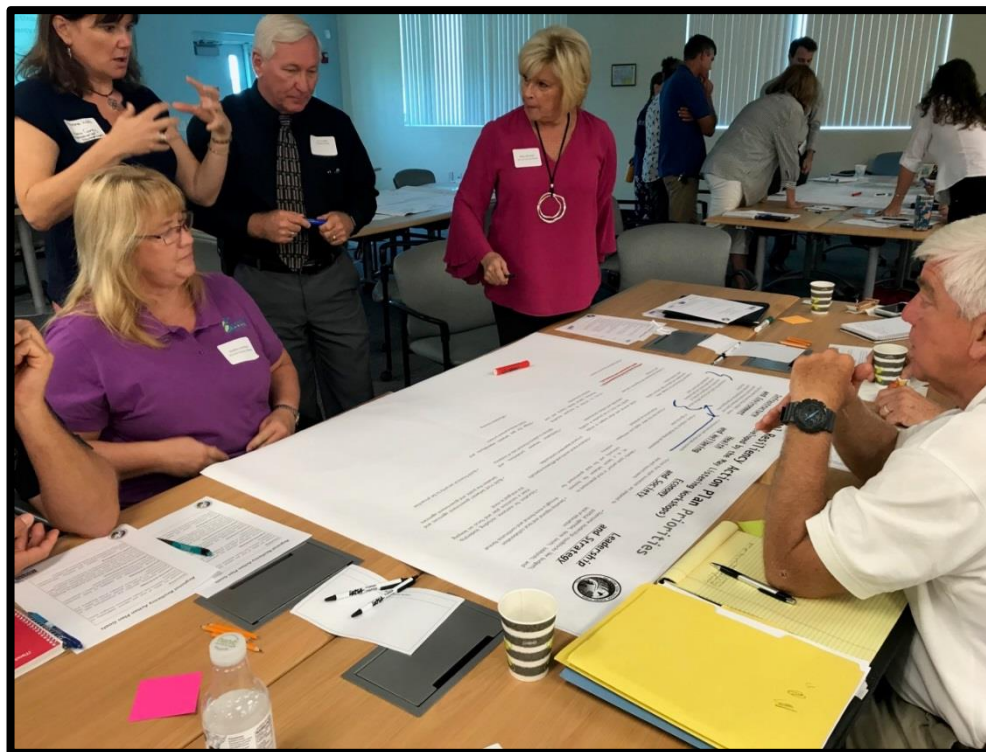
## Attendance:

Brevard Stakeholder Workshop	47 attendees
Volusia Stakeholder Workshop	50 attendees

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### Break-Out Session Groupings:

For this workshop, the attendees participated in break-out groups which had a “Priorities” and an “Actions” poster that encompassed the main ideas from the May workshops. The groups worked through the top 5 Priorities that were established in each of the 4 frameworks of the plan. The groups then worked through the Actions that coincide with each specific Priority on the Action poster. This exercise was used as a means for these stakeholders to narrow down and revise the priorities and actions used to formulate the plan. Discussions during the exercise focused on the needs, feasibility of the actions as presented, additional steps necessary to complete action items, departments/agencies, projects or programs already in place to accomplish tasks, and barriers.



Brevard Stakeholder Engagement Workshop August 20<sup>th</sup>, 2018

# Major Findings:

## Most Important Actions Chosen by Stakeholders:

Infrastructure and Environment	Health and Wellbeing	Economy and Society	Leadership and Strategy
1a) Improve infrastructure for sewage, water, stormwater and address high nutrient loading into natural systems.	1) Communicate with and educate residents.	1) Coordination between jurisdictions and agencies to address financial side of resiliency.	1) Overcome leadership roadblocks like budgets, political agendas, term limits, lobbyists, and lack of education.
1b) Educate the public and elected officials about economic and mitigation benefits of conservation lands and get problems recognized and acted upon.	2) Ensure that the water supply and stormwater infrastructure are protected.	2) Enhance transit access and efficiency especially in transit dependent communities.	2) Develop regional and local collaboration through a more formal and continuous format.
2) Conduct assessments and implement code and policy changes.	3) Protect residents by disallowing development in high-risk areas.	3) Identify “point person” in local government to act as a liaison between the business community and the local government for resiliency.	3) Education for everyone, including leadership. Have a succession plan and focus on keeping the end goal in mind.
3) Plan fiscally for long-term impacts.		4) Ensure that small businesses are prepared to deal with hazard events.	4) Build financial security to be proactive.
4) Address issues of flooding (nuisance flooding, storm surge impacts, and sea level rise).			

## **1. Infrastructure and Environment:**

- Determine locations of all vulnerable infrastructures
- Create (or add where one exists) a checklist for the planning, prioritization and funding of infrastructures projects to include assessment of vulnerabilities and if/how the project addresses long-term resiliency (and maintain funding) (Need funding to gain new data on city level/parcel level to be able to plan and educate with accurate and up to date data)
- Create a one-page document for benefits of green infrastructure
- Create a regional education plan/tool box for use across the region for all levels and sectors
- Conduct constant education of elected officials, public, developers, businesses etc. about different aspects of resiliency, natural systems and environmental issues (County Departments, TPOs, implement and reinforce) (educating public on how infrastructure works and its relationship with the environment- develop a strategy to do this)
- Train county, city and agency staff to respond to disasters or events through emergency exercises
- Identify program overlaps (Promise Lands, LMS, CRS, WMD, Stormwater, etc.) and identify what is being done that can be used for other planning and to advance resiliency
- Conduct a vulnerability assessment for stormwater infrastructure and prioritize and plan for stormwater infrastructure improvements and mitigation activities
- Implement strategies for wastewater level of service improvements
- Assess existing plans for obstruction of resilient goals; diversify and identify adaptive measures to vulnerabilities
- Reassess utility/conservation lands plan to integrate stormwater solutions more effectively (currently do to some degree- SJRWMD, capital projects, LDRs)

## **2. Health and Wellbeing:**

- Change future land use and zoning codes in vulnerable areas to promote resilient planning (3–5+ years, consider future conditions like SLR and stormwater)
- Protect sources of potable water from sewage and natural hazard infringement
- Research the potential of the existing financing programs and the roles they may play in the community (i.e. PACE, CDFI ,IIVA)
- Revisit comp. plan and revise as necessary to assume that population does not surpass sustainable levels
- Reassess budgets to determine for proactive resiliency funding (i.e. debris management, conservation lands, planning, etc.)
- Continue to utilize pre-registration to identify shelters for special needs and seniors within the community
- Ensure that a “primary” social media account relays all disaster-related information (currently doing EOC)

## **3. Economy and Society:**

- Develop a long-term financial plan for loss of or restructure of tax base in highly vulnerable areas
- Promote legislation that increases property taxes in high hazard zones to create a financial avenue for mitigation/adaptation strategies (cut out “increases property taxes”, AAAs)
- Engage small businesses (stakeholders) to ensure they have contingency plans and contingency funds for hazard events
- Develop and facilitate program development of Business Action/Continuity Plans (BCOOP) planning with small businesses and utilize local colleges and universities (Use 20+ businesses as a pilot)
- Develop a financial plan to build reserves for a “rainy day/disaster fund”
- Assess reserves and develop a plan to build reserves for disaster preparedness and response – Update charter to build reserves and conduct referendum where necessary
- Research the potential of the existing financing programs and the roles they may play in the community (i.e. PACE, CDFI ,IIVA)

