PLANNING FOR RESILIENCE

R2112: TASK 1 DELIVERABLE
VULNERABILITY ANALYSIS REPORT

This report was prepared for the Brevard County, FL by the East Central Florida Regional Planning Council under Florida Department of Environmental Protection grant agreement number: R2112 , titled: Planning for Resilience, published April 2021

RESILIENT BREVARD:

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I. Executive Summary

In 2020, the Florida Department of Environmental Protection's Coastal Management Program (FCMP) awarded the Brevard County Board of County Commissioners a grant to assess natural current and future vulnerabilities in the unincorporated areas of Brevard County. The grant funding provided the opportunity to accomplish three (3) main tasks:

- ***Vulnerability Analysis**: Identify the social, economic and functional vulnerabilities facing the County from storm surge, flooding, sea level rise, and flooding. The combined impacts of sea level rise and storm surge were also analyzed.*
- ***Public Engagement**: Engage the community in an educational manner to identify vulnerabilities and for mitigating vulnerabilities, and facilitate discussion concerning future development strategies and opportunities within the county.*
- ***Strategy and Policy Development:** Develop strategies for the County based on public input and best practices for integration strategies into the formulation of comprehensive plan policies for compliance with SB 1094 (Peril of Flood) to enhance resiliency in the County.*

Brevard County launched the Resilient Brevard project to take a comprehensive look at the social, economic, and functional vulnerabilities from various types of flooding in the county. To address these issues, the Brevard County Planning and Development Department and the Brevard County Natural Resources Management Department collaboratively-headed this effort. The County partnered with the East Central Florida Regional Planning Council, Florida Sea Grant, and RW Parkinson Consulting to conduct the vulnerability analysis, community outreach and engagement, and synthesize findings into policy recommendations.

This document provides the following: methodology, data and analysis concerning the vulnerabilities to the unincorporated areas of the County; the process and findings from the community engagement activities; strategies to be considered by the County for implementation and inclusion into the comprehensive plan and other County plans and documents; and the economic impact analysis which assessed the impacts of sea level rise on the County if no action is to be taken to improve resiliency and risk avoidance from flooding, storm surge, coastal erosion, and sea level rise.

II. Background

The repetitive loss of homes, businesses, and critical infrastructure from flooding, storm surge, and coastal erosion puts public health and safety at risk; puts a significant strain on fiscal resources; and disrupts the provision of community services. As such, it is ever more important for communities to develop actionable strategies to become more resilient to natural hazards to protect community assets, support local / regional economics, and maintain the health and welfare of residents.

Brevard County is a coastal county susceptible to impacts from sea level rise, storm surge, inland and coastal flooding from the Atlantic Ocean, the Indian River Lagoon, and the St. Johns River. These impacts can severely impair the local, regional, state, and even federal economy as Brevard County is home to the world's busiest cruise port, Port Canaveral, the nation's legacy spaceport, Kennedy Space Center, the Cape Canaveral Air Force Station, and Patrick Air Force Base. In addition to these major installations and their supportive industries, the County offers world-class tourist destinations as well as working waterfronts that also provide a significant portion of the County and regional economic and employment base.

RESILIENCE IS…

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

Flooding, surge, and sea level rise can create catastrophic malfunctions to drainage systems; overload stormwater management and storage; cut off physical access to facilities; and create untold fiscal and personal economic impact from property losses (Council E. C., Space Coast Transportation Planning Organization Vulnerability Assessment, 2018). Flooding, coastal erosion, storm surge, and sea level rise can impact major transportation corridors through periodic and extended closures which can put people at risk during shock events as well as hamper recovery following an event. Further, many industries that rely on Brevard County's aerospace industry consider the sufficiency of the roadway network in their long-term business planning which can cause disinvestment if not proactively managed.

ACUTE SHOCKS

"Single, sharp events that threaten a community" Examples:

- ***Flooding***
- ***Heat Wave***
- ***Severe Storms & Extreme Rainfall***
- ***Infrastructure Failure***
- ***Disease Outbreak***

Predictions are that these natural hazards are going to increase over time and, as such, coastal communities are working individually and collectively to create strategies to ensure coastal communities are physically, economically, and socially resilient to the impacts of increased frequency and duration of flooding that can occur as a result of sea level rise and the impacts it can have on vital infrastructure and services.

The US Economic Development Administration notes that "Economic Resilience becomes inclusive of three (3) primary attributes: the ability to recover quickly from a shock, the ability to withstand a shock, and the ability to avoid the shock altogether."

Funding agencies at the local, regional, state, and federal levels are tying resiliency, flooding, and future conditions from sea level rise and flooding to funding programs making it more important for local jurisdictions and regional / state agencies to assess vulnerabilities and implement resiliency in development and redevelopment activities.

Brevard County launched the Resilient Brevard project to take a comprehensive look at the social, economic, and functional vulnerabilities from various types of flooding in the county. To address these issues, the Brevard County Planning and Development Department and the Brevard County Natural Resources Management Department collaboratively-headed this effort under a grant by the Florida Department of Environmental Protection. The County partnered with the East Central Florida Regional Planning Council, Florida Sea Grant, and RW Parkinson Consulting to conduct the vulnerability analysis, community outreach and engagement, and synthesize findings into policy recommendations.

The project kicked off July 1, 2020 and the report was finalized April 30, 2021. The following report encompasses the various aspects of the project process, vulnerability analysis findings, engagement activities, feedback, and recommendations for further action for the County.


III. Project Overview

A. Goal and Objectives

The overarching goal of the Resilient Brevard project is to reduce impacts from coastal and inland flooding to both the built and natural environment, and maintain the overall quality of life of the residents, businesses, and visitors to Brevard County, FL, today and into the future. The objectives of this project are to identify current and future coastal vulnerabilities specific to the unincorporated areas of Brevard County and then develop cross-disciplinary policy strategies that reduce risk and impact from the effects of flooding, sea level rise, storm surge, and storm surge with sea level rise.

The objective of the policy strategies recommended through this project are to develop cross-disciplinary strategies and policies consistent and compliant with Senate Bill 1094, also known as the Peril of Flood statute. The strategies and draft policies to enhance resilience in Brevard County developed through the completion of the Resilient Brevard project will be presented at public hearings following the completion of this report to be considered for adoption into the Brevard County Comprehensive Plan.

Between July 2020 through April 2021, County Staff, supported by the East Central Florida Regional Planning Council, Thomas Ruppert of the Florida Sea Grant, and Dr. Randall Parkinson of RW Parkinson Consulting, Inc., worked together with the community to fulfill the following project tasks:

- ***Vulnerability Analysis***: *Identify the social, economic and functional vulnerabilities facing the County from storm surge, flooding, sea level rise, and flooding. The combined impacts of sea level rise and storm surge were also analyzed.*
- ***Public Engagement***: *Engage the community in an educational manner to identify vulnerabilities and for mitigating vulnerabilities, and facilitate discussion concerning future development strategies and opportunities within the County.*

- ***Strategy and Policy Development:*** *Develop strategies for the County based on public input and best practices for integration strategies into the formulation of comprehensive plan policies for compliance with SB 1094 (Peril of Flood) to enhance resiliency in the County.*

B. Legislative Connection

This project is Brevard County's opportunity to take a hard look at current and future vulnerabilities, and to develop strategies and implement policies / programs aimed to mitigate, adapt or retreat from the impacts of flooding, storm surge, and sea level rise. Further, state and federal agencies are tying sea level rise and flooding resilience to funding, including the Federal Highway Administration (FHWA), Department of Housing and Urban Development (HUD), the Federal Emergency Management Agency (FEMA), the Florida Department of Environmental Protection, Florida Department of Economic Opportunity, and the Florida Department of Transportation.

Senate Bill 1094, called the Peril of Flood statute, enacted in 2015, codifies resiliency requirements for communities required to have a Coastal Element in their comprehensive plans. The Coastal Element guides communities in the management of coastal resources and eliminates inappropriate and unsafe development in coastal areas in order to protect the health and safety of its residents/visitors.

The statute provides six (6) guiding principles, noted in the adjacent text box, which include development and redevelopment principles, design criteria, and site development techniques that avoid and reduce impacts from flooding, as well as work to remove real property from flood zones as designated by the Federal Emergency Management Agency (FEMA).

As part of this study, the County's comprehensive plan was 'audited' to identify policies that currently meet the Peril of Flood principles and policies were recommended for any policy gaps that were identified. Some policy gaps require further study for fiscal impacts and implementation strategy. As such, those are recommended outside of the recommended policy context. Data and maps developed as part of this study will be incorporated into Brevard County's Coastal Element as an additional part of fulfilling this state requirement.

PERIL OF FLOOD

Section 163.3178(2)(f)1, *Florida Statutes*

1. ***Development & redevelopment principles & strategies that reduce flood risk***
2. ***Best practices for removal of coastal real property from FEMA flood zones***
3. ***Site development techniques that may reduce losses and claims made under flood insurance policies***
4. ***Be consistent with, or more stringent than, the flood-resistant construction requirements in the Florida Building Code & flood plain regulations***
5. ***Construction activities seaward of the coastal construction control line consistent with Chapter 161, F.S.***
6. ***Encourage local governments to participate in the National Flood Insurance Program Community Rating System***

C.Regional Initiatives and Collaboration

East Central Florida Regional Resiliency Action Plan

Resilient Brevard is consistent with the commitments made as part of the County's participation in the East Central Florida Regional Resiliency Collaborative, formed in 2018, and the resulting East Central Florida Regional Resiliency Action Plan (ECF RRAP). The ECF RRAP gathered stakeholders in Brevard and Volusia County to identify opportunities and gaps in planning for resilience, and to facilitate discussion, collaboration and local actions over a five-year timeframe in order to address climate-related vulnerabilities and strategies.

This report builds on the work developed as part of the Resiliency Action Plan and the Regional Resiliency Collaborative in a number of ways, including the use of the RRAP's Regional Approach to Sea Level Rise recommendation. Additionally, some of the recommendations included as part of this report are local government action items deemed relative to Brevard County originally identified in the ECF RRAP.

Brevard County is one of the 13 coastal jurisdictions within the East Central Florida Regional Resiliency Collaborative implementing the Peril of Flood requirements. The adjacent chart shows communities noted in green that have adopted Peril of Flood requirements, and those in blue and red are in some stage of the process of identifying and implementing policies and strategies.

The recommendations and strategies provided through this project benefit from the experience gained through the resiliency work conducted in other jurisdictions including data, best development practices, and policy strategies.

Brevard County	
Cape Canaveral	
Cocoa	
Cocoa Beach	
Grant Valkaria	
Indialantic	
Indian Harbor Beach	
Malabar	
Melbourne	
Melbourne Beach	
Palm Bay	
Palm Shores	
Rockledge	
Satellite Beach	
Titusville	

North Merritt Island Hydrology and Hydraulics Modeling Development

At the time of drafting this report, the Brevard County Stormwater Program was also working on developing an integrated surface water to ground water (SW-GW) model for the North Merritt Island watershed which will serve as a model for evaluating current flooding conditions and be used as a tool to evaluate potential flood control and natural system improvement projects, as well as other physical changes to the watershed. The final report and model are scheduled to be delivered by late August 2021.[1] This tool, once fully debugged and tested may be a good model for expanded use within other areas of the County.

Space Coast Transportation Planning Organization

The Space Coast Transportation Planning Organization (SCTPO) is the that administers all policies and procedures applicable for state and federal funding for organization for Brevard County and its municipalities.

In 2017, the SCTPO completed a study examining Brevard County's transportation infrastructure for vulnerability to Sea Level Rise. The SCTPO also adopted the East Central Florida Regional Resiliency Action Plan in March 2019. At the time of drafting this report, the SCTPO was in the process of developing a Resiliency Master Plan (RMP). The objective of the RMP is "*to define potential transportation-specific shocks and stressors, identify vulnerable corridors, and recommend strategies to improve the adaptability/recovery of the system*."[2]

With the SCTPO examining the vulnerabilities to the transportation network in Brevard County, this project will address some findings from the vulnerability analysis conducted through this study, but will not attempt to duplicate their data collection and analysis. The Resilient Brevard project benefits from coordinating with the SCTPO resiliency work to further support regional resiliency coordination.

St. Johns River Water Management District

The St. Johns River Water Management District (SJRWMD) has adopted resiliency into its core mission and day to day administration of their jurisdiction over water supply, water quality, flood protection and enhancement of natural systems. The SJRWMD provides resources to help increase community resiliency, including funding for "cost-share program to partner with many local governments to ensure the completion of shovel-

[1]Based on the scope of work for the North Merritt Island Hydrology and Hydraulics Modeling Development. Brevard County Stormwater Program. August 2021

[2] Space Coast Transportation Planning Organization "Ride the Wave to Resiliency" project site, accessed via https://ride-the-wave-to-resiliency.constantcontactsites.com/ April 2021.

ready stormwater/flood protection projects designed to reduce flooding risks and improve water quality.[3]" The SJRWM also provides technical assistance and data to communities interested in water resource issues, including flood modeling which includes projections of sea level rise and temperature rise in scenarios. The SJRWMD is also a member of the East Central Florida Regional Resiliency Collaborative.

