

**TAMPA BAY REGIONAL PLANNING COUNCIL
REGIONAL RESILIENCY REPORT**

Implementing Florida's 2015 Peril of Flood Act:
Improving Local Government Capacity to Assess Vulnerability and Develop Adaptation
Strategies to Mitigate Flood Risks

**INTEGRATING NATURE-BASED ADAPTATION, LOW-IMPACT DESIGN, COMMUNITY
REDEVELOPMENT AREAS, AND ATTAINABLE HOUSING IN THE TAMPA BAY REGION INTO
EFFORTS TO IMPLEMENT THE 2015 PERIL OF FLOOD LEGISLATION IN TO LOCAL GOVERNMENT
COMPREHENSIVE PLANS**

**Funded by a 2018 grant from
the Florida Resilient Coastlines Program in the Florida Coastal Office of DEP
with funding from NOAA's Florida Coastal Management Program.**

Produced June 2019

Project Partners

The Tampa Bay Regional Planning Council

Manatee County Government

University of Florida Resilient Communities Initiative

Collaborating Academic Partners

UF Shimberg Center for Housing Studies

UF | IFAS Extension—Program for Resource Efficient Communities

USF College of Marine Science

USF Department of Urban and Regional Planning

USF School of Architecture Florida Center for Community Design and Research

Table of Contents

- I. Executive Summary
- II. Task One: Needs Assessment and Checklist
- III. Task Two: Supporting Nature-Based Adaptation Strategies
- IV. Task Three: Assessing Community Vulnerability, Affordable Housing and Community Redevelopment Areas
- V. Task Four: Increasing Resilience in Manatee County
- VI. Conclusions and Recommendations
- VII. Resources

EXECUTIVE SUMMARY

Through this Peril of Flood Project, the Tampa Bay Regional Planning Council (TBRPC), along with its project partners Manatee County Government, the University of Florida Resilient Communities Initiative (UFRCI), and the University of South Florida (USF) focused on a multi-pronged approach which addressed nature-based adaptation and community resiliency factors not currently addressed in most vulnerability assessments (VAs) focused on publicly-owned infrastructure facilities.

Environmentally-based resiliency approaches, such as restoring wetlands and re-naturalizing shorelines or maintaining open spaces can provide buffering from storm surge and flood reduction benefits. Identifying vulnerable areas can, in turn, provide the data and illustrative mapping to support policies, principles, and strategies to inform Comprehensive Plans, especially Coastal Management Elements and redevelopment components to enhance future resiliency.

Understanding of the broader social equity and vulnerability issues associated with changing climate and certain housing segments and populations, currently lags behind knowledge of the vulnerabilities of infrastructure and the built environment. Increasing the communities' and region's understanding of social vulnerability and use of planning equity principles can forewarn unintended consequences from maladaptive development and redevelopment.

This Project assessed local government implementation status, provided training on strategies, tools, and projects that can be included in VAs, and empower local governments to amend their Comprehensive Plans and actively advanced Manatee County's efforts, to achieve greater resilience in meeting Peril of Flood requirements.

- **Nature-Based Adaptation:** Employing environmentally-based resilience approaches, such as restoration of wetlands and re-naturalized shorelines, can provide buffering from storm surge and overall flood hazard reduction. A major focus of this Project was to enable local governments to identify and describe areas that are vulnerable to coastal flooding, and identify areas that can become more resilience by incorporating environmentally-based adaptation techniques, enhancing use of green infrastructure and low-impact design (LID) projects.
- **Social Vulnerability, Housing, and Community Redevelopment Areas (CRAs):** Increasing the communities' and region's understanding of social vulnerability and planning equity principles may prevent unintended consequences from maladaptive future development and redevelopment policies and principles. The Project team met with CRA experts, the United Way Suncoast and other community organizations to gain an increased understanding of unmet community needs, demographics, and social vulnerability factors. These meetings informed the Project Team's understanding of short- and long-term impacts to public and private affordable housing and Community Redevelopment Areas (CRAs).

Better understanding and support for social vulnerabilities is critical to include policies to mitigate against such vulnerabilities in multiple Comprehensive Plan elements toward more resilient communities. Project activities supported the incorporation of the [CDC SVI tool](#) and other datasets into VA processes. Participating local government staff and local consultants defined ideas for pilot projects, new resilience incentives and visual tools for community engagement, and also called attention to future impacts such as gentrification, and the need to update Coastal High Hazard Area plans. They also identified the lack of support for multi-family developments to ensure community housing needs and prevent further loss to the already limited availability of housing.

- **Manatee County Resilience:** Manatee County was a full partner in this Project. Planning staff were already engaged in an overhaul and update of their Post-Disaster Redevelopment Plan (PDRP), “redevelopment component” of the Coastal Management Element of their Comprehensive Plan, and were seeking to include the municipalities in resilience and redevelopment planning efforts. Manatee County elected officials and staff at all levels participated in numerous meetings and workshops to better address their needs for implementing the Peril of Flood requirements and other resilience efforts. As a result of this Project, Manatee County staff strengthened their already robust GIS skills and resilience knowledge, created new mapping tools and increased their ability to infrastructure and community vulnerability. Their one-day resilience workshop attracted more than 90 people, enhanced relationships with cities and produced community recommendations for the County to use in plan updates. The grant has motivated staff to develop a Resilience Action Plan and will make updates to plans in FY 2020.

Sustaining the Regional Resilience Coalition

The TBRPC formed the Tampa Bay Regional Resilience Coalition and held a signing ceremony in October 2018. As of June 2019, the Resilience Coalition includes all six counties and 22 cities in the RPC region, which have signed a Memorandum of Understanding. The POF Project activities supported this new initiative by providing opportunities for elected officials and local government staff to learn about specific risk information and discuss potential strategies with their peers. The cities of Holmes Beach and Bradenton Beach joined the Resilience Coalition within one month of attending the Manatee County Resilience Workshop.

The Project created opportunities for knowledge sharing among local government staff, and also produced multiple maps and tools for local users which begin to integrate housing and other community risk factors. The project survey, roundtable discussions and multiple evaluations defined additional needs for technical assistance. The Project also identified the different support and resource needs of smaller cities, compared to larger cities and counties. The TBRPC and Coalition will use the user-defined information to develop new continuing education programs.

Task 1: Survey to Assess Status and Training Needs and Developing Best Practices Checklist

OVERVIEW

All Florida local governments are required to amend their comprehensive plans to comply with the requirements of the Peril of Flood by or before the deadline for their regular, statutorily-required comprehensive plan evaluation and appraisal (EAR). The initial phase of the Project included an online survey which assessed the status of Tampa Bay Regional local governments' Peril of Flood implementation efforts, and determined needs for resources, tools, and training to address the key categories of Peril of Flood requirements. The Project also proposed to create a Best Practices Checklist for Conducting and Integrated Vulnerability Assessment.

SUMMARY

On September 17, 2018, the Project Team held the Project Launch Meeting with representatives from Manatee County (Team Manatee) and the Shimberg Center for Housing Studies at the Manatee County Emergency Operations Center (EOC). After several internal meetings, the Peril of Flood Implementation Project Team (Project Team), developed the survey and draft Best Practices Checklist (Checklist)

The preliminary draft Checklist was compiled using the Southeast Compact Regional Climate Action Plan (RCAP) 2.0, and the Maryland Coastal Community Resiliency Indicators and Rating Systems report and other tools to define objectives, policies, and strategies. The draft was reviewed by the Project team and other participants throughout the Project. On November 2, 2018, the Team gave an overview at the One Bay Resilient Communities Working Group (One Bay Working Group) to solicit input. The One Bay Working Group offered suggestions. The Project Team then disseminated the online Survey to elected officials, TBRPC council members, and local government staff via TBRPC and Manatee County stakeholder mailing lists. Additional emails were sent, and printed reminder cards were distributed at the December 2018 TBRPC Council meeting to solicit additional responses.

As of June 2019, the 22-page draft Checklist also includes a section focused on policy considerations, goals and objectives. The Checklist draft was revised after the Community Vulnerability Workshop to include a Housing Section. The TBRPC proposes to engage subject matter experts for additional critical review in Summer-Fall 2019. The designed draft was submitted on June 28.