- Assess existing plans for diversification and identify adaptive measures to economic vulnerabilities
- Help businesses develop and plan for resilience individually and with groups like Chamber of Commerce
- Enforce against and educate about price gouging
- Can use EOC model as a guideline for interagency long-term planning

#### **4. Leadership and Strategy:**

- Find champions and strong advocates for planning for resiliency and natural systems, both elected and non-elected
- Create a climate compact
- Develop Positive Public Leadership Relations and Newsletters, Forums, etc.
- Investigate and develop innovative long-term funding and revenue generators
- Create a Chief Resilience Officer position
- Support the update of codes and policies to discourage development and high rises along coast and vulnerable areas
- Build reserves and adjust budgets to include specific line items to be proactive regarding vulnerable infrastructure including commercial infrastructure
- Educate leadership on potential political impacts (Quarterly workshops for elected officials)
- Support the update of codes and policies to discourage development and high rises along coast and vulnerable areas
- Identify the roadblocks and acknowledge them as a first step



## Take-aways:

As one can tell, this activity from the workshops narrowed down the initial ideas. This was the goal of the workshop so that the community as a whole would be the driving force behind the plan's elements. Going forward, the Priorities and Actions are to be revised by our RRAP Steering Committee, ECFRPC staff, and any other necessary stakeholder to work toward a final form document.



Volusia Stakeholder Engagement Workshop August 21st, 2018

# Appendix D

## Regional Planning for Sea Level Rise Recommendation

# Regional Planning for Sea-Level Rise Recommendation

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A regional, coordinated approach to planning for sea level rise is important as agencies and communities identify potential risks to infrastructure, plan for future land uses, and determine appropriate mitigation and adaptation measures to minimize the risks of future flooding and inundation. One way that local governments can collaborate is to create sea level rise projections that are jointly developed and utilized across a defined area. Two examples of successful Florida regional coordinated sea level rise adaptation workgroups that have undertaken such efforts include:

- The *Southeast Florida Regional Climate Change Compact* which was established in 2010 by Broward, Miami-Dade, Monroe, and Palm Beach Counties as a mechanism for coordinating climate change mitigation, adaptation, and associate policy development across the four counties. The Compact's Technical Ad Hoc Working group comprised of experts from local universities, scientists from NOAA and the U.S. Geological Survey, and civil engineers in public service, worked together with the USACE to create 2011, and later, the [2015 Unified Sea Level Rise Projection](#) which establishes a single baseline for regional adaptation planning and provided the foundation for the [Southeast Florida Regional Climate Change Action Plan 2.0](#).
- The Tampa Bay Climate Science Advisory Panel, an ad hoc network of scientists and resource managers in the Tampa Bay region (Pinellas, Hillsborough, Manatee, and Pasco counties) formed in 2014, with the goal of developing recommendations for local governments and regional agencies addressing climate change mitigation strategies associated with sea level rise in the Tampa Bay Region. The [Recommended Projection of Sea Level Rise in the Tampa Bay Region](#) was developed by the Panel in 2015. The projection model is used as guidance for the Tampa Bay Regional Planning Council One Bay Resilient Communities workgroup and provided foundation for [The Cost of Doing Nothing Report](#) in 2017.

It is important to note that the unified sea level rise projections reached by both groups are regionally specific and rely on tidal gauge data sourced from within each region.

## Summary

The East Central Florida Regional Resiliency Action Plan Planning for Sea Level Rise Sub-Committee, comprised of federal, regional and local experts, academia and planners across sectors, developed a regional planning approach to sea level rise. The purpose of this approach is to provide local governments and regional agencies with a coordinated and vetted approach to planning for sea level rise. The recommended sea level rise range developed by the Sea Level Rise Sub-Committee provides a flexible approach to sea level rise planning as no one projection rate curve should be used for planning purposes across the board.

To date in the east central Florida region, most vulnerability analyses conducted have been based on the U.S. Army Corps of Engineers 2013 sea level rise projections. [ER 1100-2-8162](#) is the current USACE guidance for calculating Sea Level Change curves. These curves represent the range of potential future sea level change conditions considered by USACE planners and engineers. These curves were the first to be included in the Florida Department of Transportation funded [Sea Level Scenario Sketch Planning Tool](#) developed by the UF Geoplan Center in 2012 to help identify transportation infrastructure vulnerable to current and future flood risks. In phase three of the tool, improvements were made to analyze and visualize current flood risks (100-year and 500-year floodplains and hurricane storm surge zones) as well as future flood risks from sea level rise using the 2012 National Oceanic and Atmospheric Administration (NOAA)/ National Climate Assessment data.

In the 2017 update of the FEMA Community Rating System Manual (CRS), more emphasis was placed on future conditions and impacts of climate change in section 116.c of the CRS Manual by providing credit 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;
- demonstrate that it has programs that minimize increases in future flooding; use regulatory flood elevations in the V and coastal A Zones that reflect future conditions, including sea level rise;
- advise prospective property buyers of the potential for flooding due to climate changes and/or sea level rise; base regulatory map on future-conditions hydrology, including sea level rise; when a community accounts for sea level rise in managing its coastal A Zones;
- regulates runoff from future development in the stormwater program;
- manages future peak flows in the watershed master plan so that they do not exceed present values;

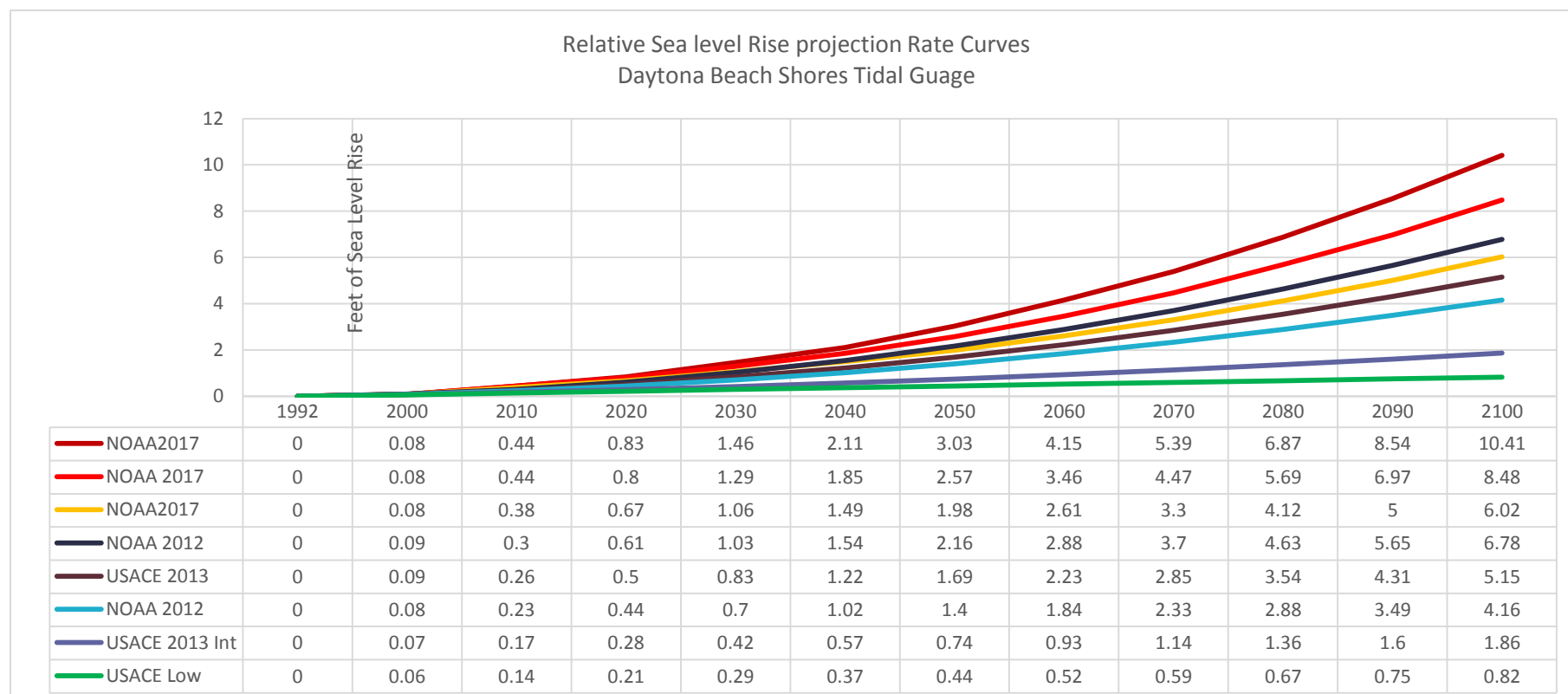
- address impacts of sea level rise in the watershed master plan (coastal communities);
- conducts flood hazard assessment and problem analysis to address areas likely to flood and flood problems that are likely to get worse in the future, including (1) changes in floodplain development and demographics, (2) development in the watershed, and (3) climate change or sea level rise.