Florida Department of Environmental Protection

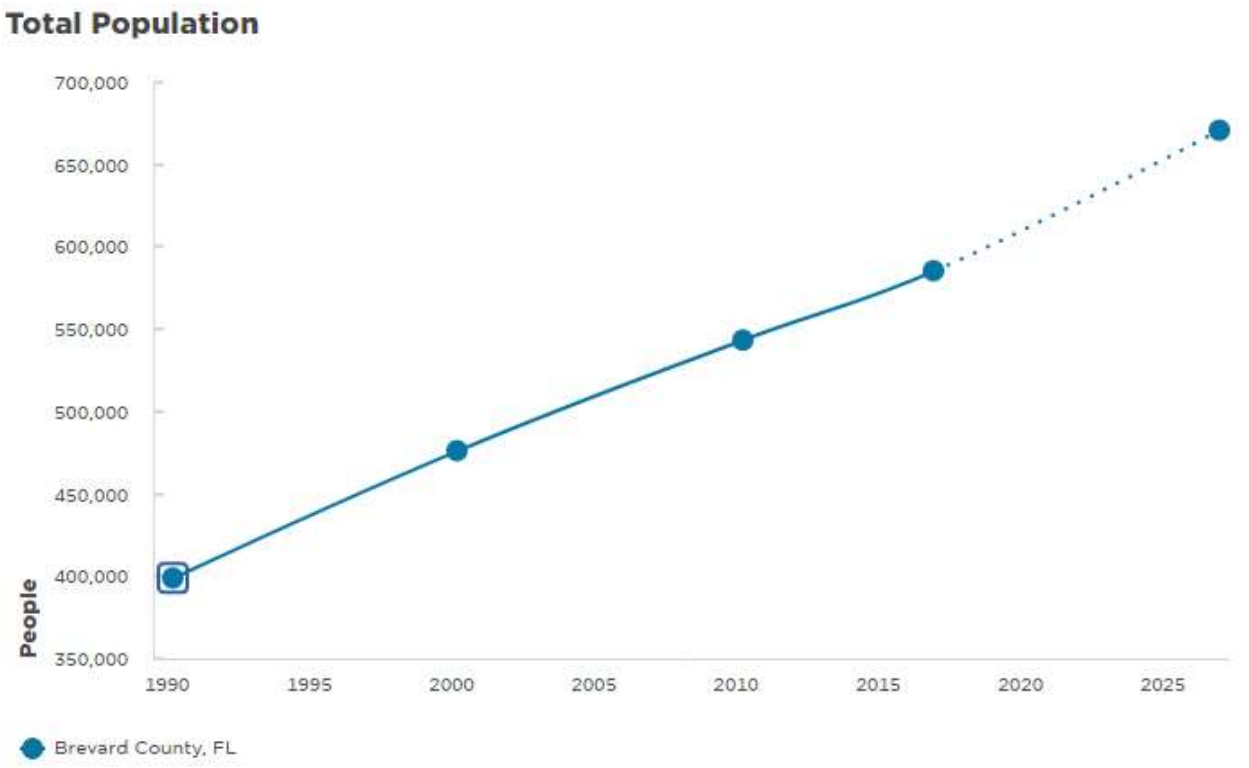
During the drafting of this study, the Florida Department of Environmental Protection (DEP) published a Notice of Proposed Rule for Rule 62S-7, F.A.C.: *Sea Level Impact Projection (SLIP) Studies for State-Financed Coastal Construction*. This rule will mandate that sea level rise be considered when reviewing any projects in coastal communities funded by state or federal funding. As regional and statewide focus continues to address natural hazards including sea level rise, it will be increasingly important for the County to ensure consistency in applying standards that may impact the same areas. For example, the location of strategies related to the "Coastal Zone" may be defined differently.

IV. Socio-Economic Profile

Natural hazards create tremendous stress on an entire population, but some segments of the population may require more support in preparing for and recovering from the impact of shock events and chronic stressors. Data and information provided below offers more insight into the socioeconomic conditions in Brevard County as provided by the 2015-2019 US Census American Community Survey (ACS) and other noted resources.

The current population of Brevard County is 585,507. Over the next five (5) years, from 2020 to 2025, the population is projected to increase by 85,368 people. There are an estimated 230,417 households with the average household size comprised of 2.5 people.

[3] St. Johns River Water Management District Sea-Level Rise and Resiliency site, accessed via https://www.sjrwmd.com/localgovernments/sea-level-rise/ . April 2021.



Sources: US Census; US Census ACS 5-year

The median age for the 2020 population is 47.3 years. According to the data,18% of the population are children under the age of 18 and 24% are over the age of 65. Presently 21% of the population is under the age of 19. Nearly 55% of the County is of working age, aged between 20 and 64 years old.

The County's population is trending toward the older generations, however, nearly 26% of the population is aged 20 to 44 which is indicative of the potential of population growth through child birth. Additionally, with 18% of the population comprised of children, the County has the opportunity to engage and educate them in the concerns associated with resilience and natural hazards to benefit them as they age into property and business owners in the future.

47.3
Years Old
Median Age

74.4%
of Total Population
Race/Ethnicity: White (non-Hispanic) per capita
Brevard County, FL

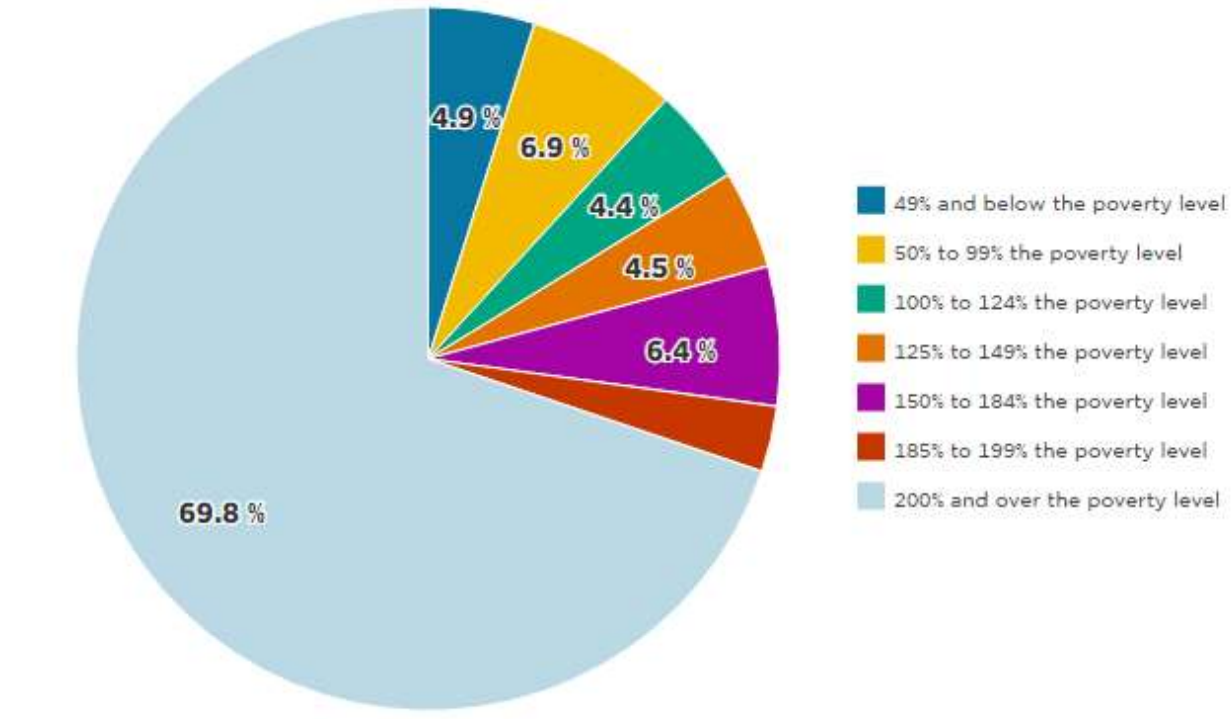
25.6%
of Total Population
Race/Ethnicity: Non-White Population per capita
Brevard County, FL

Nearly 26% of the County is comprised of non-White residents. Of the languages spoken in the County, 75.2% of households speak only English, 18.1% speak Spanish, 4.2% speak "other Indo-European" languages, and 1.9% speak "Asian-Pacific Islander" languages.

The median household income in Brevard County is $56,775 as compared to the statewide median household income of $55,660. The per capita income in the County is $31,882 which is a little higher than the statewide per capita income of $31,243. Brevard County hosts around 194,470 jobs with 50,432 of those jobs classified as "middle-skilled". Middle-skill occupations are defined as office / administrative support, construction / extraction, and installation / maintenance / repair. From analyzing this over time, we can better understand what sectors are our highest job providers and may present more economic opportunity.

There are a total of 33,440 households headed by single parents with the majority of those (24,050) being headed by single mothers. According to the data, there are 22,824 (9.9%) households receiving food stamps, and 28,387 families are classified as living 49% and below the poverty level. Further, 11,123 households are without a vehicle and 91,584 individuals living with disabilities in the County as well.

Figure 1: Brevard County, FL Income to Poverty Ratio



Brevard County, FL

Sources: US Census ACS 5-year 2015-2019

According to the US Department of Housing and Urban Development (HUD) and US Department of Transportation (US DOT), 12.6% of "low-income" households are considered "severely cost burdened" which means they pay over 50% of their income for housing leaving very little disposable income for anything else. For those low-income individuals, over 39% of their income is spent on housing, and when adding the expense of transportation, these individuals are pushed to spending over 110% of their income.

The HUD and USDOT also provides the Location Affordability Index which "provides ubiquitous, standardized household housing and transportation cost estimates at the Census block-group level for the majority of the populated area of the United States"[4]

The HUD and USDOT also provide a metric of affordability of a location based on access to employment. The Employment Access Index is a measure of job opportunity and can be used as a proxy for economic activity. This index is calculated for all census block groups in the US and accounts for the quantity of and distance to employment. This serves as an indicator of the vulnerability of the population if access to employment becomes further strained or limited by natural hazards and shock events.

COST BURDENED

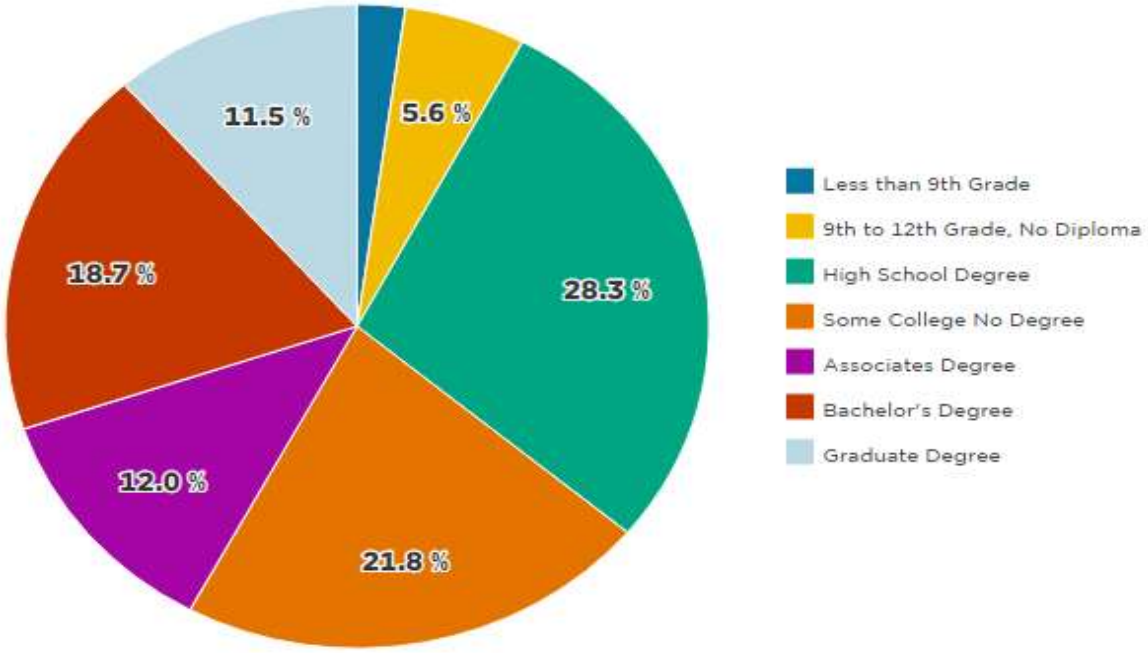
Those who pay more than 30% of their income for housing are "cost-burdened". Those who pay more than 50% of their income for housing are considered "severely cost burdened".

US HUD and DOT

[4] US Department of Housing and Urban Development accessed via https://hudgis-hud.opendata.arcgis.com/datasets/c1c32742599a42c9a45c95be50ed2ab6_0). April 2021.

Educational attainment is correlated with greater economic opportunity and prosperity. Over time, our goal is to improve high school graduation, college matriculation, and postsecondary attainment rates. Postsecondary education includes undergraduate or graduate/professional school. The largest proportion, 28.3% (122,936 individuals), of Brevard County's population a high school degree and 21.8% (94,827 individuals) have some college but no degree. A large portion of the population has attained a degree: 12% (52,010 people) have an Associate's Degree; 18.7% (81,151 people) have a Bachelor's Degree; and 11.5% (50,015 people) have a Graduate Degree.

Figure 2: Educational Attainment in Brevard County, FL



Brevard County, FL

Sources: US Census ACS 5-year 2015-2019

A summary of the socioeconomic conditions within the County is provided in Table **1** below.