Survey was deployed to local governments to assess their current comprehensive plans, ordinances, and processes and identify unmet technical information needs. The Project Team analyzed the results of Manatee County survey responses. The team defined priority topics and level of training support needed for the two technical assistance workshops to be planned.

LESSONS LEARNED.

Need for Increased Communications. From the survey and discussions, the Project Team learned that there was limited awareness of the Peril of Flood requirements, which varied among and within local governments. Many elected officials expressed general awareness but had little understanding of the details and requirements. Notably, staff awareness appeared to lessen the farther the employees' job responsibilities tended from direct involvement with the local comprehensive plan. The survey data and in-person reactions to the Checklist indicated a need to create a better understanding of the role of a VA in developing strategies to implement Peril of Flood requirements.

RECOMMENDATIONS/NEXT STEPS.

Ongoing communications about resilience and requirements of Peril of Flood is needed. To assure that the Peril of Flood requirements and the underlying policy background were communicated systematically, the Project Team decided to include an introductory overview of Florida resilience efforts at the state level and of the Peril of Flood legislation in each of the subsequent meetings and workshops.

TASK 2: Supporting Vulnerability Assessments (VAs) and Nature-Based Adaptation

OVERVIEW

Using environmentally-based resilience strategies can reduce flood impacts due to storm surge and extreme rain events. The focus of this Project task was to increase local governments ability to identify areas that could become more resilience by incorporating environmentally-based adaptation techniques, enhancing use of green infrastructure and low-impact design (LID) projects.

The two main goals of the second task included providing technical assistance meetings to focus on local government efforts related to VAs; and a workshop to increase knowledge of environmentally-based adaptation strategies and mapping to support Peril of Flood data requirements.

The Project Team held meetings and conference calls with staff in Manatee, Pinellas, and Hillsborough counties to better understand the scope of local efforts and specific unmet technical information needs. TBRPC also met with recently established resilience working groups in Pasco County, Citrus County, and Hernando County to discuss status of their VAs, get updated on Peril of Flood planning efforts, and collect input from different departments about perceptions of changes in local weather, climate risks, and interests in nature-based adaptation strategies.

The workshop was designed to demonstrate feasibility and benefits of nature-based engineering solutions to motivate attendees to map potential natural assets. The workshop focused on shoreline projects to provide surge and erosion protection for private and public property. Sessions also addressed criteria for potential open space, site assessments, engineering and planning considerations, and benefits to ecological systems. The overview and case study of Robinson Preserve in Manatee County demonstrated how coastal open spaces could be designed to anticipate ecosystem changes to SLR, improve coastal protection for the community, and provide recreational amenities.

SUMMARY

The workshop was held on March 21, 2019 at the Tampa Bay Regional Planning Council office and included leading experts: Jerry Murphy, AICP, CFM, Research Associate, University of Florida Resilient Communities Initiative; Thomas F. Ries, Southeast Biological Services and Restoration Director, Environmental Science Associates; Damon Moore, Environmental Program Manager, Manatee County Parks & Natural Resources Department; and Laura Geselbracht, Senior Marine Scientist, The Nature Conservancy.

The workshop attracted 47 attendees representing a diverse group of professionals from local government floodplain managers, planning, public works, and stormwater management staff and private sector from Hillsborough, Pasco, Palm Beach and Manatee counties, the Hillsborough Planning Commission, the Sarasota-Manatee MPO and the cities of Clearwater, Gulfport, St. Petersburg, University of South Florida planning faculty and planning students. Additional attendees included staff from the East Central Florida RPC, planning staff at MacDill A.F.B., and employees from leading engineering companies.

After the workshop, attendees were better equipped to:

1. Understand how statutory Peril of Flood provisions relate to community planning for coastal areas;
2. Understand how nature-based strategies can augment or replace conventional structural engineering approaches to surge mitigation and stormwater management;
3. identify local sites that are suitable for nature-based adaptation projects;
4. develop a list of priority nature-based flood and resilience projects that consider climate change impacts (extreme weather, storm surge, sea level rise);
5. understanding of project implementation process, steps and different technical and tools to evaluate different projects;
6. define and evaluate the risk reduction benefits to infrastructure and ecosystem services benefits for specific projects;
7. identify barriers in local government plans, policies and processes that need to be updated;

LESSONS LEARNED

The workshop was highly rated by attendees who completed the evaluation. The session *Principles of Restoration and Adaptation to Decrease Flood Risks* was rated extremely useful or very useful by 93 percent of attendees. *Identifying and Assessing Potential Sites* was the second highest rated session, with 86 percent of attendees rating it extremely useful or very useful.

The evaluation assessed attendees' status of specific implementation activities (had been completed or how likely they were to implement) in the next 12 months. Results found that only two activities had some level of completion: 40 percent indicated that they had completed "mapping and categorizing green spaces", and 24 percent had completed "defining public lands that experience repetitive flooding as opportunities for Open Space Preservation." All other activities were below 10 percent.

The top three actions attendees indicated intent to act were:

- 1) conduct site assessments for living shorelines or enhanced seawalls;
- 2) look for proposals to develop plans or implementation;

- 3) create green infrastructure or nature-based language for the comp. plan/coastal management element.

Thirty-five (35) percent indicated they *would definitely conduct* site assessments for living shorelines or enhanced seawalls, and 40% indicated that they were *moderately likely to conduct* site assessments.

RECOMMENDATIONS/NEXT STEPS

This phase of the Project increased the level of attention and interest in nature-based adaptation. That interest will be sustained in the future by TBRPC initiatives to support a community of practice. The survey and workshop attendees defined technical topics and policy issues. In May, the TBRPC and local government staff involved in the Regional Resilience Coalition agreed to form a new Shoreline and Seawalls workgroup which will work within the Coalition to develop a guidance document and support local governments.

The TBRPC will work with the Tampa Bay Estuary Program, and other environmental partners to develop a continuing education plan for the next year to address specific technical and policy training needs. Additional TBRPC efforts will include discussions at the Resilient One Bay meetings on innovative design projects that can address inland flooding, model language for various plan elements, including Coastal High Hazard Areas Long Range Development codes and other specific technical needs to increase site assessments and mapping.

OTHER INFO:

The application for APA CMs was supported by the Florida Planning and Zoning Association: 5.5 CECs were provided. See link to [APA](#).

Presentations are available here: <http://www.tbrpc.org/peril-of-flood-workshops/>.

TASK 3: Linking Affordable Housing Agencies & CRAs in Resiliency Planning

OVERVIEW

Vulnerability assessments and resilience planning efforts need to be informed by a robust understanding of risks to community populations and affordable housing. Understanding the socio-economic considerations of specific populations, and potential climatic impacts to housing, transportation infrastructure, and economic services of vulnerable neighborhoods are key. Additional assessments of comprehensive Plans, including local development regulations, and redevelopment components are needed to ensure support for resilience and reduce potential risks. This Project (Task3) implemented a multi-level effort to increase the Project Team's and local government partners' understanding of the threats to vulnerable community populations, housing stock, and Community Redevelopment Agencies (CRAs).

SUMMARY

The Project Team and unfunded partners at the University of South Florida Department of Urban and Regional Planning, USF School of Architecture and UF Shimberg Center of Housing Studies developed new information, resources, GIS maps, online tools and presentations which supported knowledge-sharing and discussions at the CRA meetings and workshops. The resources are being disseminated through the Project Team (TBRPC, UF, and Manatee County) websites.

The project deliverables included the following:

- 3.1. two, 90-minute meetings to discuss Community Redevelopment Areas and affordable housing -- Hillsborough County on June 12, and one in Pinellas County on June 13;
- 3.2. 1-day workshop "Conducting Social Vulnerability Assessments" on June 14.
- 3.3. Produced maps and data layers and updates to plans for local governments;
- 3.4. Report with recommendations from the CRA meetings and Workshop.

Approximately, 55 professionals were engaged through the two CRA meetings and the 1-day workshop. The group included representatives from four counties, two county Municipal Planning Organizations, nine cities, and six CRAs/ redevelopment areas, several planning and engineering firms, and community organizations involved in social equity issues. Professional roles were also diverse – with HR representatives from major beverage companies to building construction specialists, and many were also first-time TBRPC workshop attendees. The meetings and workshop were catalytic in defining unmet needs and creating new efforts.