According to the guidance in Section 404 of the manual, the CRS has adopted the base minimum projection for sea level rise for the purpose of CRS credits and prerequisites. *“The “intermediate-high” projection for 2100, as included in the report [Global Sea Level Rise Scenarios for the United States National Climate Assessment \(National Oceanic and Atmospheric Administration, 2012, https://scenarios.globalchange.gov/sites/default/files/NOAA\\_SLR\\_r3\\_0.pdf\)](https://scenarios.globalchange.gov/sites/default/files/NOAA_SLR_r3_0.pdf), is the minimum projection that must be used for CRS purposes. Communities may use other projections provided that they are equal to or greater to NOAA’s “intermediate-high” projection for 2100.”*

Also in 2017, as part of the science update for the Fourth National Climate Assessment, NOAA updated its projection rate curves based on the most updated data, science, modeling, literature and technical expertise. NOAA’s technical report, [NOAA Technical Report NOS CO-OPS 083](#), provides further information concerning the 2017 [Global and Regional Sea Level Rise Scenarios for the United States](#). These curves exceed the previous projections from 2012. NOAA 2017 projections are “grounded” in 2000, while the NOAA 2012 and USACE curves are “grounded” in 1992 (different tidal epochs). This means that when comparing the mean sea level projections for NOAA 2012 and NOAA 2017 in the [USACE sea level change](#) calculator, NOAA 2012 for intermediate high shows 0.08 feet for the year 2000, while NOAA 2017 shows 0.00 feet for high in 2000. Therefore, the calculator settings must be adjusted to compensate for the different tidal epochs and provide a comparable starting point. This is accomplished by checking the box “Adjust to MSL (83-01) Datum” in the calculator when assessing NOAA 2017 curves.

The figure below illustrates the NOAA 2012, USACE 2013 and the NOAA 2017 sea level rise projection rate curves after epoch adjustment.

Figure 3: All Relative Sea Level Rise Projection Rate Curves



Based upon the latest updates to the NOAA projection rate curves, the 2017 CRS Manual update, and the past sea level rise vulnerability assessments, as well as the findings from [NOAA Technical Report NOS CO-OPS 083](#) concerning the current and future occurrence of nuisance flooding, the sub-committee developed an approach to implementing these projections into planning processes and plans. The formal recommendation of the sub-committee is described below..

## Formal Recommendation

The East Central Florida Regional Resiliency Action Plan's sea level rise projection sub-committee provides the following recommendation for the east central Florida region for planning for sea level rise:

*No one projection rate curve should be used for planning purposes across all projects and programs. Instead, a range of rise should be considered based upon the vulnerability, allowable risk, and project service life and the forecast project "in-service" date of a facility or development. The range should include a minimum rise of 5.15 feet by 2100 (2013 USACE High) with an upper range of 8.48 feet by 2100 (2017 NOAA High). Short-term planning should consider impacts out to 2040 (20-year planning horizon), medium-term planning should consider impacts out to 2070 (50-year planning horizon), and long-term planning should extend out to 2100 (80-year planning horizon). Adaptation plans of the community should also be taken into consideration when planning, engineering and constructing infrastructure relative to sea level rise and flooding to ensure consistency with community development plans.*

### Upper Bound Description

The sea level rise estimates associated with the NOAA 2017 high rate curve are recommended as the upper bound of the planning scenario. These data are recommended for assessment and adaptation, mitigation and minimization planning of those facilities that have little risk tolerance and long functional life span, as well as new/proposed (re)development or significant intensification on previously minimally developed land that may be on future fringes of vulnerable areas. The upper bound of sea level rise planning should consider the local estimate for the forecasted year of facility life expectancy based on in-service date. USACE guidance requires a 100-year potential service life of large infrastructure projects. These projects along with new community development projects should include an approved adaptation strategy prior to construction consistent with the community's adaptation plan. It is recommended that

facilities necessitating an upper bound of sea level rise planning are recommended to plan for a minimum rise in sea level of 1.85 feet by 2040, 4.47 feet by 2070 and 8.48 feet by 2100.