Table 1: Socio-Economic Summary of Brevard County

Total Population	**585,507** People
Population Under Age 18 (Children)	**107,753** People
Population Age 65 and Over (Seniors)	**137,161** People
Age 65 and Over in Group Quarters (Seniors)	**2,100** People
Median Earnings - Total	**$31,882** USD
Unemployment Rate	**5.2%**
Median Home Value	**$196,400** USD
People Below Poverty Level	**68,456** People
Families Below Poverty Level	**11,575** Families
Family Below Poverty Level - Female No Spouse	**5,200** Families
Family Below Poverty Level - Male No Spouse	**1,497** Families
Population Living with a Disability	**91,584** People
Ability to Speak English: Less Than Very Well	**18,189** People
Vehicles Available for Occupied Housing Unit: No Vehicles	**11,123** Occupied housing units
Percent of Low Income Households Severely Cost Burdened	**12.6%** Households
Percent of Income Spent on Housing - Low Income Individuals	**39.7%**
Percent of Income Spent on Housing and Transportation - Low Income Individuals	**110.3%**

Sources: HUD CHAS 2013-2017; US Census ACS 5-year 2015-2019; US HUD & DOT LAI V3.0 2016

Vulnerability has many dimensions. Social Vulnerability is an indicator of how resilient a community is when confronted by external stresses on human health based on a number of factors, including poverty, lack of access to transportation, and crowded housing.

SOCIAL VULNERABILITY

How resilient a community is when confronted by external stresses on human health.

The Social Vulnerability Index (SVI) is an indicator of vulnerability utilized by the Center for Disease Control (CDC) that provides an indicator of vulnerability to segments of the population within US Census tracts. Social Vulnerability is one method by which resiliency projects could be prioritized as it gives insight into the unique stressors that may impair a population's ability to recover or fully disable a population already living within crisis conditions.

CDC SVI databases and maps can be used to[5]:

- *Estimate the amount of needed supplies like food, water, medicine, and bedding.*
- *Help decide how many emergency personnel are required to assist people.*
- *Identify areas in need of emergency shelters.*
- *Plan the best way to evacuate people, accounting for those who have special needs, such as people without vehicles, the elderly, or people who do not understand English well.*
- *Identify communities that will need continued support to recover following an emergency or natural disaster.*

The SVI ranks each census tract on 15 social factors, provides an Overall SVI (the aggregate of all social factors) and then provides SVI scores for four (4) aggregate themes under which the 15 social factors are grouped. Scores can range from 0 (lowest

[5] CDC SVI Fact Sheet | Place and Health | ATSDR, accessed via https://www.atsdr.cdc.gov/placeandhealth/svi/fact_sheet/fact_sheet.html

vulnerability) to 1 (highest vulnerability). The four (4) themes are noted and described in greater detail below.

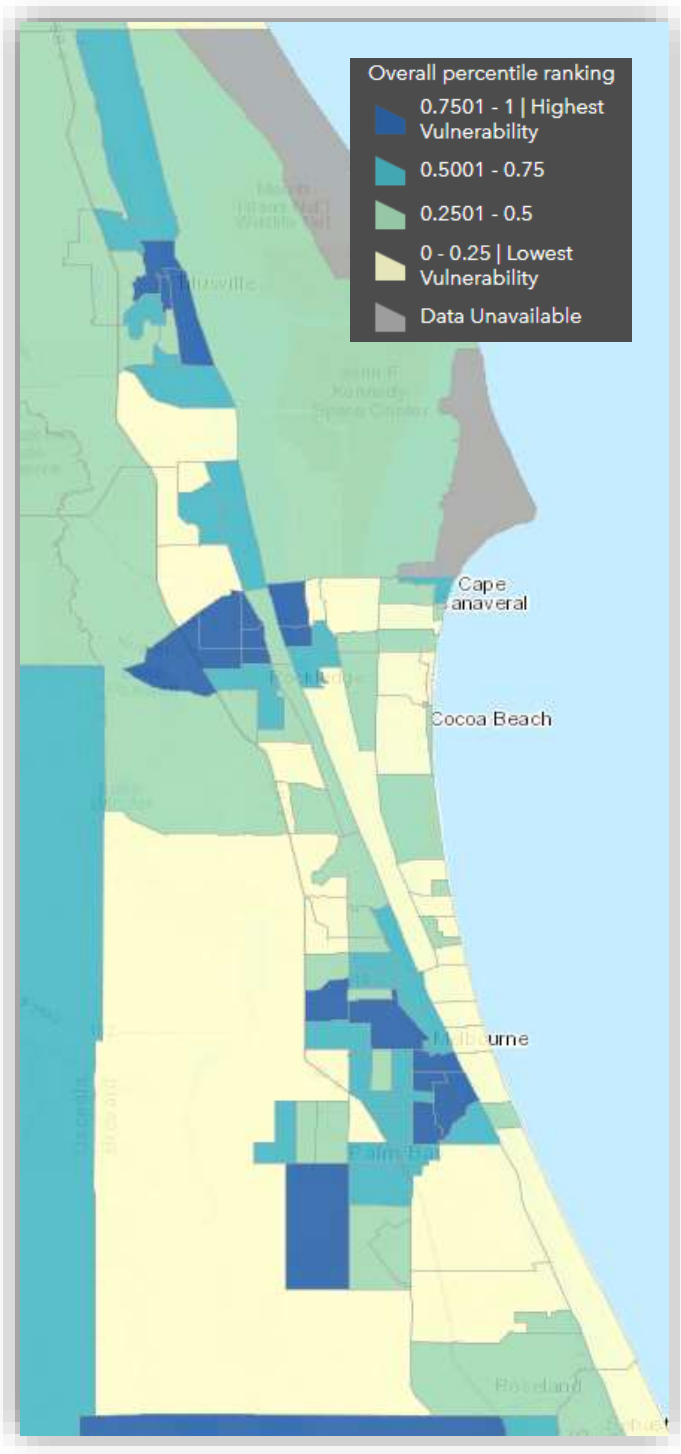
Overall Social Vulnerability

Brevard County's Overall SVI Score (2018) is 0.3713. A score of 0.3713 indicates a low to moderate level of vulnerability as averaged over the entire County.[6]

There are, however, census tracts with indicators of higher social vulnerabilities than other tracts in the County. These areas may be areas to focus and prioritize specific resiliency strategies depending upon the vulnerabilities.

What can be seen by the Overall SVI is that there are pockets of tracts of the highest vulnerability, from 0.7501 to 1, as represented by the darkest colors on the map. The most vulnerable tracts in Brevard County are census tracts around Titusville (604, 607, and 714); Rockledge and Cocoa (623.01, 623.02, 623.03, 624, 625, 626, 699.02, and 697); and around Melbourne (646.02, 647, 649.02, 651.22, 651.23, and 651.24).

Figure 3 Brevard County
Overall Social Vulnerability Index (2018)



[6] Centers for Disease Control and Prevention/ Agency for Toxic Substances and Disease Registry / Geospatial Research, Analysis, and Services Program. CDC Social Vulnerability Index 2018. Database,

Socioeconomic Vulnerability Theme

This theme is comprised of households with the following social factors:

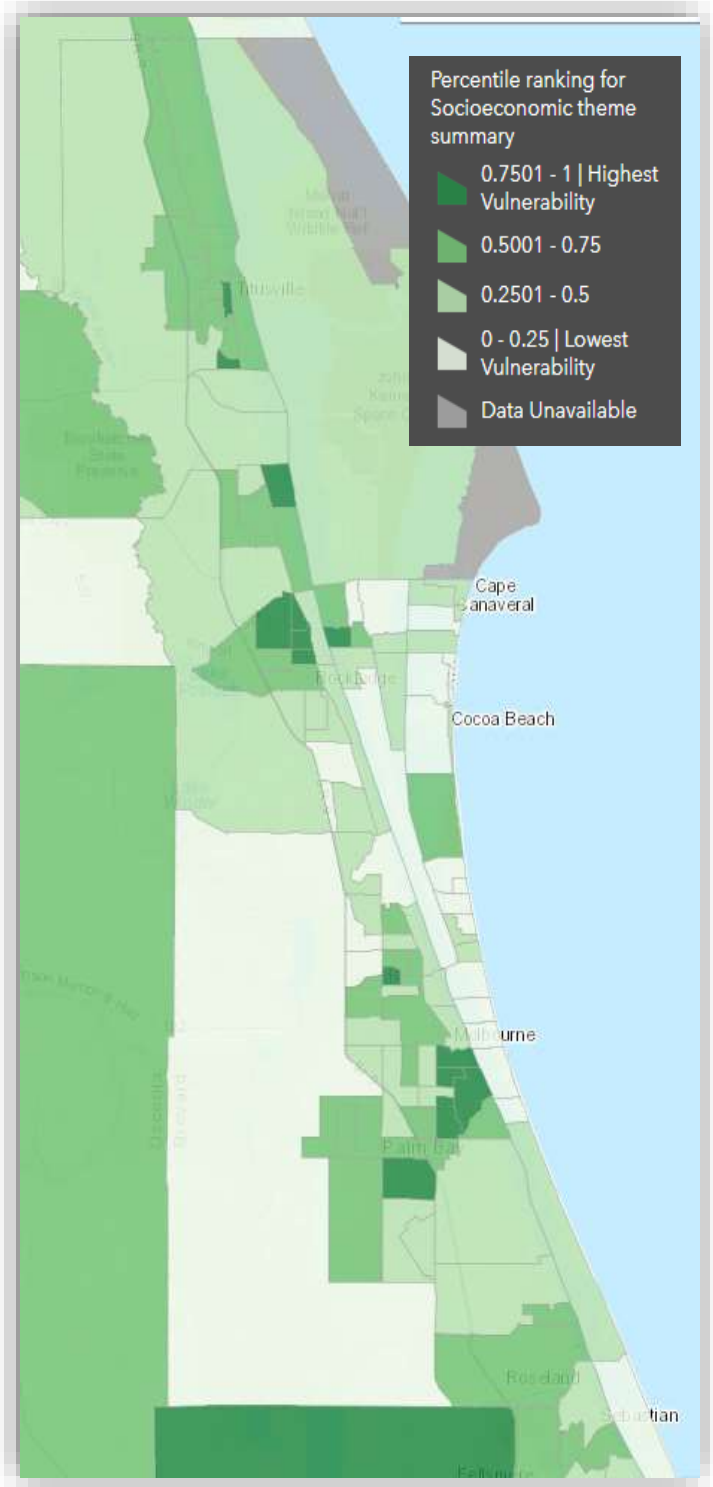
- ***Households Below Poverty***
- ***Unemployed***
- ***Median Income***
- ***No Highschool Diploma***

These populations of individuals may be disproportionately affected by natural hazards due to lack of disposable income for retrofitting or repairing their residences to be more resilient to natural hazards. Further, these individuals may for lack of education, have less mobility to change jobs in the event their current employment is somehow disrupted.

Brevard's aggregate Socioeconomic SVI is 0.3197 indicating a low to moderate level of vulnerability.

There are, however, some of census tracts that have the highest level of vulnerability include 607 and 610.02 near Titusville; 621.06 just north of Sharpes; 623.01, 623.02, and 624 just south of Sharpes; and 697 east of Sharpes near Cocoa. In Central Brevard County, another tract of the highest level of socioeconomic vulnerability is 645. In southern Brevard, there are five (5) tracts near Palm Bay of the highest vulnerability including 649.02, 651.22, 651.23, 651.24, and 713.22.

Figure 4 Brevard County Social Vulnerability Index Socioeconomic Theme (2018)



Florida. Accessed via https://www.atsdr.cdc.gov/placeandhealth/svi/data_documentation_download.html on April 19, 2021

Household Composition / Disability Vulnerability Theme

This theme is comprised of households with members:

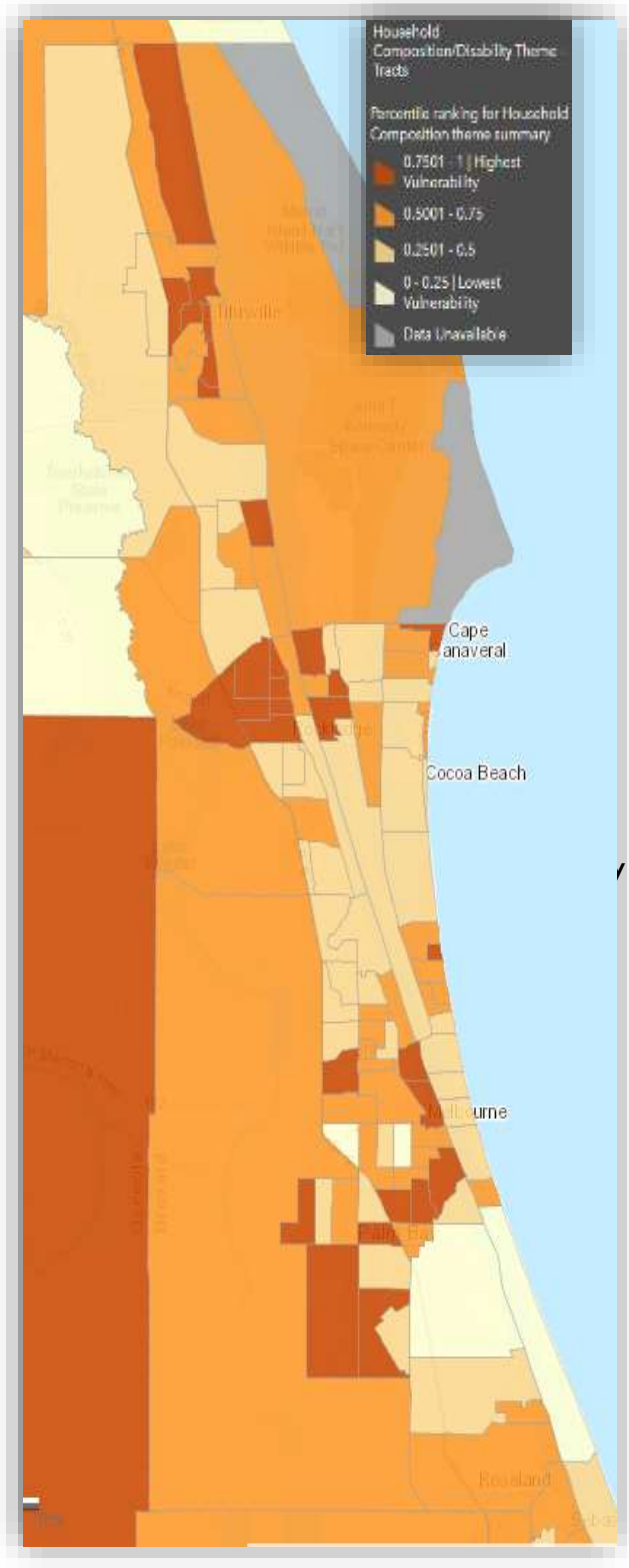
- ***Aged 65 Or Older***
- ***Aged 17 Or Younger***
- ***Civilians With Disabilities***
- ***Single-Parent Headed Households***

Understanding where these populations are concentrated increases the likelihood that these individuals will require assistance in evacuations, special needs shelters, storm preparedness, and potential help making improvements to their property to improve resilience. Further, households with children and single parents are disproportionately affected when support services, such as childcare centers, may be disabled due to a shock or flood event. As such, understanding where these populations are located will further support the County prioritize resilience projects for that area.