New Resources Produced for the Project

- Manatee County Housing Stock Analysis and Map
- Maps of CRA locations and flood/SLR risks
- Map of Mobile Home Park Locations
- Overview Presentation of Affordable Housing Risks and Impacts:
- Housing Section Added to the Integrated Vulnerability Assessment Checklist

Meetings and Workshop Highlights

The CRA meetings started with updates from the attendees on their general CRA planning and management projects. The Project team then reviewed flood and surge maps of the updated regional SLR projections from the Tampa Bay Climate Science Advisory Panel and facilitated discussions about potential impacts, community vulnerability factors, equity. The attendees and the Project Team discussed feasible program ideas including support business resilience.

Overall, the workshop was highly rated with the morning sessions on new information and strategies receiving slightly higher ratings than the afternoon hands-on/ “how to” sessions. The form asked about intent to implement specific assessment or planning actions. A three-point scale was used to define “How likely you are to do, or support, each of the following activities in the next 12 months.” Attendees reported that they were “highly likely to do...” the following:

- 55% Hold meetings with stakeholder partners to discuss community vulnerability
- 45% Map and categorize potential impacts to vulnerable populations
- 41% Conduct internal meetings to discuss integrated vulnerability assessments
- 36% Review comp plan for compliance to Peril of Flood requirements
- 32% Map and categorize housing stock
- 23% Review housing and redevelopment plans to identify potential updates
- 18% Update plan elements that address affordable housing

Outcomes and Next steps

Several outcomes will be implemented post-grant.

1. **Engage the Florida Redevelopment Association (FRA):** As a result of his involvement in the POF CRA meetings, New Port Richey Councilman Altman engaged FRA director Carole Westmoreland who immediately included a new session based on this Project at their annual conference in Tampa on October 17-19. TBRPC will work with FRA to develop survey for their members on resilience, prior to the Conference.
2. **New Pinellas County CRA Workgroup:** In May, the County formed a CRA working group comprised of CRA directors which will meet quarterly. Resiliency will be on the Sept. meeting agenda and TBRPC will support the County staff.
3. **Defining New Resilience Programs for CRAs:** The CRA coordinators quickly identified opportunities to support resilience improvement efforts among local businesses. The TBRPC will work with the CRAs develop program concepts.
4. **Increase Consistency in Housing Risk Categories.** The TBRPC, the USF School of Architecture and UF Shimberg Center for Housing Studies will begin to define a process to support consistent housing mapping and analysis.
5. **Partnership with UnitedWay Suncoast.** TBRPC and the United Way staff will meet in July to discuss partnership to on resilience planning efforts to better assess and address underlying, existing social and economic vulnerability conditions.

LESSONS LEARNED

Use of Housing Data in Vulnerability Assessments Needs a Vetted Process. Presenters and attendees at the workshop defined a clear need to convene experts to discuss housing data standardization, define appropriate risk-related housing construction parameters and review the county level data quality and management. In general, while housing was mapped, more work is needed to better support local and regional housing resilience vulnerability assessments. The issue was identified at the end of the day, after the three presenters had shown different age parameters to map housing stock. The attendees commented on the complexity and variability of housing data, and strongly indicated that other organizations and experts be engaged.

Engaging local CRA experts is crucial. The TBRPC staff invited Peter Altman, New Port Richey Councilman and TBRPC Council member to participate in the Project meetings because of his expertise in CRAs and finance. Altman is the sole elected official member on the Board of the Florida Redevelopment Association, serves on the New Port Richey CRA Board, and on the Steering Committee of the Tampa Bay Regional Resilience Coalition. Councilman Altman provided input on CRA challenges, planning processes, and participated in the two CRA meetings to facilitate discussions. Chris Moore, who oversees Pinellas County's CRA in Lealman, provided additional perspective and hosted in the new Lealman Community Center. Moore was instrumental in identifying and recruiting pertinent county staff to attend the meetings.

TASK 4: Manatee County Workshop *INCREASING COMMUNITY RESILIENCE*

OVERVIEW

The goal of this task was to conduct a workshop that focused on Manatee County constraints and opportunities. The Project team and Manatee County staff collaboratively planned and facilitated a 1-day workshop. Participants include staff responsible for community engagement, communications, finance, housing, CRAs, planning, operations and infrastructure, as well as elected and appointed officials from the County and Manatee municipalities, and members of the public.

Prior to the workshop, Team Manatee developed a locally-focused sea level rise mapping tool. Utilizing inundation modelling based on the resources available in the *Adaptation Planning Guide*, census data supplemented by data from the American Community Survey (ACS), and the County and available municipal Geographic Information Systems (GIS) local data layers, The Project Team and Manatee GIS staff collaborated in documenting the process used to develop the tool, so this process could be replicated by other local governments in the region and beyond. The process and the resulting SLR mapper and analyses were presented to the attendees at the one-day workshop in Manatee County on April 30 and at the June 14 workshop at the TBRPC.

The Manatee County staff recognized the benefit of adding SVI to the VA. This expanded VA will also improve compliance with the criteria of F.S. Section 163.3178(2)(f) enumerated by the Peril of Flood legislation for the required “redevelopment component” of the Comprehensive Plan Coastal Management Element.

SUMMARY

On April 30, 2019, the Project Team and Team Manatee hosted the workshop, *INCREASING COMMUNITY RESILIENCE: Discussions about new research, state requirements, and collaboration*, at the Bradenton Area Convention Center. Manatee County Commissioner Vanessa Baugh gave the welcome, Deputy Manatee County Administrator John Osborne gave a brief overview and update on County resilience initiatives. The Project Team introduced the project and Peril of Flood requirements. Libby Carnahan, UF/IFAS Sea Grant, presented the updated sea level rise projections developed by the Tampa Bay Climate Science Advisory Panel. This was the first public presentation of the updated data.

After the SLR presentation, The Project Team facilitated questions from the attendees and focused on identifying areas that are currently impacted by flooding, such as low service areas, or that experience repetitive flooding. Team Manatee collected notes from the discussion. The Project Team facilitated a discussion of recent and current local activities and efforts to implement Peril of Flood requirements. The County staff presentation of the Robinson Preserve Expansion project case study defined the process for the first natural area restoration project undertaken by Manatee County in which SLR was overtly considered in planning and design. The case study included a review of photos of actual changes to the habitats and described

considerations of the relative impacts of SLR between preserved open space and habitat restoration projects.

Products and Data Created by Manatee County

- a new inundation mapping tool Manatee County staff created using ESRI software. The tool depicts potential inundation in Manatee County for a projected 1 to 6 feet SLR above current Mean Higher High Water (MHHW) conditions.
- an Infrastructure Hot Spot Analysis showing at risk areas of infrastructure concentrations.
- social and economic analysis conducted for this Project, describing threats from SLR, utilizing data from the American Community Survey, esri Community Analyst, and supplemental analysis provided by the TBRPC.
- Infographics which visualize demographic, housing, and economic impacts from 1-6 feet SLR scenarios.

After the presentations the attendees separated into 11 tables for break-out group discussions. The draft Checklist and the TBRPC map of the mobile home parks throughout the region was provided and each table was asked to identify at-risk areas in their communities and discuss ideas for local government action. The results provided information for Manatee County staff and other represented local governments to consider when updating local plans for compliance with the Peril of Flood requirements. The ideas included:

- reduce impervious parking areas,
- increase open space,
- allow density transfer rights and/or clustering via development incentives for new development,
- create floodplain overlays and increase buffers in overlay areas,
- evaluate stormwater design standards and require green infrastructure,
- identify way to increase natural environment preservation,
- support local mitigation banks for wetlands and other natural areas,
- allow more preservation of Government-owned property,

The attendees also expressed a desire to increase collaboration among local government staff, externally and internally, and to engage in the TBRPC Resilience Coalition. Attendees volunteered to participate in technical activities, including the Gulf Coast GIS Users Group, a Comprehensive Plan Update Workgroup, and Resilience Coalition Partners.