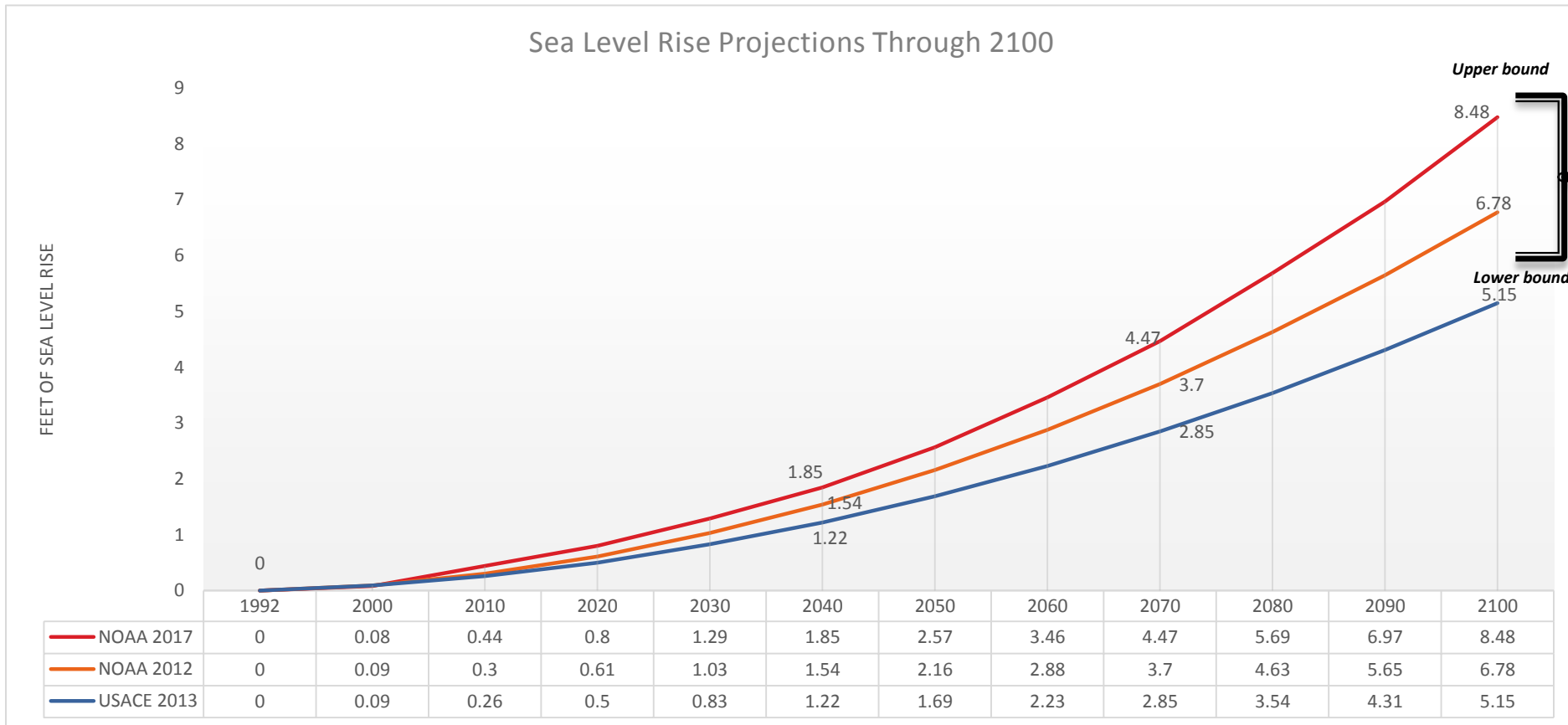
#### Lower Bound Description

The recommended minimal or lower bound of planning level for consideration is the USACE 2013 High Rate Curve or a minimum planning of 5.15 feet of rise by 2100 (1.22 ft. by 2040 and 2.85 ft. by 2070). This minimal planning level would be recommended for facilities that are less vulnerable, have a greater risk tolerance to flooding, are of little impact in terms of the health, safety and welfare of the community, facilities with a short time-frame of functionality or facilities that are easily relocated or planned for relocation. Using the USACE 2013 High Rate Curve as a minimum ensures that CRS activities applying even this lower bound are eligible for CRS credits under the 2017 manual.

*The following figure illustrates the recommended range for sea level rise planning and includes the projected rise in sea level by decade. The 2012 NOAA High projection is included for reference to illustrate the change in projection for this rate curve since the initial 2012 assessment.*



Figure 4: ECF Regional Resiliency Action Plan Recommended Bounds for Planning for Sea Level Rise



# Appendix E

## FDEP Adaptation Planning Guidebook Grant Resources

# FDEP Adaptation Planning Guidebook Grant Resources

<https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf>

The FDEP Adaptation Planning Guidebook provides a listing of grants and funding sources to implement resilience measures across sectors. The pages that follow include the excerpt from the document.

Federal Funding Opportunity	Description and Details
DOC/Economic Development Administration Investment for Public Works and Economic Development Facilities	Economic Development Administration (EDA) provides assistance to support the construction or rehabilitation of essential public infrastructure and facilities necessary to generate or retain long-term private sector jobs and investments, attract private sector capital, and promote regional competitiveness. Grants may be used for projects such as expanding and upgrading infrastructure to attract new industry, supporting technology-led development, redeveloping brownfield sites, promoting eco-industrial development, and supporting heritage preservation development. Generally, EDA investment assistance may not exceed 50% of the project cost. Projects may receive an additional amount that shall not exceed 30%, based on the relative needs of the region in which the project will be located, as determined by EDA. Additional financial limitations may apply depending on the recipient.
EPA Aquatic Ecosystem Restoration (CAP Section 206)	Work under this authority may carry out aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest, and are cost-effective. There is no requirement that an existing US Army Corps of Engineers project be involved.
EPA BEACH Grants	EPA makes grants available to eligible coastal and Great Lakes states, territories, and tribes to help them implement programs to monitor water quality at their beaches and to notify the public when water quality problems exist.
EPA Coastal Program	The U.S. Fish and Wildlife Service (FWS) Coastal Program partners with communities to provide technical and financial assistance to assess, protect, and restore or enhance priority coastal habitats for the benefit of fish and wildlife. The program is delivered through a network of 24 field offices in priority coastal habitats along the Atlantic, Pacific, Gulf of Mexico coasts and in the Great Lakes. Program biologists provide restoration expertise and financial assistance to federal and state agencies, local and tribal governments, businesses, private landowners, and conservation organizations such as local land trusts and watershed councils.

Federal Funding Opportunity	Description and Details
EPA Smart Growth Implementation Assistance Program	<p>The SGIA program is an annual, competitive solicitation of state, local, regional, and tribal governments (and non-profits that have partnered with a governmental entity) that want to incorporate smart growth techniques into their future development. Once selected, communities receive direct technical assistance from a team of national experts in one of two areas: policy analysis (e.g., reviewing state and local codes, school siting guidelines, transportation policies, etc.) or public participatory processes (e.g., visioning, design workshops, alternative analysis, build-out analysis, etc.). The assistance is tailored to the community's unique situation and priorities. EPA provides the assistance through a contractor team – not a grant. Through a multiple-day site visit and a detailed final report, the multi-disciplinary teams provide information to help the community achieve its goal of encouraging growth that fosters economic progress and environmental protection. EPA initiated the SGIA program in 2005 with three goals in mind:</p> <ol style="list-style-type: none"> <li>1. To support communities interested in implementing smart growth policies;</li> <li>2. To create regional examples of smart growth that can catalyze similar projects in the area; and</li> <li>3. To identify common barriers and opportunities for smart growth development and create new tools.</li> </ol>
FEMA Community Disaster Loan Program	<p>The Federal Emergency Management Agency (FEMA) provides direct loans to local governments to offset the loss of tax or other revenues as a result of a major disaster. The local government must demonstrate a need to maintain local governmental functions such as police and fire protection, or water and sewer services. Loans are not to exceed 25% of the local government's annual operating budget for the fiscal year in which the major disaster occurs, up to a maximum of \$5 million. To apply: The State's Governor requests a Presidential declaration of an emergency or disaster. An applicant should consult the office or official designated as the single point of contact in the state for more information on the process. Upon declaration, one may apply for assistance through the Governor's authorized representative.</p>
FEMA Flood Mitigation Assistance Program	<p>FEMA provides funds to local governments, tribes and some non-profits to reduce or eliminate claims made under the National Flood Insurance Program (NFIP). Specifically, the program aims to reduce the number of repetitive loss structures insured by NFIP. (Repetitive loss structures are those that have sustained two or more losses, each exceeding \$1000, within a ten-year period.) There are three types of grants that fall within the Flood Mitigation Assistance (FMA) program area: 1. Planning Grants to prepare flood mitigation plans; 2. Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures; 3. Technical Assistance Grants for the state to help administer the FMA program and activities. To apply projects should be submitted as the need arises to the state which then selects applications based on predetermined priorities set forth in a disaster specific Mitigation Strategy to send to FEMA for final approval.</p>
FEMA Hazard Mitigation Grant Program	<p>FEMA provides funds to local governments, tribes and some non-profits to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Grants given through the states to local governments following an official Presidential disaster declaration are used to implement long-term hazard mitigation measures that provide a long-term solution to a specific risk. For example, the grant could be used to elevate flood-prone homes or businesses, thus allowing floodwater to flow under the house rather than through it. FEMA will pay up to 75% of the project cost, while the remaining 25% must be funded through the state, local government applicants or individual property owners. In-kind services and materials can be used.</p>