From the County overview, the aggregate Household Composition / Disability Theme SVI is 0.3346 which indicates low to moderate vulnerability.

The tracts with the highest vulnerability are located in north, central, and southern Brevard. Tract 601.01 is located near Mims, and tracts 604, 605, 607, 610.01, 610.02 are located around Titusville. Tract 621.06 is located north of Sharpes. A concentration of tracts is located near Rockledge and Coca, including: 623.01, 623.02, 624, 625, 626, 629, 698.02, 699.02, and 716.

Figure 5 Brevard County Social Vulnerability Index Household Composition / Disability Theme (2018)



Minority Status & Language Vulnerability Theme

This theme comprises households that are:

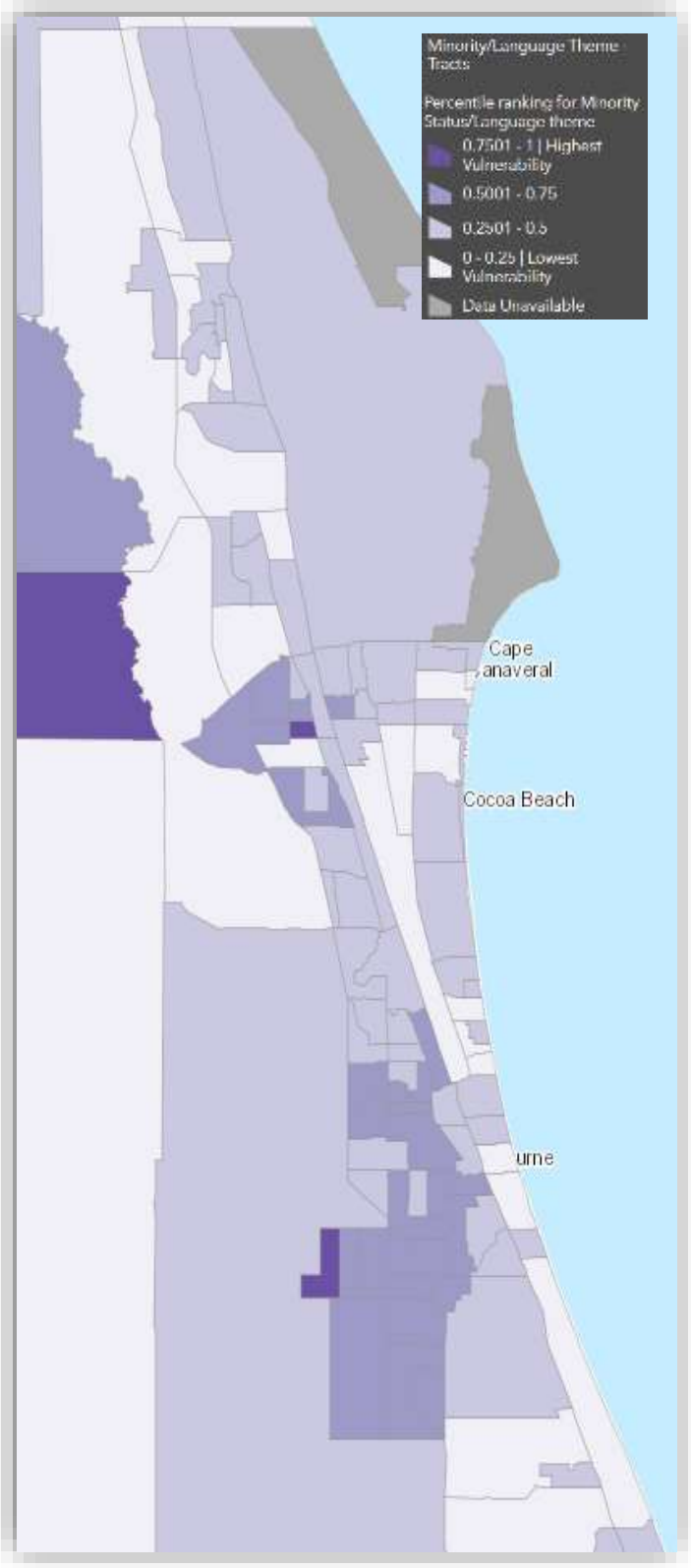
- ***Minority***
- ***Speak English "Less Than Well"***

Understanding where these populations are concentrated supports the County understand where to modify the provision of services to include translations for the dominate language of the area as well as how to lead educational programs on concerns associated with resilience and natural hazards.

The aggregate SVI score for this theme is 0.695 which indicates moderate to high levels of vulnerability when averaged together within this theme.

The tracts with the highest indicators of vulnerabilities to language barriers and comprised of minority populations are located in census tracts 624, 625, 630, 631.04 near Rockledge and Cocoa. The next concentration of vulnerable populations is in census tracts around and within the limits of the City of Palm Bay.

Figure 6 Brevard County Social Vulnerability Index Minority Status & Language Theme (2018)



Housing Type & Transportation Vulnerability Theme

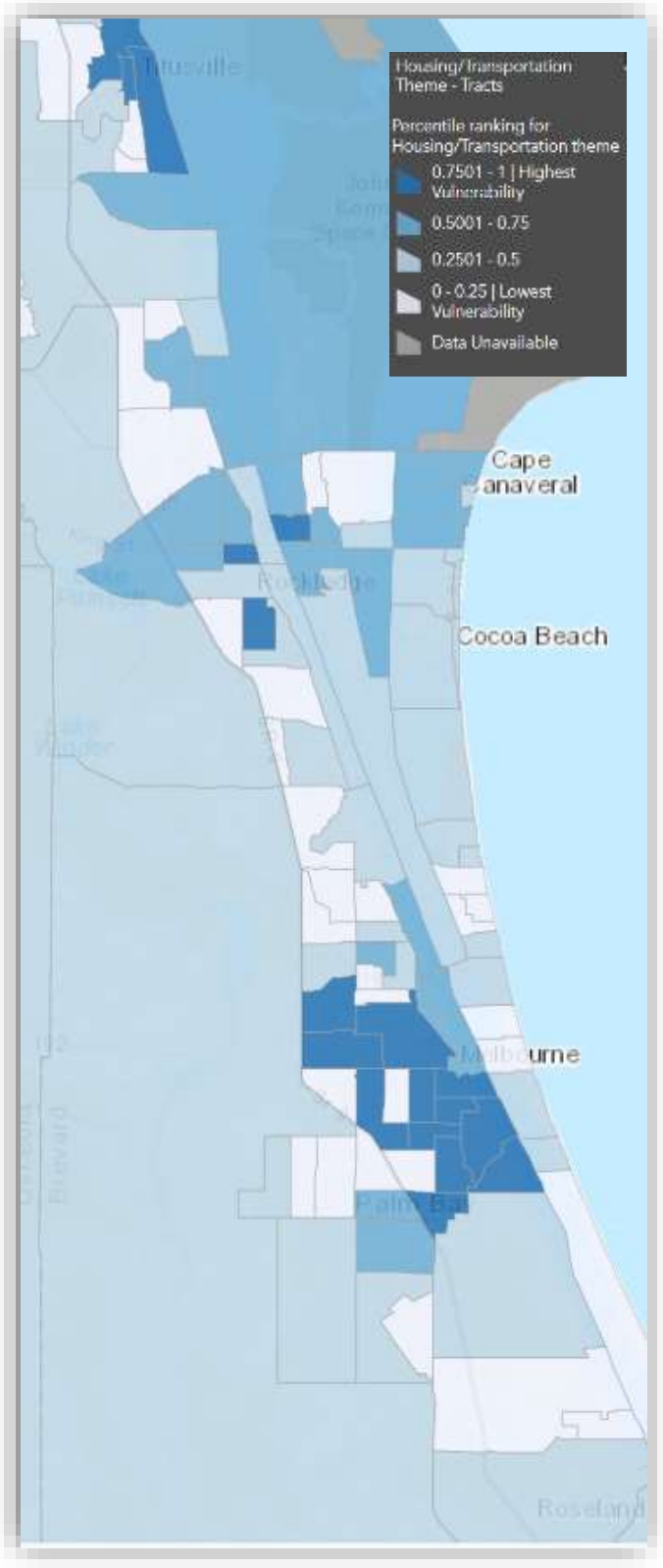
This theme is a composition of census tracts with high percentages of:

- ***multi-unit structure***
- ***mobile homes***
- ***crowding***
- ***no vehicle***
- ***group quarters***

The aggregate SVI score for this theme is 0.3489 which indicates low to moderate levels of vulnerability when averaged together within this theme.

As can be seen from the map, there are concentrations of census tracts with higher degrees of these specific vulnerabilities. Further analysis is recommended to understand the specific cause or result of the issue, and the specific strategies that would enhance their resilience.

Figure 7 Brevard County Social Vulnerability Index Housing & Transportation Theme (2018)



V. Vulnerability Assessment

As the goal of the vulnerability analysis and subsequent policy actions are based upon specific hazards and their areas of impact (physical and social), the methodology section of this report highlights the base data utilized and the general methods of analysis. The physical vulnerabilities assessed for this report include: sea level rise, frequent flooding, storm surge and designated flood areas. Modeling by the East Central Florida Regional Planning Council also assessed storm surge with the effects of sea level rise.

It is worth noting that the data utilized in the vulnerability assessment will be updated in future years as new data and modeling technology become available, and advances are made in climate science. Continuing to monitor the latest science and data, as well as work with experts will be important for the County.

The maps for each hazard include critical facilities and are also located in Appendix II with the county sectioned into "north", "central", and "south" for granularity.

A. Shallow Coastal Flooding

NOAA's Coastal Flood Exposure Mapper provides data to visualize the potential scale and extent, not exact location, of inundation of low-lying coastal areas susceptible to flooding during extreme high tides, otherwise referred to as shallow coastal flooding or nuisance flooding. According to NOAA, extreme high tides occur a few times per year when the sun, moon, and earth align, or during storm events. Flood levels can increase due to rainfall or wind.

Since the 1960's, the occurrences of high tide flooding (exceeding local thresholds for minor impacts to infrastructure) have increased 5- to 10-fold in several U.S. coastal cities and counties. The coastal flood data utilized in this vulnerability was obtained from NOAA's Coastal Flood Exposure Mapper. The flood thresholds are derived from national flood thresholds from NOAA Technical Report NOS CO-OPS 086: Patterns and Projections of High Tide Flooding along the U.S. Coastline Using a Common Impact Threshold (Sweet, 2018).

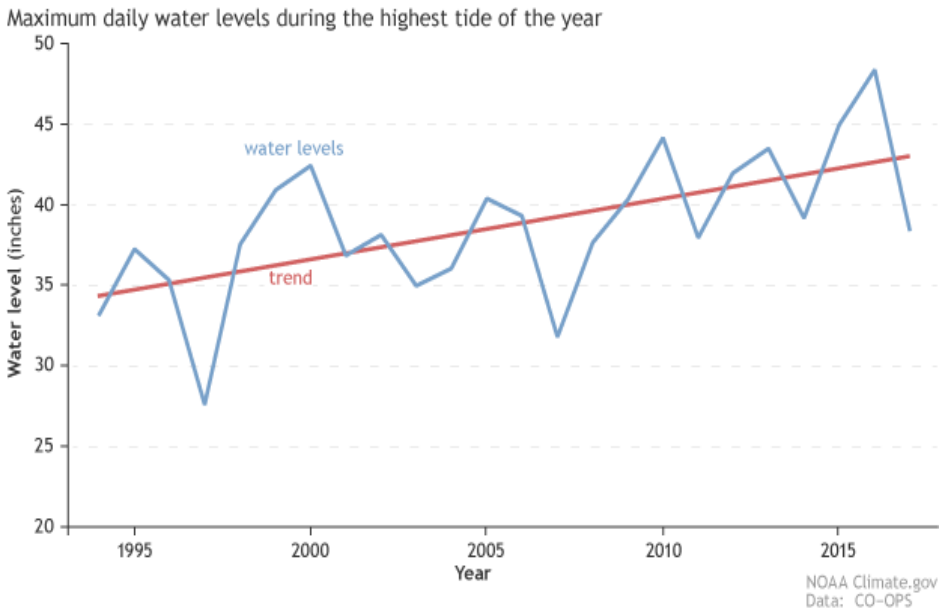
NOAA is utilizing this data to replace the flood thresholds previously used in the tool from the National Weather Service (NWS) which take into account local flood risk and are used to issue NWS coastal flood watches, warnings and advisories. Trident Pier (Brevard County) is the Station used for Brevard County. The NOAA NOS CO-OPS 086 report

indicates the derived threshold in this area for minor flooding (high tide flooding is 0.55 meters [1.8 ft. above MHHW]).