LESSONS LEARNED

Developing Whole Organizational Support. Only a few director-level staff from Public Works, Utilities, and Property Management were present at the Workshop. Infrastructure that is maintained and services provided by these departments (current and future projects) are, and

will continue to be, most impacted by SLR inundation (including effects of salt-water intrusion). The attendees expressed a need for greater collaborative connections across multiple departments, suggested consideration of structural reorganization, such as establishing a staff entity dedicated to resilience initiatives and better cross-disciplinary integration.

RECOMMENDATIONS/NEXT STEPS.

Manatee County staff has organized internal meetings to disseminate the resulting information and define next steps. County staff is building on this Project to further the County's implementation of the Peril of Flood legislation in their Comprehensive Plan. The results are informing the County's PDRP update. The newly developed data is enhancing their VA, and was expanded to include environmental and socio-economic data and the SVI. That effort is projected to be completed in FYE 2020 and proceed in tandem with Peril of Flood implementation activities.

At the conclusion of Task 4, both the Project Team and Team Manatee noted that several of the VA tools identified in the *Adaptation Planning Guide* were more amenable to use than others. Team Manatee's preferred tools are identified in Appendix X.

CONCLUSIONS AND RECOMMENDATIONS

The Peril of Flood legislation and its mandate to coastal local governments to affirmatively amend their comprehensive plans to comply with its requirements has opened eyes and minds in the Tampa Bay Region to the exigent reality of a changing climate. While the requirements of the statute currently are *de minimus*, nothing in the statute limits a local government—or any regional council—from collaborating with the local governments of the region to better understand the challenges posed by changing climate and improving the resilience of the region.

More and more local governments are developing integrated sustainability and resilience plans, but in general more support is needed from senior level administrators and elected officials to encourage the integration of resilience objectives and metrics throughout plans, programs and budgets. This ideally would include inclusion of metrics in every department, and the involvement of human resources departments to better define roles, responsibilities and metrics to effectively measure how resilience practices are being implemented. Resilience is similar to good fiscal governance: it must be embedded in all levels, departments and programs. It cannot be a separate project, or led by one person.

We agree with the Institute for Sustainable Communities that, “[b]ound together by a shared focus on place, Regional Climate Collaboratives are harnessing the power of networks to build resilience to climate impacts and, in some cases, to reduce the emissions driving those impacts.”¹

In conducting this Project, the Project Team engaged a broad spectrum of local government representatives—some citizens, some elected officials, and numerous staff members in varying positions of responsibility across multiple department disciplines. Through this process, we repeatedly observed that local government staff in the Tampa Bay region understand that changing climate brings existential challenges, whatever their position of authority or responsibility. Citizens, appointed boards, and elected officials are also seeking out education to better understand their role.

We conclude that the public, and the public fora that engage the region’s varied citizen population, is the next frontier in effective implementation of the Peril of Flood legislation. The opportunities this legislative direction provides for “education through implementation” are currently limitless, and the public information such education provides can better prepare the community for the coming storms.

We are grateful to all our collaborators and partners in mobilizing this effort, and particularly to the Florida Resilient Coastlines Program in the Florida Coastal Office of DEP and their grantors for their leadership in this immense area of endeavor generally. Thank you.

PROJECT RESOURCES

Tampa Bay Regional Planning Council

Workshop Presentations and other resources:

<http://www.tbrpc.org/peril-of-flood-workshops/>

Manatee County Climate Portal

<https://www.mymanatee.org/gisportal/apps/sites/#/mc-climate-adaptation.>

[inundation mapping tool:](#)

<https://www.mymanatee.org/gisportal/apps/MapSeries/index.html?appid=a3738b09236c4b00b91136daef27d208>.

Infrastructure impacts hotspot analysis:

<https://www.mymanatee.org/gisportal/apps/View/index.html?appid=57346603fdd849098dbd4b0a9760f8f1>.

Peril of Flood Implementation

Conducting an Integrated Vulnerability Assessment Checklist

Best Practices & Potential Policy Considerations, Goals & Objectives



Project Overview

Introduction to the Peril of Flood Project

This Integrated Vulnerability Assessment Checklist was developed by the Tampa Bay Regional Planning Council (TBRPC) in collaboration with Manatee County, the University of Florida Resilient Communities Initiative, and the University of South Florida for the 2018-2019 Peril of Flood project.

The overarching goals of the Peril of Flood project were to support local governments' ability to integrate nature-based adaptation, low-impact design, and considerations for affordable housing resiliency and Community Redevelopment Areas, into local government comprehensive plans to address requirements of the 2015 Peril of Flood legislation.

The Project activities, which included a survey of plan status and technical training needs, also supported the Tampa Bay Regional Resiliency Coalition goals of increasing consistency among practices and methods. Manatee County was the primary Project partner and included reviews by staff at TBRPC member governments in the six-county region that includes: Citrus, Hernando, Hillsborough, Manatee, Pasco, and Pinellas Counties.

Acknowledgments



The checklist was funded in part, through a grant agreement from the Florida Department of Environmental Protection, Florida Resilient Coastlines Program by a grant provided by the Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration Award No. [NA16NOS4190120](#). The views, statements, findings, conclusions and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida, NOAA, the U.S. Department of Commerce or any of their subagencies.



Table of Contents

Section 1. Land Use Policy Tools Application to Vulnerability	4
Comprehensive Plan	4
Development Regulations, Land Use Analysis, & Permitting	4
Land Acquisition	4
Density Transfer & Provisions	5
Financial Incentives & Penalties	5
Public Facilities (including Public Housing)	5
Post-Disaster Reconstruction Decisions	5
Capital Improvements	5
Addressing Risk & Vulnerability	6
Land Use Planning	7
All-Hazard Mitigation Planning	8
Emergency Response & Disaster Preparedness	8
Infrastructure & Critical Facilities	9
Natural Resources	10
Economy & Society	11
Section 2. Potential Policy Considerations, Goals & Objectives	12
Agriculture	13
Energy & Fuel	13
Regional Collaboration & Coordination	14
Natural Systems	14
Public Health	15
Risk Reduction	15
Civic Engagement	16
Water	16
Sustainable Mobility	17
Social Equity	18
Economic Resilience	18
Public Policy	19
Home & Shelter	19
Resources	20



Identifying climate risks, impacts, and community vulnerabilities is a crucial step towards resilience planning.

This checklist was assembled to help community teams identify the many aspects that should be evaluated to assess your community's risks for flooding. It will also help to identify focus areas where additional attention is needed to collect information and document potential vulnerability conditions.

Section 1. Land Use Policy Tools | Application to Vulnerability

Comprehensive Plan

The community's vision for its future and plan for realizing that vision addresses all statutory requirements and includes annexes, components, elements, etc., addressing:

- | | | |
|---|--|--|
| ☐ All-Hazards Mitigation | ☐ Post-Disaster Redevelopment | ☐ Stormwater Management |
| ☐ Floodplain Management | ☐ Capital Improvements | ☐ Historic Preservation |
| ☐ Evacuation | ☐ Economic Development | ☐ Housing |
| ☐ Emergency Response | ☐ Coastal Management | |
| ☐ Continuity of Operations | ☐ Shoreline Restoration | |
| ☐ Disaster Recovery | ☐ Open Space | |

Development Regulations, Land Use Analysis, & Permitting

- | | |
|--|--|
| ☐ Permitted Land Use | Provision regulating the types of land use (e.g. residential, commercial, industrial, open space, etc.) permitted in areas of community; may be tied to land development regulations |
| ☐ Density of Land Use | Provision regulating density (e.g. units per acre); may be tied to land development regulations |
| ☐ Subdivision Regulations | Provision controlling the subdivision of parcels into developable units and governing the design of new development (e.g. site storm water management) |
| ☐ Zoning Overlays | Provision to use zoning overlays that restrict permitted land use/density in hazardous areas; may be special hazard zones or sensitive open space protection zones |
| ☐ Setbacks or Buffer Zones | Provision requiring setbacks or buffers around hazardous areas (e.g. riparian buffers and ocean setbacks) |
| ☐ Cluster Development | Provision requiring clustering of development away from hazardous areas, such as through conservation subdivisions |
| ☐ Land Suitability | Hazards are one of the criteria used in analyzing and determining the suitability of land for development |
| ☐ Site Review | Provision requiring addressing hazard mitigation in process of reviewing site proposals for development |
| ☐ Design/Construction/
Guidelines/Requirements | Guidelines or requirements that apply to the design or construction of developments in hazard areas |