Federal Funding Opportunity	Description and Details
Pre-Disaster Mitigation Grant Program	<p>The Pre-Disaster Mitigation (PDM) program provides annual funding to support states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. This program promotes implementation of activities designed to reduce injuries, loss of life, and damage and destruction to property from natural hazards. Administered by the state, the Pre-Disaster Mitigation (PDM) program is a competitive federal grant program that was created to assist communities with the implementation of cost effective mitigation activities prior to disasters. The intent of this program is to reduce overall risk to people and property, while also minimizing the cost of disaster recovery.</p> <p>The State of Florida provides workshops to explain the purposes of the program, eligible project types and application requirements. A 25-percent local match is required (to the federal contribution of 75 percent); this is a cost reimbursement program.</p>
Repetitive Flood Claims Program	<p>The Repetitive Flood Claims (RFC) grant program makes up to \$10 million available annually for FEMA to provide RFC funds to states and communities to assist them in reducing flood damages to insured properties that have had one or more claims with the NFIP. FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the applicant has demonstrated that the proposed activities cannot be funded under the Flood Mitigation Assistance (FMA) program.</p>
Transportation Enhancement Program by Federal Highway Administration	<p>The Transportation Enhancement Program provides funding and technical assistance for eligible activities, as specified in the federal act (SAFTEA-LU), including bicycle/pedestrian facilities, renovation of historical transportation facilities and other transportation enhancement activities. All projects must be related to the transportation system; project examples include bicycle and pedestrian facilities, scenic or historic site acquisition, scenic or historic highway programs, landscaping and beautification projects, historic preservation, rehabilitation and operation of historic transportation facilities, preservation of abandoned railroad corridors, control and removal of outdoor advertising, planning and research, and mitigation of water pollution due to highway runoff. Local governments, metropolitan planning organizations (MPOs), state agencies, federal agencies and statewide or national interest groups are eligible to apply.</p> <p>Application requirements are coordinated through the Florida Department of Transportation's (FDOT) Environmental Management Office.</p>
USACE - Aquatic Ecosystem Restoration	<p>There is a total of \$50 million available nationwide per fiscal year under this authority. The federal funding limit per project is \$5 million. The source is continuing authority given by Congress to the USACE.</p>
USACE – Hurricane and Storm Damage Reduction Projects	<p>Authority for this action is provided under Section 103 of the River and Harbor Act of 1962, as amended. This authority may be used for protecting multiple public or private properties and facilities, and for the protection of single non-federal public properties against damages caused by storm-driven waves and currents. This authority allows federal participation in the cost of protecting the shores from hurricane and storm damage.</p> <p>The source is continuing authority given by Congress to the USACE. There is a total of \$30 million available nationwide per fiscal year under this authority. The federal funding limit per project is \$5 million.</p>



Federal Funding Opportunity	Description and Details
USACE – Ecosystem Restoration in Connection With Dredging	<p>Authority for this action is provided under Section 204 of the Water Resources Development Act of 1992. This program authorizes “projects for the protection, restoration and creation of aquatic and ecologically related habitats, including wetlands, in connection with dredging an authorized navigation project.”</p> <p>The source is continuing authority given by Congress to the USACE. There is a total of \$15 million available nationwide per fiscal year under this authority. There is no per project federal funding limit for this authority.</p>
USACE - Clearing and Snagging for Flood Control	<p>Authority for this action is provided under Section 208 of the Flood Control Act of 1954, as amended. Program authority provides for minimal measures to reduce nuisance flood damages caused by debris and minor shoaling of rivers. Work under this authority is limited to in stream clearing and snagging, or channel excavation and improvement with limited embankment construction by use of materials from the channel excavation.</p> <p>The source is continuing authority given by Congress to the USACE. There is a total of \$7.5 million available nationwide per fiscal year under this authority. The federal funding limit per project is \$500,000.</p>
USACE - Flood Plain Management Services Program	<p>The Corps may provide flood plain information and planning assistance to state, county and city governments, and Native American nations as well as to other federal agencies. Flood and floodplain information also is provided to private citizens, corporations and groups. Funding for FPMS is obtained through appropriations for non-reimbursable FPMS items and through cost recovery for reimbursable services. Non-reimbursable items are funded with congressional appropriation through the USACE.</p> <p>Within personnel and funding capabilities, technical services and planning guidance shall be provided for state, regional or local governments, other non-federal public agencies and for Indian tribes without charge. Requests from federal agencies and private persons for services limited to “quick responses” (walk-in or telephone requests each of which require only 10 minutes or less of work by one person) may also be honored without charge; otherwise, technical services and planning guidance shall be provided to federal agencies and private persons on a 100-percent cost-recovery basis.</p>
USACE- Emergency Streambank and Shoreline Protection	<p>Authority for this action is Section 14 of the Flood Control Act of 1946, as amended. This program is designed to implement projects to protect public or not-for-profit public facilities and/or services that are open to all on equal terms, have been properly maintained but threatened by natural processes on stream banks and shorelines, and are essential and important enough to merit federal participation in their protection. A non-federal interest must be a public agency able to enter into an agreement in accordance with the requirements of Section 221 of the Flood Control Act of 1970. Section 221 specifies that the non-federal sponsor be a legally constituted public body with full authority and capability to perform the terms of its agreement and to pay damages, if necessary.</p> <p>There is a total of \$15 million available nationwide per fiscal year under this authority. The federal funding limit per project is \$1.5 million. Total project costs, including any planning and design costs in excess of \$100,000, are cost shared. The maximum non-federal contribution is 50 percent.</p>