Due to the topography of Brevard County, these impacts can be realized on both sides of the Indian and Banana River Lagoons as well as along the oceanfront side. Windspeed, direction, and rainfall events can make these conditions even worse.

NOAA estimates that as sea level rises by 2050, the frequency of flooding above the minor flooding threshold elevation may increase upwards of 85 days/year in the Southeast Atlantic and 364 days by 2100 under the intermediate scenario. The figures from NOAA show the elevation of historical yearly flood events at Trident Pier and the trend of rising water levels during the highest tide of the year since 1994.

Figure 8: Maximum Daily Water Levels During the Highest Tide of the Year



Figures 9, 10, and 11 below depict areas in Brevard County susceptible to shallow coastal flooding. Due to the overall size and length of the County, these figures are divided as "north", "central", and "south" Brevard County. As can be seen, the predominance of shallow coastal flooding in the County occurs on the Indian River coast between Scottsmoor and Mims, and over much of Merritt Island from the Indian River, Banana River, and the Atlantic Ocean. Shallow coastal flooding occurs to lesser extent in "south" Brevard on the Indian River Lagoon side of the barrier island and along the tributaries, including the Saint Sebastian River, Turkey Creek, Crane Creek, and Eau Gallie River.

Figure 9: Critical Facilities Impacted by Shallow Coastal Flooding: North Brevard

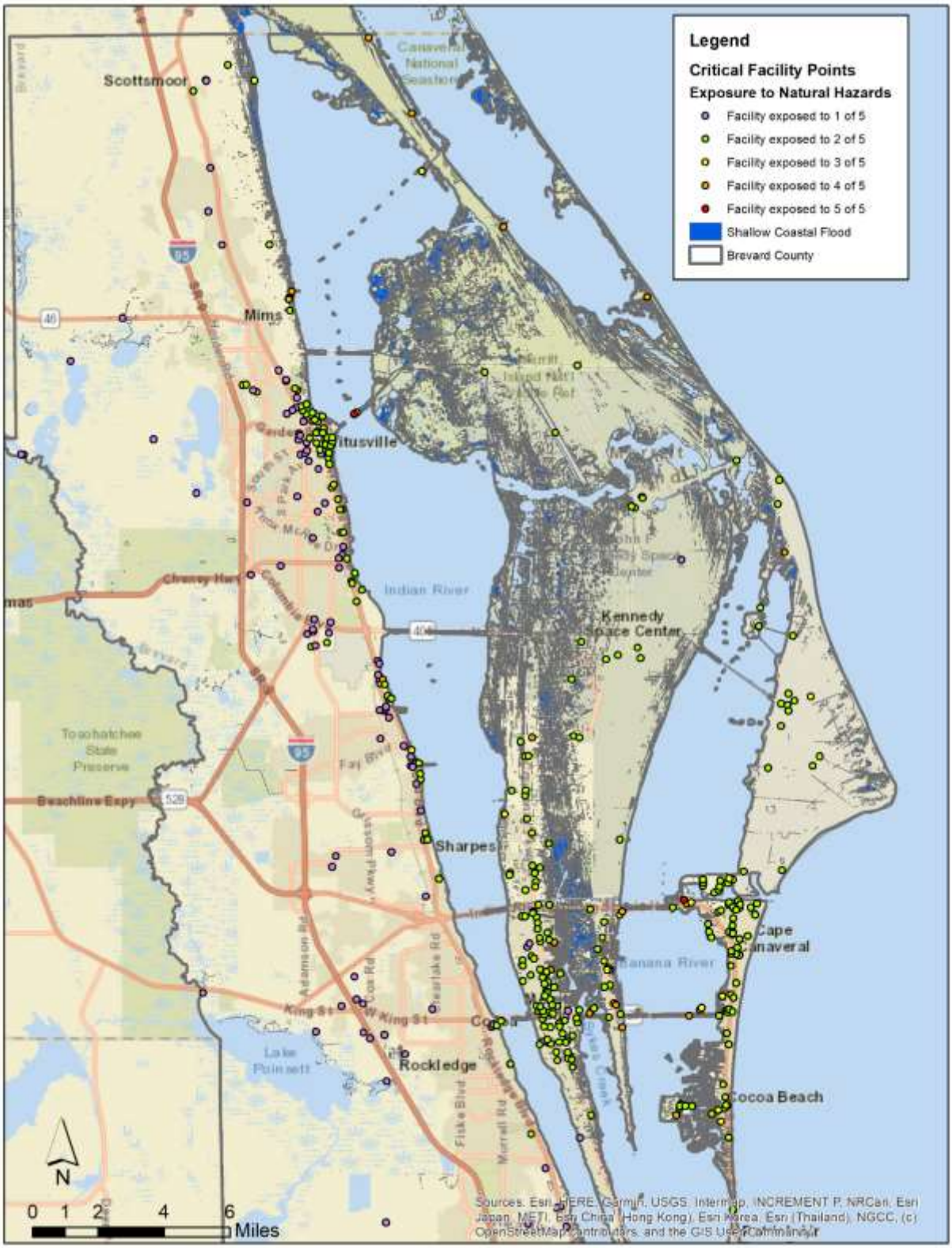


Figure 10: Critical Facilities Impacted by Shallow Coastal Flooding: Central Brevard

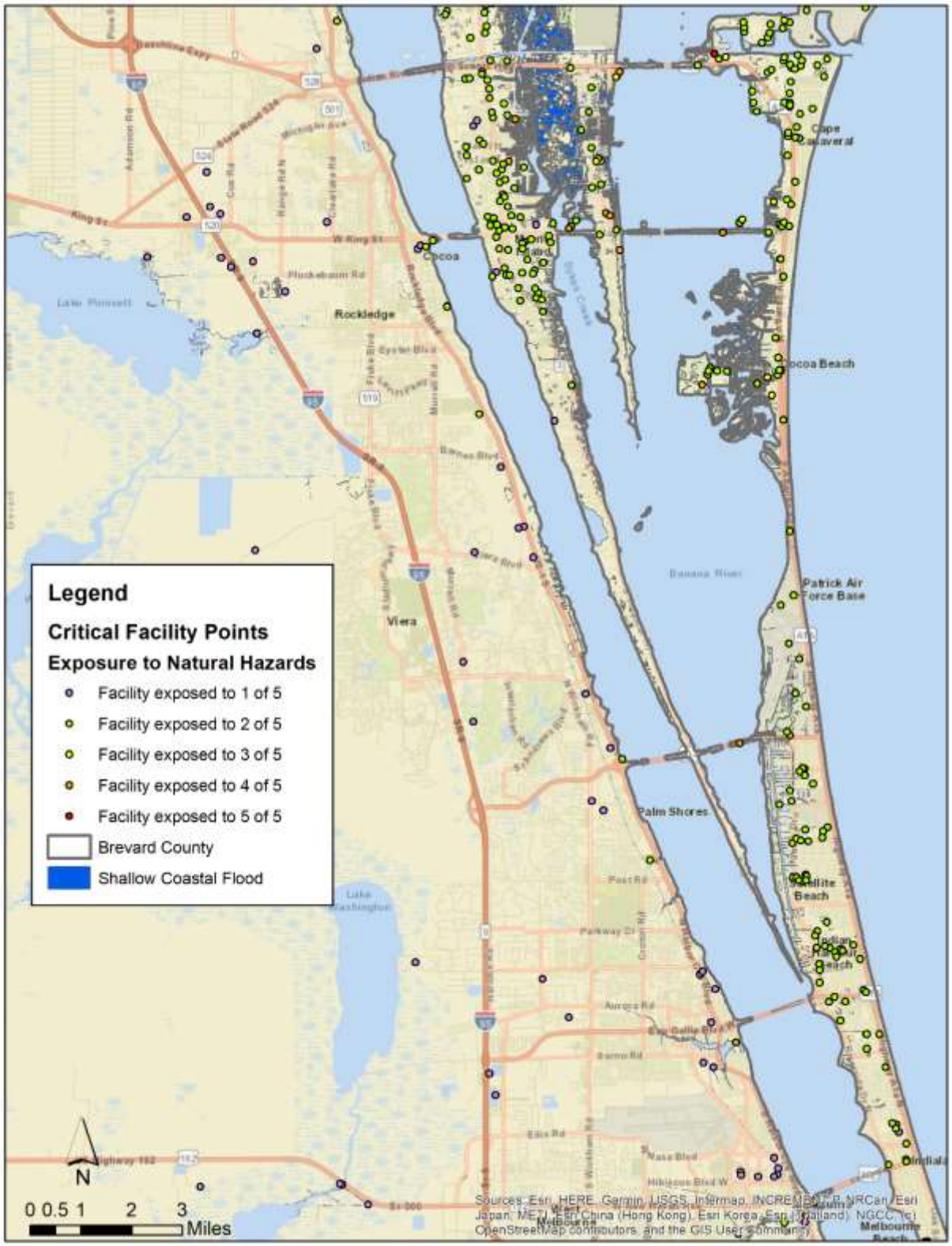
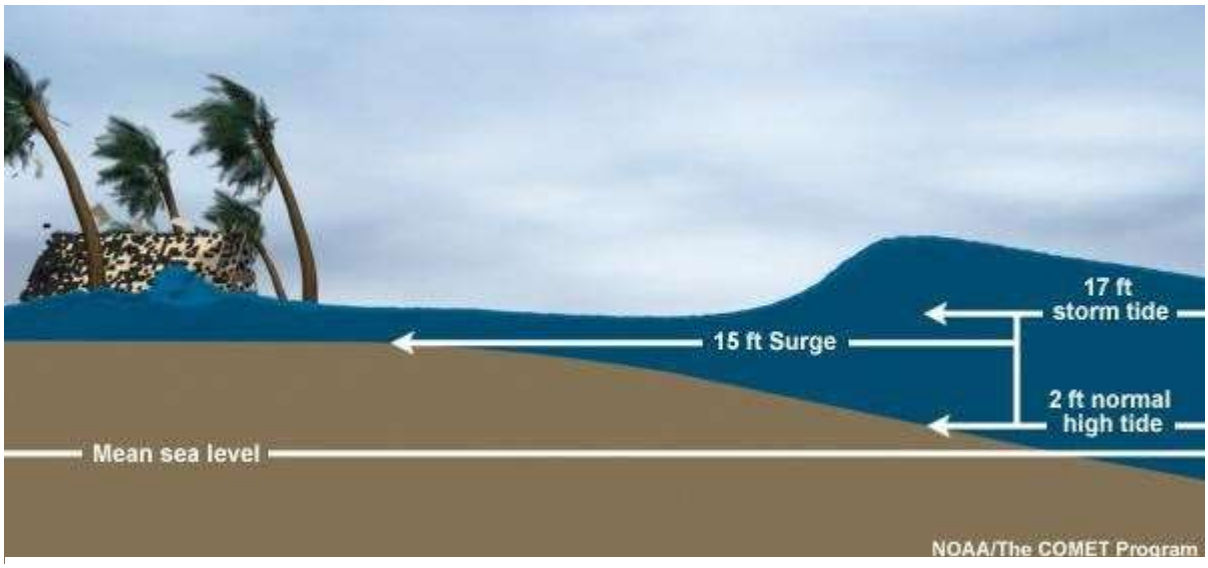


Figure 11: Critical Facilities Impacted by Shallow Coastal Flooding: South Brevard

B. Storm Surge

A SLOSH (Sea, Lake, and Overland Surges from Hurricanes) Basin is a geographical region with known values of land topography and ocean bathymetry. These set basins are used to simulate various hurricane tracks to estimate storm surge inundation in an actual event and/or a worst-case scenario.

Figure 12: Storm Surge



Source: Onslow County, NC

In late 2020, the regional planning councils across the State of Florida partnered again with the Florida Division of Emergency Management to update the Statewide Regional Evacuation Study (SRES). As part of this update, new SLOSH modeling was completed utilizing the statutorily required National Hurricane Center Basins. Previously in 2017, Brevard County was included in the South Florida Super Basin which also covered the Tampa Bay, Southwest Florida, South Florida, Treasure Coast Regions. This basin replaced 6 smaller SLOSH basins across the region, including the Cape Canaveral Basin which had previously been used for Brevard and Volusia County. Having a larger basin improves the modeling of storm surge created by a hurricane traversing a region, such as one that follows a coastline for an extended period of time (i.e., Hurricane Dennis in 2005 and Hurricane Matthew in 2016). Every basin update from the National Hurricane Center's Storm Surge Unit is an update on the evolution of their understanding of how storm surge inundates areas prone to this hazard. Additionally, improved resolution and newer elevation data is one of the major reasons for publishing an update to the region's evacuation study. Higher resolution LiDAR data improves storm surge mapping and

illustrates any physical changes made to the coast from recent storms. The 2020 SRES update again moved Brevard County into a new basin, the North Florida Basin, and new storm surge was modeled for Brevard and Volusia Counties. This new data provides a more accurate analysis and includes smaller grid sizes to process the SLOSH model.

Storm surge can expose and degrade underground utilities and water mains (see picture below), destroy electrical equipment, wash away seawalls and revetment systems and can destroy entire portions of roadways and sidewalks. Coastal erosion, a side-effect of storm surge, can deteriorate the foundations of critical facilities located adjacent to water bodies resulting in requiring costly improvements.