Land Acquisition

- | | |
|---|--|
| ☐ Acquire Land & Property | Purchase land/property in hazard area |
| ☐ Open Space or Easement
Requirement/Purchase | Provision encouraging open space purchase by the community or open space easements as an element of development approval |

Density Transfer Provisions

- | | |
|--|---|
| ☐ Transfer/Purchase of Density Entitlements | Provision for transferring density entitlements to control density; maybe transfer of density entitlement or purchase of density entitlements |
|--|---|

Financial Incentives & Penalties

- | | |
|---|---|
| ☐ Density Bonuses | Density bonuses such as ability to develop with greater density in return for dedication or donation of land in areas subject to hazards |
| ☐ Tax Abatement | Tax breaks offered to property owners and developers who use mitigation methods for new development |
| ☐ Impact/Special Study/Protection Fees | Provision requiring impact fees, special study fees, or protection fees for development in hazardous areas; fees could cover costs of structural protection |

Public Facilities (including Public Housing)

- | | |
|--|--|
| ☐ Siting | Provision to site public facilities, including municipal buildings and public housing, out of hazard areas |
| ☐ Sizing/Capacity | Provision limiting capacity of public facilities, including public housing, in hazard areas to cap amount of development |

Post-Disaster Reconstruction Decisions

- | | |
|---|--|
| ☐ Development Moratorium | Provision imposing a moratorium on development for a set period of time after a hazard event to allow for consideration of land use change |
| ☐ Post-Disaster Land Use Change | Provision related to changing land use regulations following a hazard event; may include redefining allowable land uses after a hazard event |
| ☐ Post-Disaster Capital Improvements | Provision related to adjusting capital improvements to public facilities following a hazard event |

Capital Improvements

- | | |
|--|---|
| ☐ Infrastructure "Hardening" or "Weatherproofing" | Provision encouraging or requiring development in hazard zones to increase structural resilience to hazards |
| ☐ Elevating | Provision pertaining to the physical elevation of structures in hazard zones |
| ☐ Drainage Improvements or Flood Control | Provision that pertains to drainage or flooding issues within the community |
| ☐ Ecosystem Enhancement | Provision to improve or preserve the functioning of the natural environment within the community |
| ☐ Slope/Dune Stabilization | Provision that pertains specifically to stabilization of slopes or dunes or seeks to control erosion |

Addressing Risk & Vulnerability

- ☐ 1. The Community has considered the following risks:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 2. The Community has identified and mapped the past extent of the following coastal hazards based on historical information, existing plans and reports, and scientific and local knowledge:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 3. The Community to identify the damage and cost of previous storms, floods, or erosion.
- ☐ 4. The Community tracks repetitive loss properties within the National Flood Insurance Program (NFIP).
- ☐ 5. The Community defines historic rates of local sea-level rise through tide-gauges or research.
- ☐ 6. Staff trained in mapping or monitoring the following:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 7. Maps and geospatial data to define and describe the future extent of the following coastal hazards:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 8. Plans to estimate future financial losses from sea-level rise.
- ☐ 9. Property values for properties at-risk from sea-level rise.
- ☐ 10. Mapping and geospatial data to assess the coastal hazard vulnerability of the following community assets:
 - ☐ Critical facilities (hospitals, fire stations, etc.)
 - ☐ At-risk populations (elderly, low-income, disabled)
 - ☐ Buildings (number and type of structures)
 - ☐ Infrastructure (roads, schools, hospitals, public works, etc.)
 - ☐ Natural resources (Critical Areas, unique ecosystems and habitats, etc.)
 - ☐ Historical resources (historic districts, properties landmarks)
 - ☐ Cultural resources (libraries, museums, archaeological)
 - ☐ Economic resources (business districts, factories, tourism areas)
- ☐ 11. Staff trained in the use of FEMA's HAZUS-MH.
- ☐ 12. Risk and vulnerability assessments with these people and agencies:
 - ☐ Planning staff
 - ☐ Public work officials
 - ☐ Transportation planners
 - ☐ Emergency management
 - ☐ Elected officials
 - ☐ General public

Land Use Planning

- ☐ 1. Participate in the FEMA NFIP Community Rating System (CRS).
- ☐ 2. Include goals, objectives, policies, and strategies in the coastal management element of the comprehensive plan to reduce coastal hazard vulnerability.
 - ☐ Discourage development in vulnerable areas and identify specific land use tools to respond to coastal hazard threats.
- ☐ 3. Target frequently flooded areas to be planned/zoned for open space/recreation, easements, or acquisition.
- ☐ 4. Include goals, objectives, policies, and strategies in the comprehensive plan regulating development within areas vulnerable to coastal hazards.
- ☐ 5. Include goals, objectives, policies, and strategies in the comprehensive plan limiting development within the floodplain.
- ☐ 6. Include goals, objectives, policies, and strategies in the comprehensive plan that promote infill outside vulnerable areas.
- ☐ 7. Include goals, objectives, policies, and strategies in the comprehensive plan that promote infill outside vulnerable areas.
- ☐ 8. Include goals, objectives, policies, and strategies to address the impacts of climate change on drinking water availability in the General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge Element.
- ☐ 9. Adopt a floodplain management plan.
- ☐ 10. Extend planning horizons to incorporate potential long-term coastal hazards such as:
 - ☐ Sea-level rise
 - ☐ Coastal erosion
 - ☐ Increased storm activity and severity
- ☐ 11. Include goals, objectives, policies, and strategies to address relocation, abandonment, and protection of infrastructure at risk from coastal flooding or other coastal hazards in the General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge Element.
- ☐ 12. Have a certified floodplain manager (CFM®) on staff.
- ☐ 13. Have a floodplain manager or planner who participates in one of more of the following organizations:
 - ☐ Association of State Floodplain Managers (ASFPM) or Florida Floodplain Managers Association (FFMA)
 - ☐ American Planning Association (APA) or Florida APA chapter
 - ☐ American Society of Civil Engineers (ASCE) or state or local section of ASCE
 - ☐ American Public Works Association (APWA)
- ☐ 14. Have technical and computer mapping capabilities.
- ☐ 15. Adopt the current editions of the Florida Building Code.
- ☐ 16. Conducted a build-out analysis using existing zoning.
 - ☐ Evaluate the build-out analysis using existing zoning.
- ☐ 17. Require disclosure statements for vulnerable coastal properties.
- ☐ 18. Establish a timeline or strategic plan for the relocation, abandonment, or protection of buildings in areas at risk to coastal flooding or other coastal hazards.
- ☐ 19. Require additional elevation (freeboard) of residential, non-residential, and public buildings and infrastructure to be above base flood elevations within the 100-year floodplain.
- ☐ 20. Require flood-proofing of residential, non-residential, and public buildings and infrastructure within the 100-year floodplain.
- ☐ 21. Restrict rebuilding of structures destroyed by coastal hazards.
 - ☐ Required rebuilding--where allowed--to be more resilient to coastal hazard impacts (e.g., elevated, smaller footprint, or set back from the coast).
- ☐ 22. Use an early flood warning system.
 - ☐ Support citizen action groups that alert at-risk property owners during an event, educate residents about evacuation routes, and help residents evacuate prior to an event.

All-Hazard Mitigation Planning

- ☐ 1. Have a current FEMA-approved hazard mitigation plan.
- ☐ 2. The All-Hazard Mitigation Plan describes past mitigation efforts (e.g., shoreline stabilization, land acquisition, etc.), along with their costs and effectiveness.
- ☐ 3. The All-Hazard Mitigation Plan provides a general explanation of the environmental, social, and economic consequences of failing to address coastal hazards.
- ☐ 4. The community acquires repetitive loss structures.
- ☐ 5. The All-Hazard Mitigation Plan include maps that indicate local coastal hazard risks.
- ☐ 6. The All-Hazard Mitigation Plan identifies strategies to manage the following coastal hazards as potential threats:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 7. The All-Hazard Mitigation Plan identifies opportunities to incorporate hazard mitigation into existing planning mechanisms (e.g., land use planning, capital investments, shoreline restoration projects).
- ☐ 8. The All-Hazard Mitigation Plan identifies the federally-required update frequency (five (5) years).