Federal Funding Opportunity	Description and Details
USACE- Flood Damage Reduction	<p>Authority for this action is provided under Section 205 of the Flood Control Act of 1948, as amended. This program provides authority to plan, design and construct certain small flood-control projects in accordance with current policies and procedures, and that have not already been specifically authorized by Congress. Both structural (levees, channels or pumps, for instance) and non-structural (flood proofing or relocation of structures, for example) solutions to reduce damages caused by over-bank flooding are considered.</p> <p>A non-federal interest must be a public agency able to enter into an agreement in accordance with the requirements of Section 221 of the Flood Control Act of 1970. Section 221 specifies that the non-federal sponsor be a legally constituted public body with full authority and capability to perform the terms of its agreement and to pay damages, if necessary, in the event of failure to perform.</p> <p>There is a total of \$55 million available nationwide per fiscal year under this authority. The federal funding limit per project is \$7 million. The minimum non-federal share is 35 percent. The maximum non-federal contribution is 50 percent.</p>
USACE- Environmental Restoration	<p>Authority for this action is provided under Section 1135 of the Water Resources Development Act of 1986. The program provides authority for the USACE to review and modify the structures and operations of water-resources projects constructed by the Corps for the purpose of improving the quality of the environment when it is determined that such modifications are feasible, consistent with the authorized project purposes, and will improve the quality of the environment in the public interest. If it is determined that a Corps water-resources project has contributed to the degradation of the quality of the environment, restoration measures may be implemented at the project site or at other locations that have been affected by the construction or operation of the project if such measures do not conflict with the authorized project purposes.</p> <p>There is a total of \$40 million available nationwide per fiscal year under this authority. The federal funding limit per project is \$5 million. The non-federal share of the costs of Section 1135 modifications shall be 25 percent, and the first \$100,000 is paid 100-percent federal and any additional costs are shared 50/50 with the sponsor.</p>
USDA Community Facility Loan Program	<p>U.S. Department of Agriculture (USDA) Rural Development provides loans and loan guarantees to rural communities and municipalities of 20,000 population or less to assist them in developing public facilities that provide essential services to their residents. Facilities providing health care, public safety, transportation or cultural services, public buildings and improvements are examples of eligible projects. No match is required; joint funding of projects with state, local and private funds is encouraged. Public bodies, such as municipalities, county governments and special districts; Indian tribes and community-based, not-for-profit corporations are encouraged to apply.</p> <p>Pre-applications may be filed with the rural development office serving your area; applications may be filed year-round.</p>
USDA Community Facility Grant Program	<p>USDA Community Facility Grants can be used to assist low-income, rural areas and municipalities in developing essential public facilities for public bodies, not-for-profit corporations and Indian tribes and rural areas and municipalities with a population of less than 20,000. Funding is on a graduated scale, with larger percentages geared toward small and low-income communities. A maximum of 75 percent of project costs may be funded with this grant, depending on population and median household income of the community. Remaining costs may be funded with a rural development loan or matching funds from other sources. Pre-applications may be filed with the rural development office serving your area; applications may be filed year-round.</p>



Federal Funding Opportunity	Description and Details
USDA/RD Business and Industry Loan Program	<p>USDA – Rural Development provides direct and guaranteed loans. Loan purposes include but are not limited to: Business and industrial acquisitions when the loan will keep the business from closing, prevent the loss of employment opportunities, or provide expanded job opportunities; Business conversion, enlargement, repair, modernization, or development; Purchase and development of land, basements, rights-of-way, buildings, or facilities; Purchase of equipment, leasehold improvements, machinery, supplies, or inventory.</p> <p>Applicants can be a cooperative organization, corporation, partnership, or other legal entities organized and operated on a profit or non-profit basis; an Indian tribe on a Federal or State reservation or other Federally recognized tribal group; a public body; or an individual.</p> <p>The total amount of Agency loans to one borrower must not exceed \$10 million. Initial applications are accepted on a rolling basis. The maximum percentage of guarantee is 80% for loans of \$5 million or less, 70% for loans between \$5 and \$10 million, and 60% for loans exceeding \$10 million.</p>
Rural Development Water and Waste Disposal Loan and Grant Program	<p>The U.S. Department of Agriculture’s Rural Development Department provides long-term low-interest loans and grants, as well as loan guarantees, to rural communities and small municipalities of 10,000 or less people. These loans and grants may be used to help fund new, upgraded, renovated and expanded water-supply storage and distribution systems and waste-collection treatment and disposal systems, including wastewater, solid waste and storm drainage. Applications may be filed with the Rural Development office serving your area; applications may be filed year-round. No match is required; however, joint funding of projects with private funds is encouraged.</p>
National Science Foundation - Science, Engineering, and Education for Sustainability Program NSF-Wide Investment (SEES)	<p>This addresses the challenge of building a sustainable future through promoting research and education. Research efforts are to include global community sustainability, sustainable energy, modeling, vulnerability, resilience, sensitivity to regional change, and public engagement.</p>
National Science Foundation - Division of Ocean Sciences	<p>Funding opportunity on the subject of Physical Oceanography. In years past, this program has funded several climate change-focused research projects, including climate impacts on proglacial lake outbursts, the role of ice in large lake response to climate change, effects of lunar nodal tide on climate variability, and ocean data assimilation to research climate change. Applicants can include scientists, engineers, and educators representing universities and colleges, state and local governments, non-profit organizations, for-profit organizations, and individuals. NSF does not typically provide awards to federal agencies.</p>
National Association of Counties Strengthening Coastal Communities Challenge	<p>This association invites coastal counties from the Gulf of Mexico region with populations of less than 250,000 and the communities within and surrounding them to form multidisciplinary teams to apply for technical assistance. The technical assistance program will help communities identify ways to strengthen existing and implement new local plans and policies to increase resilience to extreme weather and climate-related hazards across the region.</p>
National Oceanic and Atmospheric Administration Office for Coastal Management Coastal Resilience Grant	<p>This competitive grant program funds projects that are helping coastal communities and ecosystems prepare for and recover from extreme weather events, climate hazards, and changing ocean conditions. All project proposals undergo a rigorous merit review and selection process by a panel of subject matter experts from across the United States that include representatives of government, academia, and private industry. Funding is typically available on an annual cycle.</p>



Federal Funding Opportunity	Description and Details
Gulf of Mexico Alliance Gulf Star Funding	Gulf Star is a public-private partnership administered by the Gulf of Mexico Alliance, a 501c3 public charity with flexibility to collaborate with others in the Gulf region. Gulf Star partners are agencies, businesses, private organizations, and citizens that provide funding for projects that are tied directly to Gulf economies such as sustainable seafood, loss of critical habitats, coastal resilience, water resources, living marine resources, and monitoring. The goal of the Gulf Star program is to facilitate partnerships between the Gulf of Mexico Alliance and outside funders who wish to use their investments strategically to achieve measurable results around these priority issues that are common to all five states of the Gulf of Mexico region.

State Funding Opportunity	Description
Florida Department of Environmental Protection - Coastal Partnership Initiative	The Coastal Partnership Initiative was developed to promote the protection and effective management of Florida's coastal resources in four specific priority areas: Resilient Communities, Coastal Resource Stewardship, Access to Coastal Resources, & Working Waterfronts. Florida's 35 coastal counties and all municipalities within their boundaries that are required to include a coastal element in their comprehensive plan are eligible to apply. Florida's public colleges, universities, regional planning councils, national estuary programs and non-profit groups may also apply, provided that an eligible local government agrees to participate as a partner. Applications are accepted once a year in response to a "Notice of Availability of Funds" published in the Florida Administrative Weekly. The funding year typically begins July 1 and ends June 30; however, this timeframe may be shifted if the grant cycle is delayed or postponed. Projects are to be completed within one year, no matter when the funding cycle begins.
DEP Clean Water State Revolving Fund Loan Program	The Clean Water State Revolving Fund (CWSRF) program provides low interest loans for planning, designing, and constructing water pollution control facilities. The Department solicits information each year for wastewater and stormwater projects. The information is used to establish project priorities for the following annual cycle. Funds are made available for Preconstruction Loans and Construction Loans. The Loan Terms include a 20-year amortization and low-interest rates. Preconstruction loans are available to all communities and provide up front disbursements for administrative services, project planning and project design. Cities, counties, authorities, and special districts responsible for sewerage services, stormwater management, and estuary protection are eligible for loans. The local government agency must generally own, operate, and maintain the facilities to be financed by a loan.
DEP Drinking Water State Revolving Fund Program	The Drinking Water State Revolving Fund Program provides financial assistance for improvements to drinking water facilities. Projects receiving the top priority are those that address public health risk problems. Compliance projects, those necessary to bring a system into compliance with the Safe Drinking Water Act, also receive a favorable priority score. Other projects are also eligible to secure remaining funds. Approximately \$65 million annually. Submit "Request for Inclusion on a Priority List" form, which may be obtained from the grant program office. A facilities plan required; project must be environmentally sound. Plans and specifications are required; all necessary permits must be obtained.