Storm Surge in Brevard County from Hurricane Irma

Source: Florida Today

Figure 13: Critical Facilities Impacted by Storm Surge: North Brevard

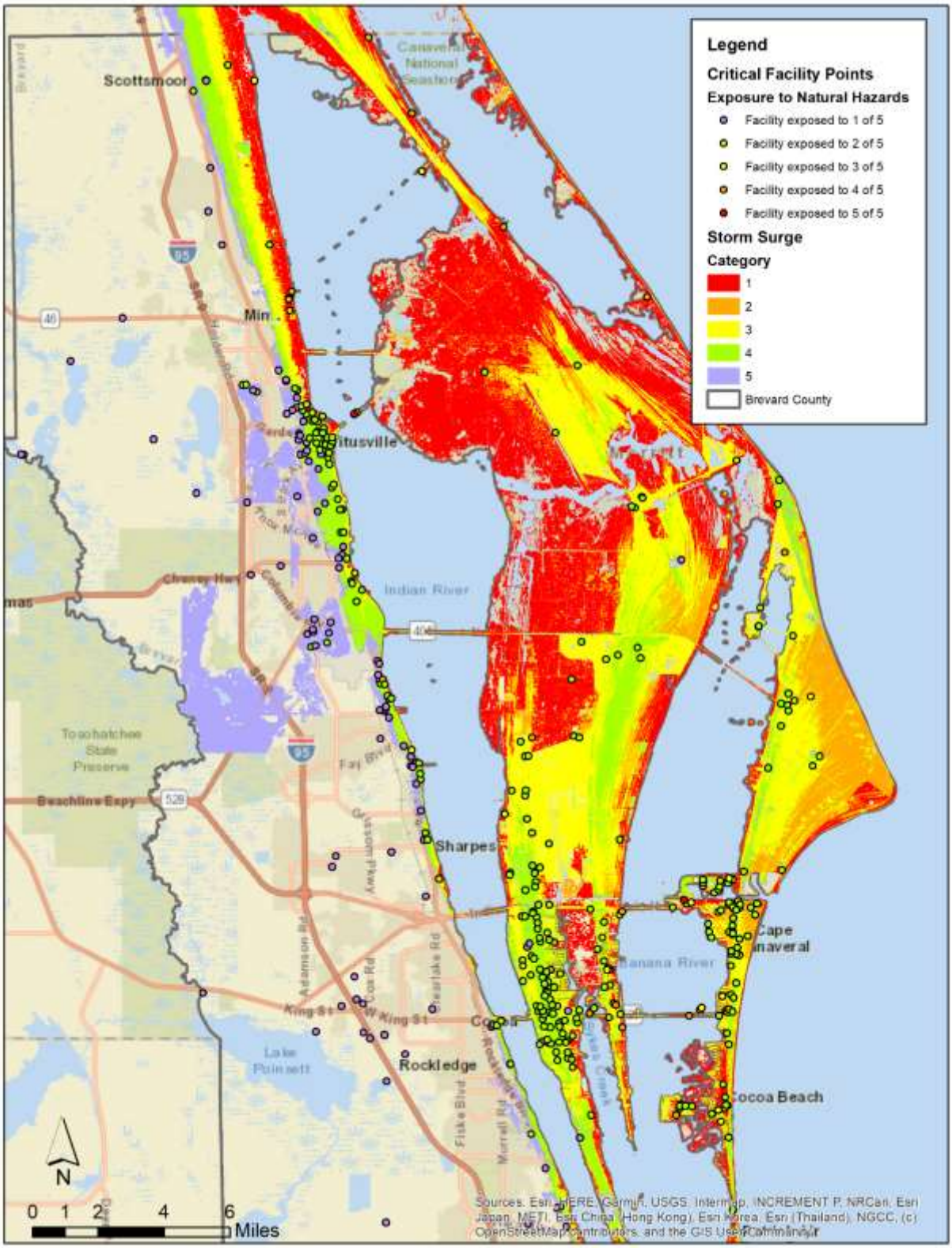


Figure 14: Critical Facilities Impacted by Storm Surge: Central Brevard

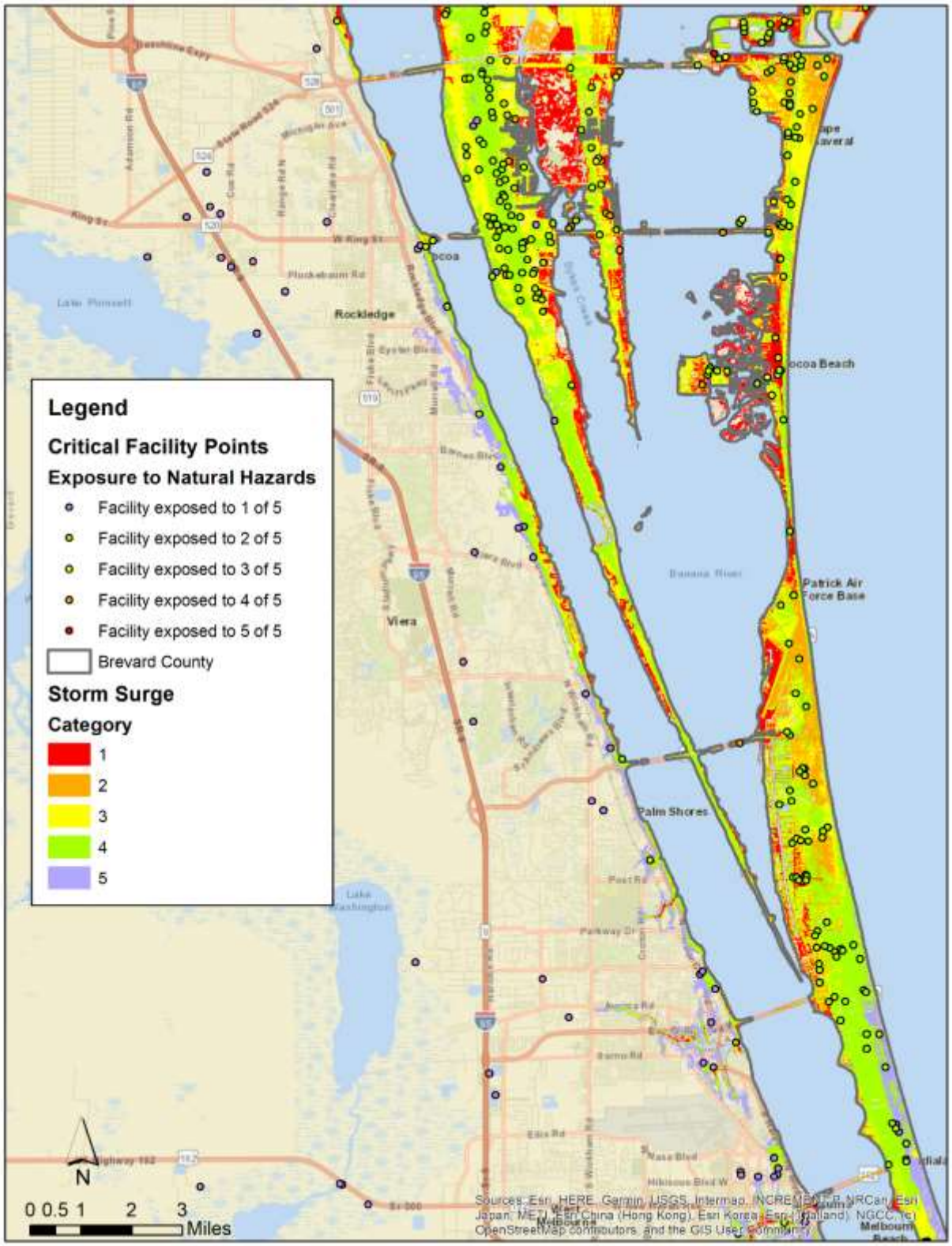
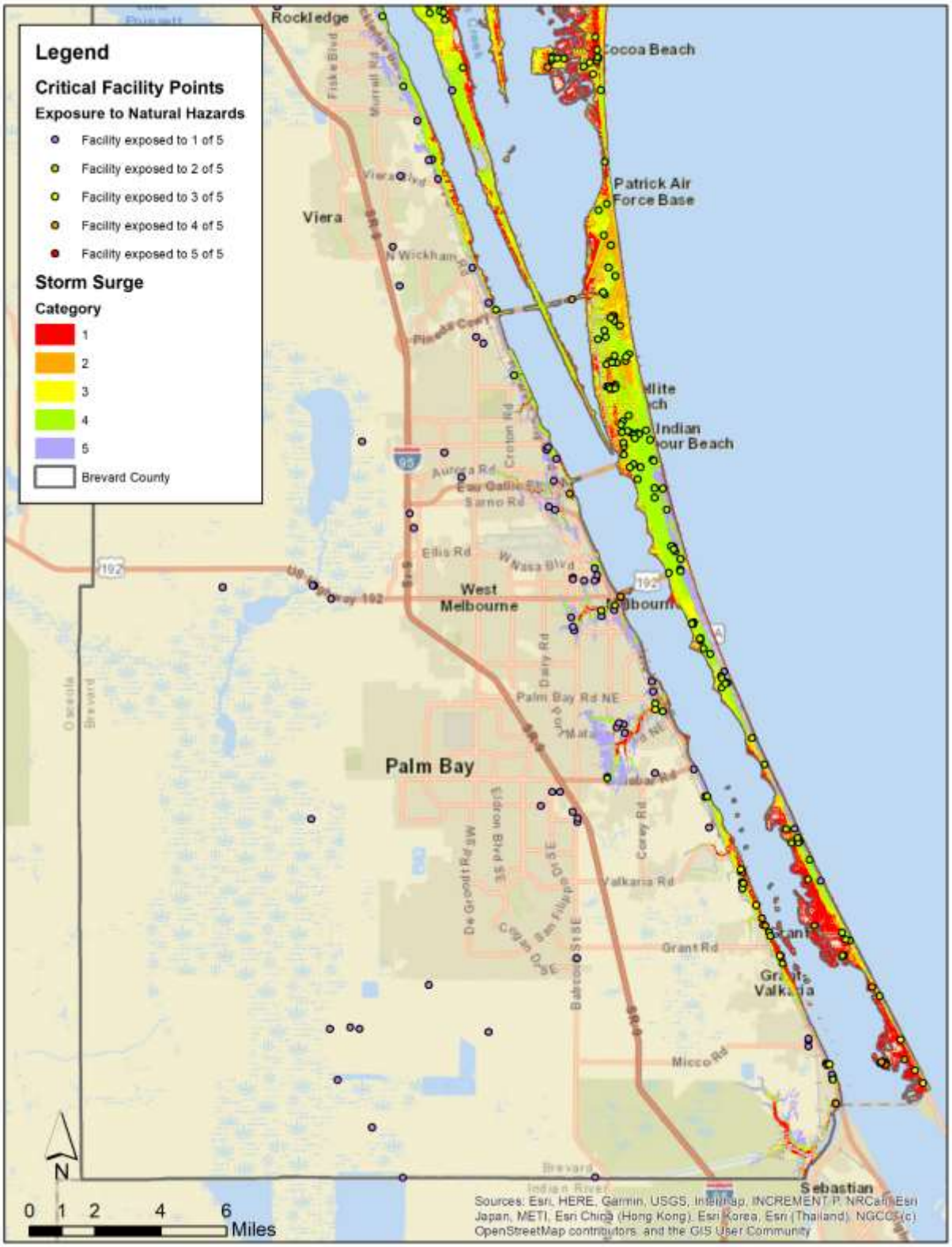


Figure 15: Critical Facilities Impacted by Storm Surge: South Brevard



C. Designated Flood Areas

The FEMA Digital Flood Insurance Rate Maps (DFRIM) from 2014 were used to conduct the assessment of assets located in the 100- and 500-year flood zones as well as the VE (Coastal areas with a 1% chance or greater of flooding and additional hazard associated with storm waves) zone. DFIRMS data indicates flood risk information derived from Flood Insurance Studies (FISs), previously published Flood Insurance Rate Maps (FIRMs), flood hazard analyses performed in support of the FISs and FIRMs and new mapping data, where available. According to FEMA, over time as various conditions change from construction and development and as environmental and watershed conditions change, flood risks also change. For this reason, FEMA has been in an effort to conduct a RiskMAP Coastal Restudy for Brevard County which includes revised DFRIMS. The County's 100-Year flood zones are generally located along the two (2) coastlines (river side and ocean side) with some flood risk extending into the center of the County. The 500-year zone encompasses a larger swath on the east side of the County and some areas to the northwest. This flood zone is similar in extent and area to the current Category 3 Storm Surge area.

Given the size and the orientation of Brevard County, the flood zone maps that follow are broken into "North", "South", and "Central" Brevard County.