Emergency Response & Disaster Preparedness

- ☐ 1. The community has first-hand experience with disaster recovery within the last ten (10) years.
- ☐ 2. The community has a communication system to use before, during, and after a disaster?
- ☐ 3. The community has assessed the vulnerability of major evacuation routes to the following coastal hazards:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 4. The community has assessed the location of shelters in relation to coastal hazards, including access considerations:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 5. The community has evaluated their critical facilities, such as hospitals, fire stations, and police stations, for vulnerability to the following coastal hazards including access considerations:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 6. The community's emergency management staff participates in the community's comprehensive planning process.

Infrastructure & Critical Facilities

- ☐ 1. The community has a capital improvements plan and equivalent budgetary process.
- ☐ 2. Professional planners, engineers, and/or certified floodplain managers are involved in the capital improvements planning process.
- ☐ 3. The capital improvements plan identify the frequency necessary to update the plan.
- ☐ 4. The community has a detailed inventory, including elevations, of the structural components of emergency access routes (e.g., roads, bridges, and culverts).
- ☐ 5. The community has procedures for regularly examining structural components of emergency access routes for damage.
- ☐ 6. Include goals, objectives, policies, and strategies in the comprehensive plan that promote infill outside vulnerable areas.
- ☐ 7. When critical transportation infrastructure is repaired, the following are considered to reduce future flood damages:
 - ☐ Elevating roads above predicted flood levels
 - ☐ Moving roads landward as erosion occurs
 - ☐ Incorporating future flooding and sea-level rise into culvert size and placement
- ☐ 8. When upgrading existing community infrastructure, the capital improvements plan considers the impact of the following coastal hazards:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 9. When planning new community infrastructure, the capital improvements plan considers the impact of the following coastal hazards:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 10. The community has a policy that identifies at what point it will stop upgrading existing community infrastructure to withstand increased coastal hazards and sea-level rise.
- ☐ 11. Maps (or other geospatial tools, e.g. Geographic Information Systems) are used to spatially define the vulnerability of the following to coastal hazards:
 - ☐ 11.1 Roads
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
 - ☐ 11.2 Public buildings (schools, hospitals, fire stations, etc.)
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
 - ☐ 11.3 Public services and utilities (wastewater treatment, water distribution, power transmission, etc.)
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge

Natural Resources

- ☐ 1. Potential conservation land acquisitions and easements are assessed for their vulnerability to coastal hazards.
- ☐ 2. Potential conservation land acquisitions and easements are assessed for their natural protective properties, such as storm surge buffer, flood water management, and erosion reduction.
- ☐ 3. Potential conservation land acquisitions and easements are assessed for their ability to provide long-term suitable habitat.
- ☐ 4. Conservation land acquisition or easement programs within the community direct funding to areas identified as the most ecologically valuable land.
 - ☐ 4.1 The community reviews scientific assessments and modelling of future habitat change.
- ☐ 5. The Conservation Element of the Comprehensive Plan:
 - ☐ 5.1 Addresses open space conservation as a way to minimize the effect of coastal hazards
 - ☐ 5.2 Is regularly evaluated and updated in coordination with the Comprehensive Plan
- ☐ 6. Public open space is maintained in a manner that provides protection from coastal hazards.
- ☐ 7. The Comprehensive Plan designates areas requiring special protection (such as wetlands, beaches, and floodplains).
- ☐ 8. The Conservation Element of the Comprehensive Plan includes coastal hazards and climate change or the comprehensive plan has a sea-level rise planning element that addresses potential changes in sensitive areas.
- ☐ 9. The community considers the following threats in the Conservation Element of the Comprehensive Plan:
 - ☐ Coastal erosion and/or shoreline change
 - ☐ Sea-level rise
 - ☐ Coastal flooding
 - ☐ Storm surge
- ☐ 10. The community has local ordinances or land development regulations to protect the following from development or disturbance:
 - ☐ Dunes
 - ☐ Bluffs
 - ☐ Eroding Cliffs
 - ☐ Wetlands
 - ☐ Beaches
- ☐ 11. The General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge Element in the Comprehensive Plan considers the impacts of coastal hazards (e.g., saltwater intrusion) on the availability of freshwater for drinking water and living resources.
- ☐ 12. The community has protective measures in place for aquifer recharge areas, including wells, springs, seeps, lakes, and headwaters.

Economy & Society

- ☐ 1. The community has mapped the vulnerability to coastal hazards of the following:
 - ☐ At-risk populations (elderly, low-income, disabilities, etc.)
 - ☐ Historical resources (historic district, properties, landmarks)
 - ☐ Cultural resources (libraries, museums, archaeological sites)
 - ☐ Economic resources (business districts, factories, tourism, working waterfronts)
- ☐ 2. The community has an economic development plan or strategy.
 - ☐ 2.1 The economic development plan or strategy identifies economic vulnerabilities due to coastal hazards.
- ☐ 3. The community's economic base is diversified.
- ☐ 4. The cost of damages from previous storms, floods, erosion, or the economic losses due to closures during disaster events and the recovery process?
- ☐ 5. Future financial losses that may result from sea-level rise.
- ☐ 6. The following social systems strongly define your community's identity:
 - ☐ Faith-based networks
 - ☐ Cultural heritage/historic districts
 - ☐ Neighborhood associations
 - ☐ Business-related networks
 - ☐ Civic organizations (Kiwanis Club, Rotary Club, etc.)
 - ☐ Universities or colleges

Section 2. Potential Policy Considerations, Goals & Objectives



Photo Credit: Tampa Bay Times, Sam Ribble

Agriculture

GOAL: Ensure the continued viability of agriculture in the face of climate change through policies and actions that encourage sustainable production, remove barriers to production, promote economic incentives, improve water reliability, and promote best management practices.

- ☐ AG-1 Promote policies that preserve the economic viability of agriculture.
- ☐ AG-2 Continue to meet the water needs of agriculture.
- ☐ AG-3 Promote locally produced foods and goods.
- ☐ AG-4 Align research and extension with climate-related needs of agriculture.
- ☐ AG-5 Maintain or create agriculture purchase of development rights programs.
- ☐ AG-6 Assess opportunities for growers and agricultural landowners to manage land to lessen the impacts of climate change and incentivize those actions.
- ☐ AG-7 Seek a national designation as a critical source of domestic agricultural products.
- ☐ AG-8 Identify and reduce obstacles for enabling urban agriculture, gardening, and other backyard agricultural practices.
- ☐ AG-9 Increase resources for the study and implementation of invasive, non-native pest and pathogen prevention; early detection; and rapid response.
- ☐ AG-10 Promote sustainable aquaculture, perennial crops, diversified farming systems, precision agriculture, and re-con touring field elevations.
- ☐ AG-11 Assess and address public health risks of more frequent and intense high-heat days to agriculture and farm workers.
- ☐ AG-12 Ensure accessible, adequate, and resilient housing options for a diverse agricultural work force.

Energy & Fuel

GOAL: Reduce consumption of electricity and fuel and increase renewable energy capacity to increase resilience, reduce greenhouse gas emissions, and improve emergency management and disaster recovery.

- ☐ EF-1 Promote renewable energy through policies and technological development in order to reduce greenhouse gas emissions.
- ☐ EF-2 Advance energy efficiency and conservation through technological solutions, behavioral strategies, and policies in order to reduce greenhouse gas emissions.
- ☐ EF-3 Increase accessibility to energy efficiency solutions for limited-income families.
- ☐ EF-4 Increase accessibility to distributed renewable energy technology.
- ☐ EF-5 Utilize renewable and distributed energy technologies for emergency management and disaster recovery.
- ☐ EF-6 Streamline permitting and administrative processes to reduce the soft costs associated with renewable energy technologies.
- ☐ EF-7 Establish financing mechanisms for current homeowners to invest in renewable energy and energy efficiency.
- ☐ EF-8 Build the capacity for distributed renewable energy and energy storage technologies in future building stock.
- ☐ EF-9 Enable grid-independent energy and waste-to-energy systems.
- ☐ EF-10 Establish a fuel-efficient municipal vehicle fleet.
- ☐ EF-11 Promote community use of electric vehicles.