State Funding Opportunity	Description
DEP Florida Beach Erosion Control Program	<p>The Florida Beach Erosion Control Program was established for the purpose of working in concert with local, state and federal governmental sponsors to achieve the protection, preservation and restoration of the coastal sandy beach resources of the state. Eligible activities of this grant-in-aid program include beach restoration and nourishment activities, project design and engineering studies, environmental studies and monitoring, inlet management planning, inlet sand transfer, dune restoration and protection activities, dune walkover construction and other beach erosion prevention-related activities. All projects must be cost effective and compliant with the Florida Strategic Beach Management Plan.</p> <p>Up to 50 percent of the project costs for beach restoration projects and up to 75 percent for inlet management projects; other state grant-in-aid funds may not be used as a local match. The program requires submittal of funding request, including a long-range budget plan with supporting information for ranking as required by Rule 62B-36, Florida Administrative Code. Annual updates of budget plans are due September 1 of each year.</p>
DEP Florida Greenways & Trails Program - Financial Assistance	<p>The purpose of the Florida Greenways &amp; Trails Acquisition Program is to acquire lands to facilitate the establishment of a statewide system of greenways and trails. A greenway is defined as (1) a linear open space established along either a natural corridor, such as a riverfront, stream, valley or ridge-line, or over land along a railroad right of way converted to recreational use, a canal, a scenic road or other route; (2) any natural or landscaped course for pedestrian or bicycle passage; (3) an open space connector linking parks, nature reserves, cultural features or historic sites with each other and populated areas; or (4) a local strip or linear park designated as a parkway or greenbelt. Trails are linear corridors and any adjacent support parcels on land or water providing public access for recreation or authorized alternative modes of transportation.</p> <p>Florida Greenways &amp; Trails Program proposal applications must be submitted by the deadline published in the Florida Administrative Weekly. Federal, state and local governments; not-for-profit organizations and individual are encouraged to apply. The program receives 1.5 percent of the allocations funded by the state under the Florida Forever Act. Limited funds will be applied to projects on a current workplan. Prior to submittal of an application, applicants must apply for and receive a "Certificate of Eligibility." Applicants must meet the minimum requirements: the project must meet the definition of a greenway or trail; the planned project corridor must be located on the recreational prioritization maps; and there must be a seller willing to negotiate and a willing manager.</p>
Florida Department of Environmental Protection Recreational Trails Program	<p>The Recreational Trails Program (RTP) provides funds for projects that provide, renovate or maintain recreation trails. Project proposals may address motorized trails, non-motorized trails or mixed-use projects (motorized, non-motorized or both). RTP grant applications must be submitted during an announced RTP application submission period; applicants may submit only one application during the submission period. Applications must involve only one project site. Florida Department of Environmental Protection staff will conduct grant application workshops to provide guidance and answer questions regarding the program.</p> <p>A 50/50, 60/40 or 80/20 match is required. Municipal, county, state or federal government agencies approved by the state. Florida non-profit corporations are eligible to apply and receive funding to conduct projects on public lands.</p>



State Funding Opportunity	Description
Florida Inland Navigation District (FIND) - Cooperative Assistance Program	Under the Florida Inland Navigation District's Cooperative Assistance Program, financial assistance is provided to federal, state and regional governments with waterway management responsibility in the district's 12 counties for the development and implementation of waterway-related improvement projects. Applications are due April 1. Funding is available as of October 1 of each year. All projects require a 50-percent match except some public navigation dredging, which may qualify for a lesser match. Federal, state and regional governments that have waterway access and improvement management responsibility within the district's boundaries (the East Coast of Florida from Nassau County to Miami-Dade County) are encouraged to apply.
FIND - Waterways Assistance Program	Under the Florida Inland Navigation District's Waterways Assistance Program, financial assistance is provided to municipalities and county governments within the district's 12 counties for the development and implementation of waterway-related improvement projects. Approximately \$10 million per year. Funding is available as of October 1 of each year. Applications are due April 1. All projects require a 50-percent match except some public navigation dredging, which may qualify for a lesser match. General purpose local governments (municipalities and county governments) located within the district's boundaries (the East Coast of Florida, from Nassau County to Miami-Dade County) are encouraged to apply.
Florida Fish and Wildlife Conservation Commission (FWC) - Florida Boating Improvement Program (FBIP)	<p>FBIP provides funding through competitive grants for boating access projects and other boating-related activities on coastal and inland waters of Florida. Projects eligible for funding through FBIP include recreational channel marking and other uniform waterway marking; publicly owned boat ramps, piers, docks, lifts, boats, hoists, marine railways, and other public launching facilities; derelict vessel removal; boater education; economic development initiatives that promote boating; and other local boating-related activities.</p> <p>Dependent upon annual appropriation by the Legislature. No cash match is required. Some non-cash (in-kind) match required. Eligible program participants include county governments, municipalities and other governmental entities of the State of Florida.</p>
FWC State Wildlife Grants	Often this grant has a climate change, sea level rise, or resilience initiative that allows for grant funding to support a efforts towards the initiative.
DEM Residential Construction Mitigation Program	Section 215.559, Florida Statutes, created the Hurricane Loss Mitigation Program, which funds the Residential Construction Mitigation Program (RCMP). Annually, the Legislature appropriates \$10 million from the Florida Hurricane Catastrophe Fund for different mitigation programs which is funded by insurance surcharges. Notice of Funding Availability (NOFA) is advertised in the Florida Administrative Weekly and all requests for proposals are issued via the <a href="http://www.myflorida.com">www.myflorida.com</a> Web portal. Application deadlines can also be found at <a href="http://www.floridadisaster.org/mitigation/rcmp/index.htm">www.floridadisaster.org/mitigation/rcmp/index.htm</a> .
Southwest Florida Water Management District - Cooperative Funding Initiative	The Cooperative Funding Initiative (CFI) is a cost-share program that covers up to 50 percent of the cost of projects that help create sustainable water resources, enhance conservation efforts, restore natural systems and provide flood protection. All CFI funding decisions are made by volunteer Basin Board members who are well informed on the specific resources and challenges within their individual basins. Working with local governments and community partners allows the district to leverage its investment. Approximately \$25 million is available yearly. 50/50 cash cost share between the Basin Boards and the cooperator. (In-kind services not eligible as a match.)