Figure 16: Critical Facilities Impacted by 100-Year Floodplain: North Brevard

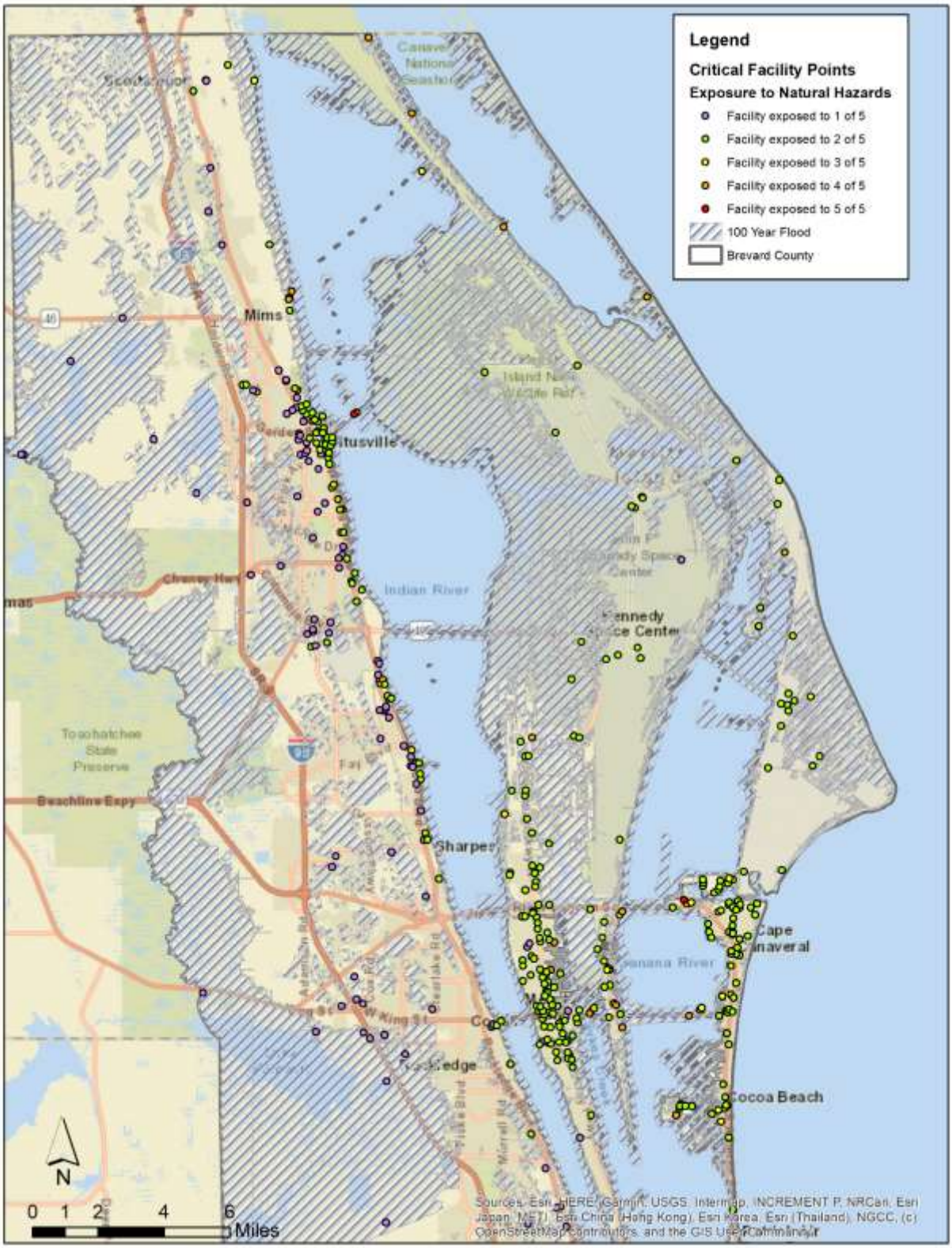


Figure 17: Critical Facilities Impacted by 100-Year Floodplain: Central Brevard

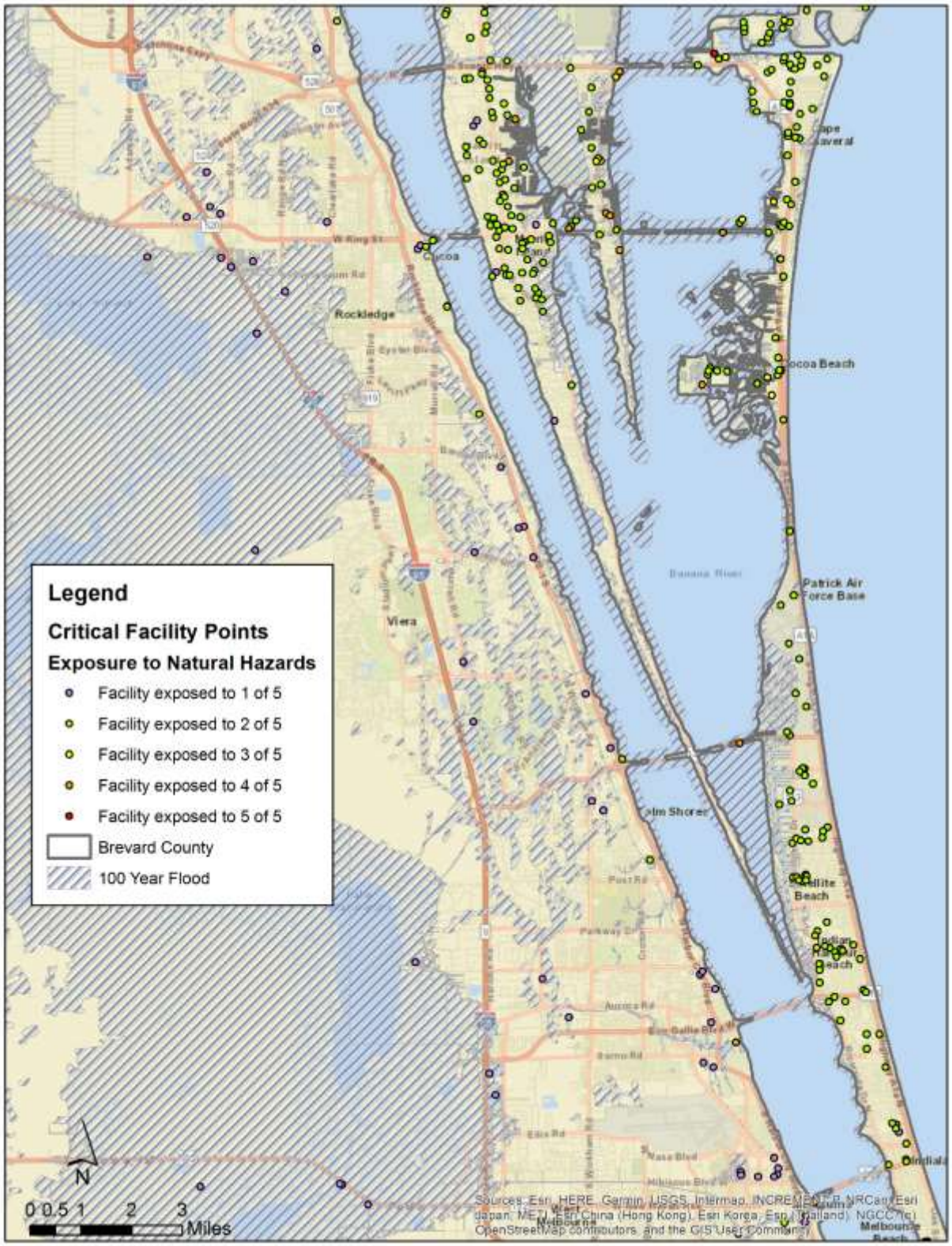
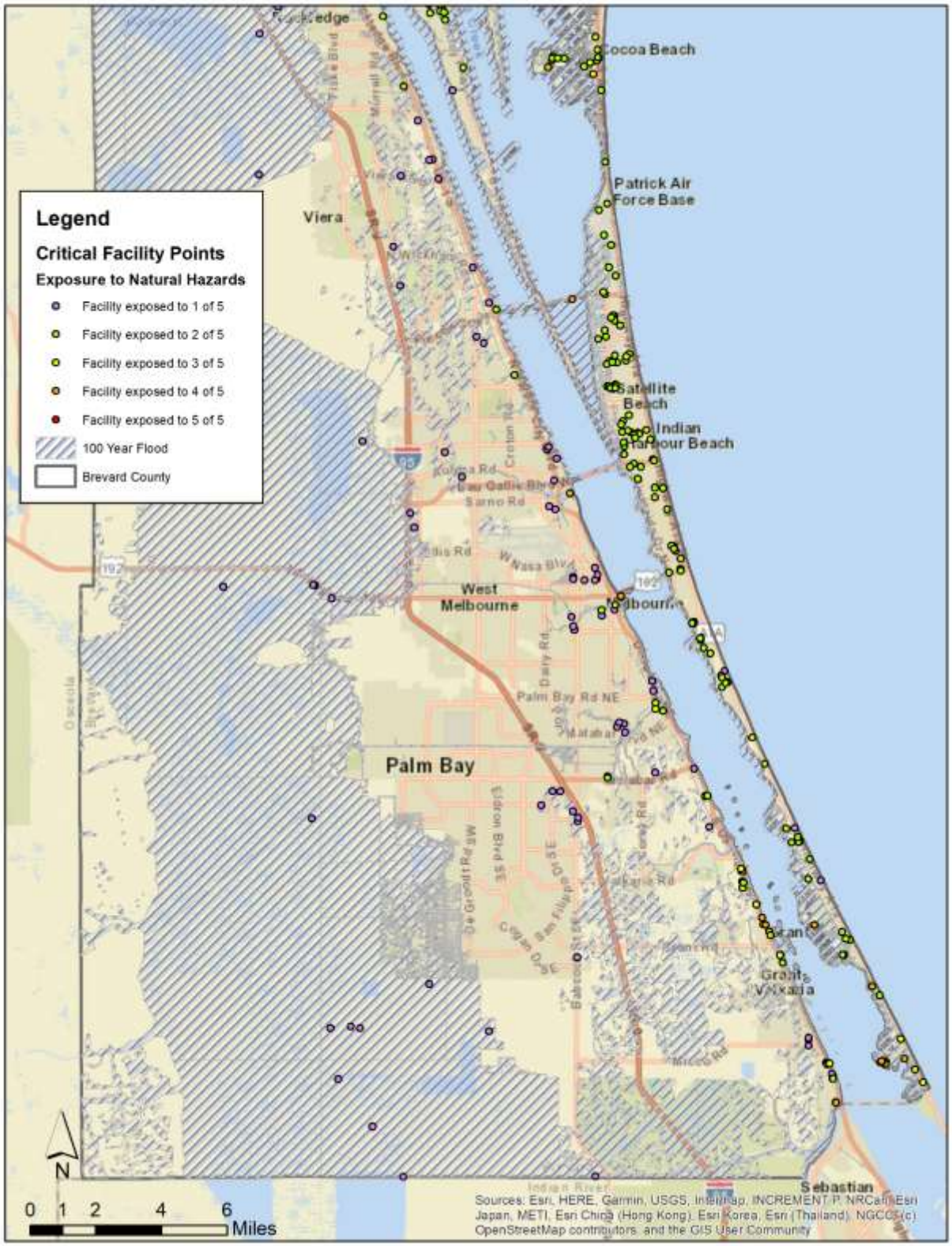


Figure 18: Critical Facilities Impacted by 100-Year Floodplain: South Brevard



D. Sea Level Rise

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 flooding and inundation.

As part of the **East Central Florida Regional Resiliency Action Plan**, the 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 method to planning for sea level rise.

The recommendation is as follows:

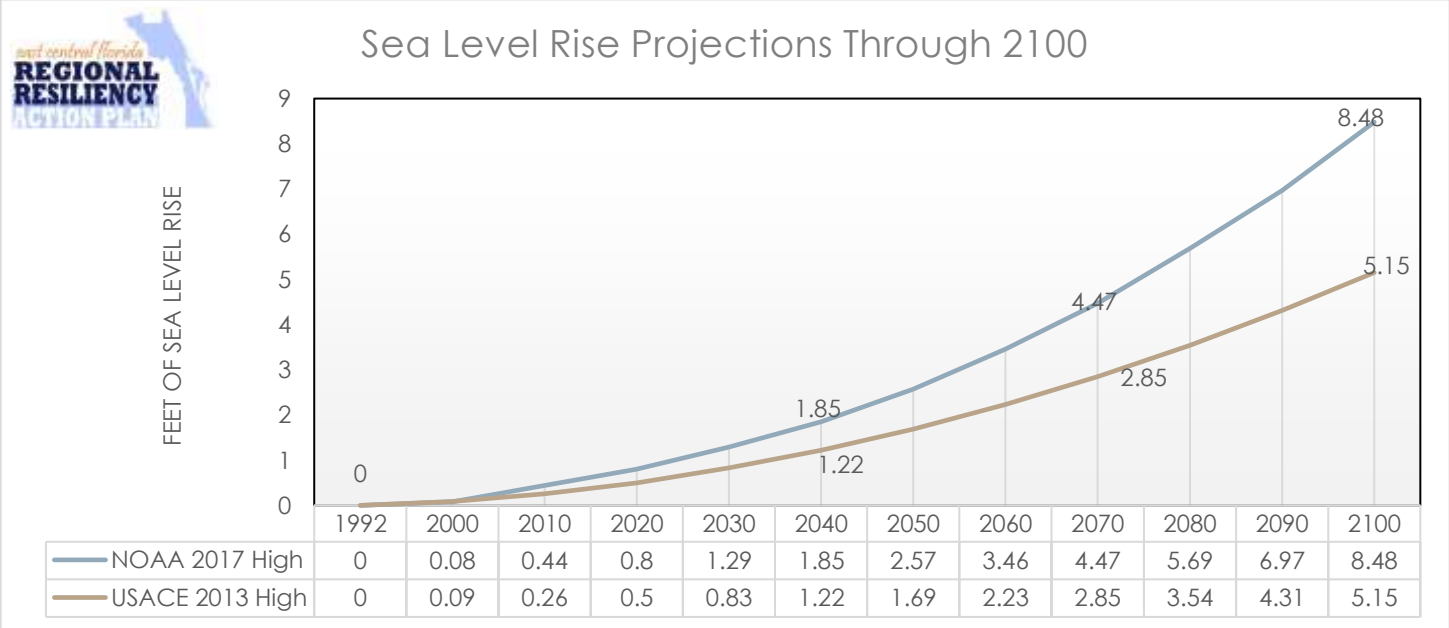
> *No one projection rate curve should be used for planning purposes across all projects and programs. Instead, a range of rise should be considered based upon the vulnerability, allowable risk, project service life and the forecast project "in-service" date of a facility or development. The range should 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).* (Council E. C., East Central Florida Regional Resiliency Action Plan, 2018)

The two (2) projections recommended as minimum and upper rate curves are derived from National Oceanographic and Atmospheric Administration (NOAA) 2017 and the US Army Corps of Engineers (USACE) 2013 data. The Sea Level Scenario Sketch Planning Tool was developed by the University of Florida (UF) GeoPlan Center for the Florida Department of Transportation (FDOT) to determine future sea level rise inundation areas utilizing U.S. Army Corps of Engineers (USACE) data. The USACE data were obtained via download from the UF GeoPlan Center. This analysis used the "modified bathtub model that applies a hydrologic connectivity filter to remove isolated inundated areas not connect to a major waterway". The resulting inundation files represent the specific projection rate curve mapped on top of Mean Higher High Water (MHHW). More details concerning the methodology utilized by the University of Florida can be found at the following link: *https://sls.geoplan.ufl.edu/documents-links/*.