Regional Collaboration & Coordination

GOAL: Strengthen coordination and collaboration on climate change issues by building the capacity to meet evolving needs.

- ☐ CC-1 Establish and implement a regional communications strategy among business, government, and community leadership.
- ☐ CC-2 Use updated sea-level rise projections.
- ☐ CC-3 Explore opportunities to better coordinate cross-agency and cross-jurisdiction reviews of major infrastructure projects.
- ☐ CC-4 Develop and track regional indicators of climate change impacts, emissions reduction, and adaptation actions.
- ☐ CC-5 Create an advisory group composed of organizations that represent the region's climate work, equitable community development, and vulnerable populations in order to track and share best practices on equitable climate action with the region.
- ☐ CC-6 Develop localized adaptation strategies for areas of greatest climate-related vulnerability in collaboration with appropriate agencies and jurisdictions to foster multi-jurisdictional solutions and maximize co-benefits.

Natural Systems

GOAL: Implement monitoring, management, and conservation programs designed to protect natural systems and the services they provide to society while improving their capacity for climate adaptation.

- ☐ NS-1 Foster public awareness of the impacts of climate change on natural systems and ecosystem services.
- ☐ NS-2 Promote collaborative federal, state, and local government conservation land acquisition and easement programs.
- ☐ NS-3 Support regional wildland fire management coordination efforts.
- ☐ NS-4 Develop sustainable financing for the monitoring, protection, restoration, and management of natural areas and ecosystem services.
- ☐ NS-5 Identify or create a group to coordinate a plan to create adaptation corridors, living collections, and other approaches to species dispersal and conservation.
- ☐ NS-6 Promote the protection and restoration of coastal natural systems and the creation of living shorelines.
- ☐ NS-7 Support coral reef protection, restoration, and sustainable-use initiatives to help Florida's sensitive reefs adapt to the changing climate and ocean acidification.
- ☐ NS-8 Advocate for federal and state funding for applied monitoring and climate-related science, conducted in partnership with the Florida Climate Institute.
- ☐ NS-9 Examine and propose revisions to environmental regulations to account for the effects of climate change.
- ☐ NS-10 Identify the effects of climate change on fish populations, the sustainability of key fisheries, and the fishing industry, then develop adaptation plans as needed.
- ☐ NS-11 Promote the protection, restoration, and creation of freshwater wetlands, open space buffer areas, and connectivity between freshwater and estuarine waters.
- ☐ NS-12 Develop and implement long-term, sustainable, solutions to beach erosion and sediment supply.
- ☐ NS-13 Maintain, create, and/or restore urban tree canopy.

Public Health

GOAL: Build capacity to proactively mitigate climate-related public health risks.

- ☐ PH-1 Understand and communicate public health risks associated with climate change.
- ☐ PH-2 Adopt and update all Florida Department of Health plans to reflect climate and sea-level rise impacts on public health.
- ☐ PH-3 Adapt federal and state public health resources to support specific community needs.
- ☐ PH-4 Reduce extreme heat exposure to promote public health.
- ☐ PH-5 Advocate for policy changes and funding for local health departments to collect data more frequently to influence public health plans.
- ☐ PH-6 Increase reporting of health data monitoring systems to evaluate emerging diseases related to climate change.
- ☐ PH-7 Develop tools to assess the impacts of climate change and sea-level rise on existing chronic conditions and to report trends or concerns for action.
- ☐ PH-8 Phase out septic systems where necessary to protect public health and water quality.

Risk Reduction

GOAL: Prepare for the inevitable shocks and stresses through coordinated and interdisciplinary risk reduction and emergency management planning and investment.

- ☐ RR-1 Identify and quantify infrastructure and populations at risk to sea-level rise and storm surge.
- ☐ RR-2 Integrate climate scenarios into emergency planning, evacuation training, and exercises.
- ☐ RR-3 Integrate climate vulnerability analysis data, as well as climate adaptation planning and funding, into existing emergency planning and funding documents.
- ☐ RR-4 Create and invest in strategic pre-disaster plans for post-disaster recovery.
- ☐ RR-5 Identify the most advanced insurance coverage models to reduce exposure in the face of climate-related risks.
- ☐ RR-6 Prioritize adaptation investments to reduce the impact of flooding and sea-level rise on transportation infrastructure, particularly on evacuation routes.
- ☐ RR-7 Ensure local comprehensive plans align with the state Coastal Construction Control Line.
- ☐ RR-8 Continue to adopt and update consistent plans at all levels of government in the region that address and integrate mitigation, sea-level rise, and climate change adaptation.
- ☐ RR-9 Review the Florida Building Code through the lens of climate vulnerability.
- ☐ RR-10 Understand and communicate risk information to all residents.
- ☐ RR-11 Promote and leverage existing policies and programs designed to reduce flood risks and economic losses.
- ☐ RR-12 Increase long-term community resilience and disaster recovery through distributed renewable energy and battery storage systems.
- ☐ RR-13 Use effective social media for emergency messaging, public health updates, and tidal flooding updates.
- ☐ RR-14 Encourage individual small business recovery plans and personal home adaptation plans.
- ☐ RR-15 Support disaster planning and preparedness training for city and county staff.
- ☐ RR-16 Ensure the emergency management definition of "communities at risk" includes economically vulnerable people.

Risk Reduction continued on page 16.

Risk Reduction (continued)

- ☐ RR-17 Align and integrate emergency management staff and responsibilities with chief resilience officer roles to bolster long-term plans.
- ☐ RR-18 Use vulnerability and risk assessment analyses and tools to identify priorities for resilience investments.
- ☐ RR-19 Incorporate strategies to reduce risk and economic losses associated with sea-level rise and flooding into local comprehensive plans, post-disaster redevelopment plans, building codes, and land development regulations.

Civic Engagement

GOAL: Build public awareness of the climate-related risks and opportunities for early, coordinated action to address these risks.

- ☐ PO-1 Assess community needs to guide local government communications.
- ☐ PO-2 Promote public awareness and understanding of climate impacts, as well as the personal actions and public policy options available to respond to climate change.
- ☐ PO-3 Inspire community action to address the causes and impacts of climate change.
- ☐ PO-4 Create open data platforms and digital tools.
- ☐ PO-5 Create culturally- and linguistically-appropriate information gathering tools and strategies to help inform decision-makers of the priorities and concerns in communities.

Water

GOAL: Advance the water management strategies and infrastructure improvements needed, in parallel with existing water conservation efforts, to mitigate the potential adverse impacts of climate change and sea-level rise on water supplies, water and wastewater infrastructure, and water management systems, inclusive of canal networks, pumps, control structures, and operations.

- ☐ WS-1 Foster innovation, development, and exchange of ideas for managing water.
- ☐ WS-2 Ensure consistency in water resource scenarios used for planning.
- ☐ WS-3 Plan for future water supply conditions.
- ☐ WS-4 Coordinate saltwater intrusion mapping.
- ☐ WS-5 Maintain inventories of water and wastewater infrastructure.
- ☐ WS-6 Develop a spatial database of resilience projects for water infrastructure.
- ☐ WS-7 Foster innovation, development, and exchange of ideas for managing water.
- ☐ WS-8 Update the stormwater rule.
- ☐ WS-9 Integrate combined surface and groundwater impacts into the evaluation of at-risk infrastructure and the prioritization of adaptation improvements.
- ☐ WS-10 Advance green infrastructure and alternative strategies.
- ☐ WS-11 Integrate hydrologic and hydraulic models.
- ☐ WS-12 Practice integrated water management and planning.
- ☐ WS-13 Advance comprehensive improvements to regional and local stormwater management practices.

Water continued on page 17.

Water (continued)

- ☐ WS-14 Foster scientific research for improved water resource management.
- ☐ WS-15 Expand partnerships and resources to further innovation in water resource management.
- ☐ WS-16 Advance capital projects to achieve resilience in water infrastructure.
- ☐ WS-17 Coordinate innovation and regional funding.
- ☐ WS-18 Recognize adaptable infrastructure.
- ☐ WS-19 Expand surface water storage.

Sustainable Mobility

GOAL: Adapt to the impacts of climate change and reduce greenhouse gas emissions by reshaping where and how to build and move from place to place.