State Funding Opportunity	Description
State of Florida Pollution Control Bond Program	This State of Florida Pollution Control Bond Program provides loans to local governments for construction of water, wastewater, solid waste, stormwater and air pollution control facilities. Proceeds from bonds sold by the state provide for up to \$300 million per year. Eligible entities must submit complete loan applications with plans and specs. Florida municipalities, county governments and special districts are encouraged to apply.
State Revolving Fund Loan Program for Wastewater Treatment	The State Revolving Fund (SRF) Loan Program for Wastewater Treatment provides low-interest loans to fund water pollution control activities and facilities. Eligible projects include publicly owned wastewater and stormwater treatment, collection, transmission, disposal and reclamation re-use facilities, as well as infiltration/inflow correction. In addition, the SRF can now fund agricultural stormwater runoff pollution control activities, brownfields associated with contamination of ground or surface waters, and estuary pollution control activities. Funded by annual federal and state match appropriation, plus repayments from previous loans, investment earnings and bond proceeds. Municipalities, county governments, special districts, authorities or agencies thereof with jurisdiction over collection, transmission, treatment or disposal of wastewater, industrial wastes or other wastes are eligible as well as districts or authorities with responsibility to provide airport, industrial or research park, or port facilities to the public. Non-governmental parties are eligible for loans to control stormwater pollution related to agricultural operations.

Non-Profit Funding Opportunity	Description
The Trust for Public Land - Conservation Finance Program	A national, non-profit organization, TPL offers a variety of services to cities, including conservation real estate transactions and conservation finance. TPL's Conservation Finance Program helps local governments gauge public support for open space and craft ballot and legislative initiatives that can generate new sources of funding for conservation. Over the last eight years, TPL's Conservation Finance Program has worked on 303 successful state and local measures to create more than \$22 billion in new funding for land, conservation including 15 measures in Florida. Over the last 12 years, TPL's Conservation Finance Program has supported 294 local ballot measures that have created \$19.3 billion in land conservation funding. In Florida, TPL's Conservation Finance Program has assisted 18 local governments in creating more than \$1.3 billion in new funds for land conservation. There is no application deadline; contact TPL with requests, as needed. Local governments and citizen groups are encouraged to apply.
Southeast RCAP Financial Service	Southeast RCAP Financial Service, is a regional non-profit lender committed to helping rural communities with water, wastewater, and housing and economic development activities in DE, MD, VA, NC, SC, GA, and FL. Its loan fund offers interim funding up to \$500,000, with interest rates as low as 3%. The terms are flexible and can be tailored to meet the needs of rural communities. It also provides money to entities that are currently waiting to draw down on rural development money. In addition, Southeast RCAP Financial Service provides financial assistance to individual household members to reconstruct and refurbish their wells. This program allows a 1% loan up to \$11,000 for a term that is flexible from 10 to 20 years for the 7-state region. The maximum loan for individual household well loans is approximately \$11,000; loan amounts for water, wastewater, housing development activities and economic development loans is \$150,000. Loans cover 75 to 100 percent of total project costs, up to \$150,000. There is a 1-percent application fee and filing cost. Borrower must pay applicable attorney fees, which are usually around \$800. There are no deadlines. Applications are accepted year-round. Commitment letters are issued within 60 to 90 days of receipt of application. Local governments, public service authorities, user associations and not-for-profits are encouraged to apply.



Non-Profit Funding Opportunity	Description
The Wildlife Conservation Society's Climate Adaptation Fund	Funding for on-the-ground projects that focus on implementing conservation actions for a climate adaptation at a landscape scale. U.S.-based non-profit organizations with approved IRS 501(c)(3) status are encouraged to apply. Public agencies, tribal governments, and universities may partner with eligible non-profits to submit proposals. There is a 1:1 match ranging from \$50K to \$250K with a maximum of 50% match funding from in-kind sources.
The Doris Duke Charitable Foundation (DDCF)	DDCF's Environmental Program strives to meet four main strategies through grant awards: 1) enabling strategic wildlife habitat conservation in an era of climate change; 2) reducing impacts on the landscape from increased energy development and energy demand; 3) encouraging land stewardship and sustainability; 4) helping to build a clean-energy economy.
The Rockefeller Family Foundation (RFF)	RFF focuses on public education of the risks of global warming, conservation of natural resources, protection of health as affected by the environment, meaning implementation of environmental laws, and public participation in national environmental policy debates. Since 2006, RFF has focused its Environment program almost exclusively on climate change. The program emphasizes public education on the risks of global warming and implementation of sound solutions. RFF is interested in the development of initiatives designed to enact aggressive policies at the state and national levels to reduce carbon emissions; disrupt the coal life cycle from mining and burning to ash disposal and exporting; bring diverse and compelling new voices into the climate debate; and examine how special interests are distorting science and delaying constructive steps to deal with this impending global crisis. United States non-profit organizations engaged in activities of national significance are encouraged to apply.
The Kresge Foundation	This Foundation's Environmental program invests in projects that revolve around the following strategies: 1) building the field of climate change adaptation; 2) fostering development of place-based adaptation strategies; 3) informing and promoting climate-wise policies and practices. The foundation primarily accepts grants by invitation; however, preliminary applications can be submitted that includes background information about the proposal. 501(c)(3) organizations, government entities are encouraged to apply
Surdna Foundation	This foundation invests in projects that support their program areas of Sustainable Environments, Strong Local Economies, Thriving Cultures, Community Revitalization, and Effective Citizenry. An example of a previous grant award is \$200K to the American Planning Association to aid U.S. planners with initiatives to integrate energy sustainability and climate change in to contemporary planning practices. U.S. based non-profit organizations are encouraged to apply. There are no application deadlines. Grants are assessed three times a year (Feb, May, and Sept), and must be submitted three to four months prior to staff review.
Alfred P. Sloan Foundation	This foundation offers grant assistance in 6 major program areas. Two such areas are the "Public Understanding of Science," and the "Basic Research" areas. Through these programs, the foundation offers grants for high-quality, original STEM (science, technology, engineering, and math) research that benefits the scientific community, as well as increases the public understanding of relevant and complex scientific issues. The Public Understanding of Science program promotes using books, television, radio, film, theatre, and other media in order to engage the public in science and technology. No application deadlines. The foundation makes grants year-round.

# Appendix F

## Best Practice Resources

# Best Practice Resources

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The following best practice resource documents were reviewed and utilized to guide the Regional Resiliency Action Plan in effort to not to recreate already established and dynamic plans, policies and ideas.

A Procurement Guide to Nature-Based Solutions - The Nature Conservancy-

[http://nrcsolutions.org/wpcontent/uploads/2018/02/NBS\\_Procurement\\_Guide.pdf](http://nrcsolutions.org/wpcontent/uploads/2018/02/NBS_Procurement_Guide.pdf)

An Rx for Resiliency - By Tom Sieniewicz, AICP, AIA, LEED AP, and Kim Way, PLA, ASLA-

<https://www.planning.org/login/?next=/planning/2018/mar/rxforresiliency/>

A Region Responds to a Changing Climate – Southeast Florida Regional Climate Change Compact Counties Regional Climate Action Plan 2012-

<http://www.southeastfloridaclimatecompact.org/wp-content/uploads/2014/09/regional-climate-action-plan-final-ada-compliant.pdf>

A Survey of Regional Planning for Climate Adaptation – National Association of Regional Councils and NOAA-

[http://narc.org/wp-content/uploads/NOAA\\_White\\_Paper-FINAL2.pdf](http://narc.org/wp-content/uploads/NOAA_White_Paper-FINAL2.pdf)

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