- ☐ ST-1 Incorporate unified sea-level rise projections, by reference, into all city, county, and regional agency comprehensive plans, mobility, capital improvement, and other infrastructure elements of plans.
- ☐ ST-2 Ensure locally produced maps for planning and project documents include the latest storm surge and sea-level rise projections.
- ☐ ST-3 Consider the adoption of green building standards to guide decision-making and development and to provide an incentive for better location, design, and construction of residential, commercial, and mixed-use developments and redevelopment.
- ☐ ST-4 Employ transit-oriented developments and other planning approaches to promote higher-density development capable of supporting more robust transit.
- ☐ ST-5 Modify local land use plans and ordinances to support compact development patterns, creating more walkable and affordable communities.
- ☐ ST-6 Develop and implement policies and design standards that recognize the mobility system's most vulnerable users and incorporate sustainable elements.
- ☐ ST-7 Develop policies to enhance the urban tree canopy to protect bicyclists, motorists, and pedestrians from heat and pollution exposure.
- ☐ ST-8 Ensure investments reduce greenhouse gas emissions and increase the resilience of the mobility system to extreme weather and climate impacts.
- ☐ ST-9 Increase the use of transit as a mobility mode for the movement of people in the region.
- ☐ ST-10 Expand, connect, and complete networks of bicycle and pedestrian facilities, including those supporting access to transit.
- ☐ ST-11 Expand the use of mobility demand management strategies to reduce peak period and single-occupant vehicle travel.
- ☐ ST-12 Address resilience, maximize efficiency, and increase the use of low-carbon mobility modes for the movement of freight in the region.
- ☐ ST-13 Implement mobility system management and operations strategies to maximize the efficiency of the existing mobility system in a coordinated manner across local governments and agencies in the region.
- ☐ ST-14 Use evidence-based planning and decision-making for mobility system investments and management.

Social Equity

GOAL: Create equitable climate policies, programs, and decision-making processes that consider local socio-economic and racial inequities and ensure all can participate and prosper.

- ☐ EQ-1 Encourage dialogue between elected officials, staff, and socially vulnerable populations about local climate impacts and community priorities to inform leaders of community needs.
- ☐ EQ-2 Integrate social vulnerability data into all local government processes.
- ☐ EQ-3 Support public infrastructure that enables economical mobility, health, and safety for all community members.
- ☐ EQ-4 Address the needs of socially vulnerable populations by engaging existing community leaders and representative organizations in decision-making processes, particularly for critical public infrastructure.
- ☐ EQ-5 Build the capacity of existing and future leaders of socially vulnerable populations to ask, analyze, and communicate about their community's climate resilience.
- ☐ EQ-6 Partner with intermediary organizations that have deep community ties with socially vulnerable populations to co-create engagement and outreach strategies.
- ☐ EQ-7 Provide equity and social justice training for local government staff.
- ☐ EQ-8 Ensure beneficial social equity outcomes in considering the impacts of land use policy, public infrastructure, and public service decisions on high-vulnerability populations.

Economic Resilience

GOAL: Establish an economic resilience strategy involving elected and business leadership, inclusive of funding mechanisms to guide, incentivize, protect, and promote public and private investments and the economic integrity of the community.

- ☐ ER-1 Establish a regional economic resilience communications strategy.
- ☐ ER-2 Advance regional resilience infrastructure standards.
- ☐ ER-3 Seek federal and state engagement to develop a resilience strategy.
- ☐ ER-4 Integrate resilience and economic development.
- ☐ ER-5 Establish funding strategies to provide for equitable investment.
- ☐ ER-6 Engage in the National Flood Insurance Program (NFIP) process.
- ☐ ER-7 Strive for economic equity in adaptation planning.
- ☐ ER-8 Implement best practices for the identification, evaluation, and prioritization of threatened resources to preserve historic and archaeological resources and increase resource resilience.
- ☐ ER-9 Conduct an assessment of unused or underutilized properties and develop an approach for utilizing such properties that enhances overall resilience goals.
- ☐ ER-10 Designate adaptation action areas, restoration areas, and growth areas as a priority-setting tool for vulnerable areas, and as a means to maximize benefits to natural systems while guiding people and commerce to less vulnerable places.

Public Policy

GOAL: Guide and influence all levels of government to address climate change in relevant policies, programs, and legislation.

- ☐ PP-1 Support—at all levels of government—policy, legislation, and funding to reduce greenhouse gas emissions in all sectors, use less energy and water, deploy renewable energy and low-carbon transportation, prepare for and adapt to climate impacts, build community resilience, and study climate and earth science.
- ☐ PP-2 Develop common positions on climate, energy, and resilience issues, and advocate for those positions before state and federal legislatures, regulatory bodies, and the executive and judicial branches of government.
- ☐ PP-3 Urge federal, state, regional, and local partners to prioritize climate change considerations in the planning, construction, and operation of the regional water management and flood control system.
- ☐ PP-4 Participate in coalitions of public-, private-, non-profit-, and/or academic-sector actors dedicated to climate, energy, and resilience issues.
- ☐ PP-5 Coordinate climate, energy, and resilience policies among counties, municipalities, school districts, and other units of government in the region.
- ☐ PP-6 Prioritize climate policies that advance social and economic equity for high-vulnerability populations and limited-income residents
- ☐ PP-7 Consider the direct and indirect impacts of projects, policies, and investments on relevant stakeholders.
- ☐ PP-8 Encourage the general public to engage in civic discourse regarding climate, energy, and resilience issues.

Home & Shelter

GOAL: Adapt to changing climate with more resilient regional housing and sheltering capacity, dispersal, and opportunities.

- ☐ HS-1 Use socio-economic and other geospatial data to assess and map the climatic, economic, and social vulnerability of accessible housing, businesses, and residents.
- ☐ HS-2 Integrate climate scenarios into the Housing Element of the Comprehensive Plan, the Consolidated Housing Plan, Annual Action Plans / Affordable Housing Incentive Plans, Affordable Housing Master Plans, Local Housing Assistance Plans, and inventories of public lands for affordable housing.
- ☐ HS-3 Amend the Comprehensive Plan and implementing regulations to support more equitable housing opportunities in close proximity to mobility options and other resilient critical infrastructure.
- ☐ HS-4 Create an advisory group composed of housing advocates and residents to improve the inventory of accessible housing stock and the resilience of vulnerable populations.
- ☐ HS-5 Connect members of socially-vulnerable populations and accessible housing residents to decision-making processes to build community and inform critical infrastructure expansion, emergency management, and redevelopment planning.
- ☐ HS-6 Identify climatic vulnerability of existing emergency shelters and plan for adaptation or relocation.
- ☐ HS-7 Expand the current capacity and inventory of emergency shelters to establish local shelter-in-place alternatives to mass evacuation.
- ☐ HS-8 Foster exchange of ideas, innovation, and research to improve attainable housing and sheltering development.

Resources

Aboriginal Resilience Index, <https://adrp.jibc.ca/wp-content/uploads/2015/04/ARI1.pdf>, site last visited 6/24/19.

Community Plan Checklist, Getting to Resilience, www.PrepareYourCommunityNJ.org/resilience-checklists/, site last visited 6/24/19.

Florida Adaptation Planning Guidebook, <https://floridadep.gov/sites/default/files/AdaptationPlanningGuidebook.pdf>, site last visited 6/24/19.

Maryland's CoastSmart Communities Scorecard, <http://dnr.maryland.gov/ccs/coastsmart/Documents/scorecard.pdf>, site last visited 6/24/19.

Plan Integration for Resilience Scorecard Guidebook: How to spatially evaluate networks of plans to reduce hazard vulnerability, <http://mitigationguide.org/wp-content/uploads/2018/03/Guidebook-2019.03-Update-v1.pdf>, site last visited 6/24/19.

Regional Climate Action Plan (RCAP 2.0), <http://southeastfloridacclimatecompact.org/regional-climate-action-plan/>, site last visited 6/24/19.

Regional Resilience Primer, <http://us.sustain.org/wp-content/uploads/2017/01/Regional-Resilience-Report-FINAL1.pdf>, site last visited 6/24/19.



Photo Credit: Associated Press, Jay Conner