As the GeoPlan Center currently only has NOAA 2012 data, updated 2017 NOAA data were downloaded from NOAA's Digital Coast Sea Level Rise Viewer which depicts the potential inundation of coastal areas resulting from a 1 to 10-foot rise in sea level above current MHHW conditions. These data were produced using a modified bathtub approach that accounts for local and regional tidal variability and hydrological connectivity. Two (2) source datasets are used to create the final inundation data: a Digital Elevation Model (DEM) of the area and a tidal surface model that represents spatial tidal variability. Again, these data do not account for erosion, subsidence or any other future changes in an area's hydrodynamics. A detailed methodology for producing these data as well as references to data accuracy can be found at the following link: *http://www.csc.noaa.gov/slr/viewer/assets/pdfs/Inundation_Methods.pdf*

Data utilized in the analysis illustrates inundation as it would appear during the MHHW (excluding wind driven tides) in accordance with the amount of sea level rise portrayed.

Figure 19: ECF Regional Resilience Action Plan Regional Approach to Sea Level Rise Planning



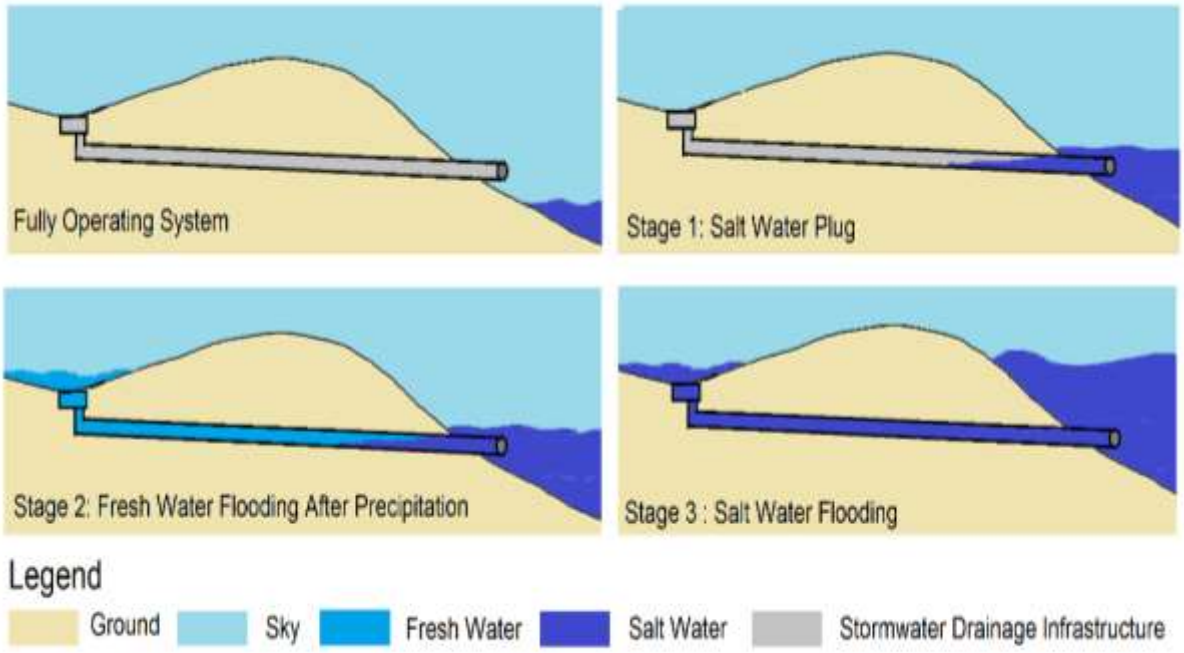
	1992	2000	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
NOAA 2017 High	0	0.08	0.44	0.8	1.29	1.85	2.57	3.46	4.47	5.69	6.97	8.48
USACE 2013 High	0	0.09	0.26	0.5	0.83	1.22	1.69	2.23	2.85	3.54	4.31	5.15

For the purpose of assessing sea level rise vulnerabilities within the County, the ECFRRAP regional approach was used as the parameters for the assessment. The planning horizons for the County include 2040, 2070, and 2100.

The maps on the following pages illustrate the potential areas of impact within unincorporated Brevard County based upon the NOAA and the USACE projection rate curves for the specific planning horizons. It is important to note that these maps show

areas that will be inundated during MHHW, but effects may be seen prior to inundation through increased erosion and wave action, as well as failure of stormwater systems.

Figure 20 Stages of Stormwater Infrastructure Failure Due to Sea Level Rise



Source: Stetson University

Using depth data provided through the GeoPlan Center in regard to the USACE curves, the County can expect to encounter 28 inches of inundation during high tide events above 1.22 feet of sea level rise (2030-2040), 47 inches of inundation with 2.85 feet of rise (2050-2070), and 75 inches of inundation with just over five (5) feet of rise (2080-2100).

Figure 21: Critical Facilities Impacted by NOAA Sea Level Rise: North Brevard

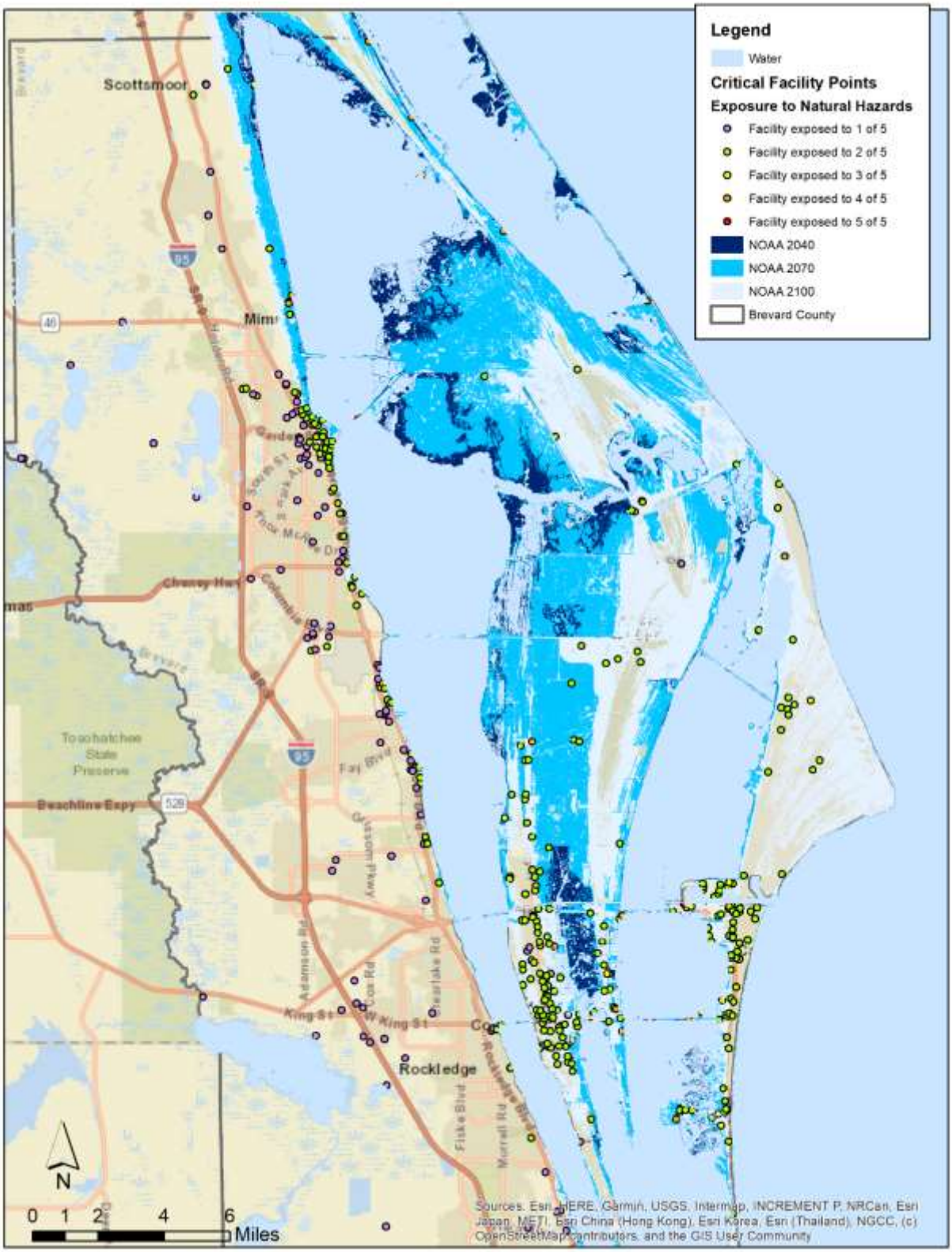


Figure 22: Critical Facilities Impacted by NOAA Sea Level Rise: Central Brevard

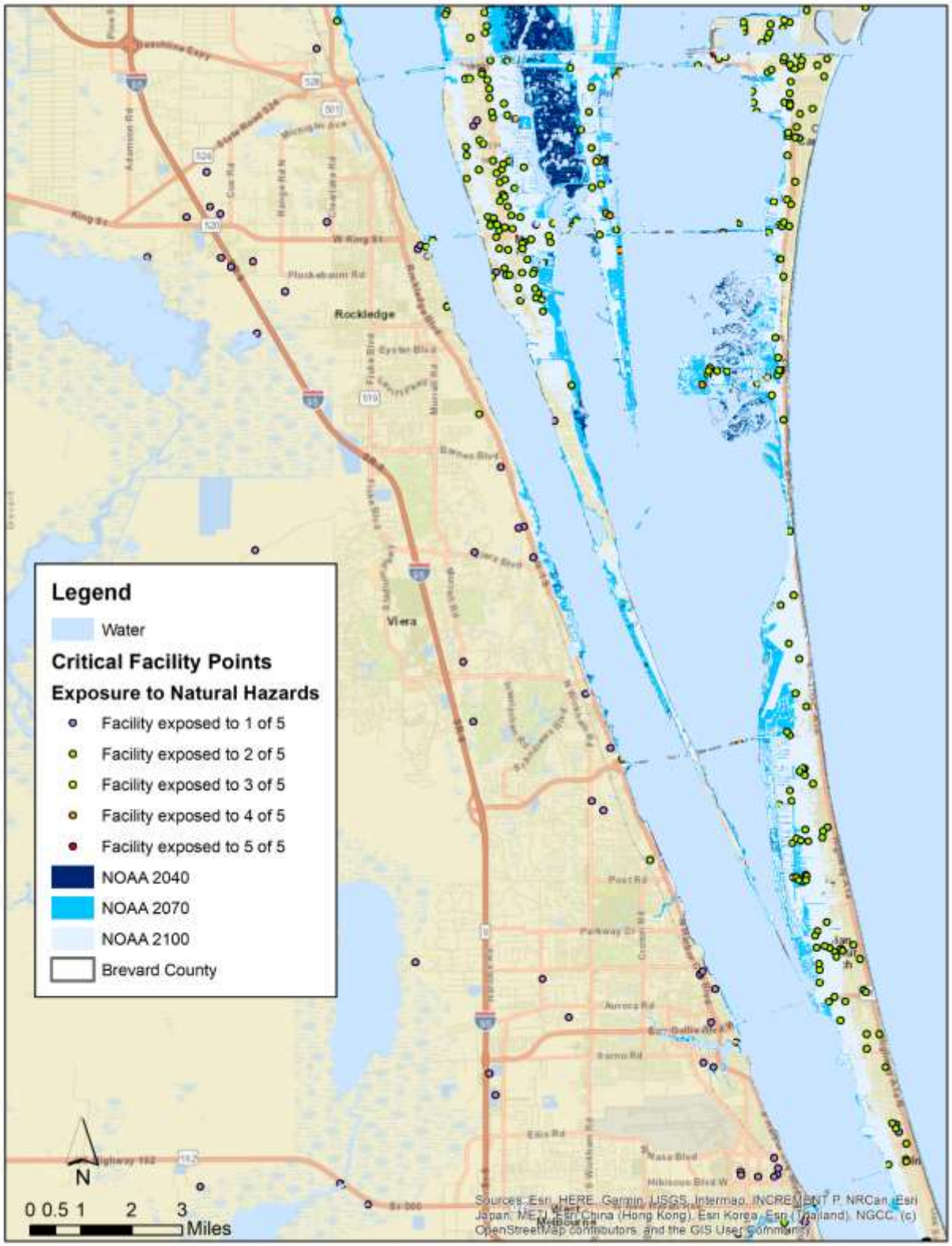


Figure 23: Critical Facilities Impacted by NOAA Sea Level Rise: South Brevard

Figure 24: Critical Facilities Impacted by USACE 2013 Sea Level Rise: North Brevard

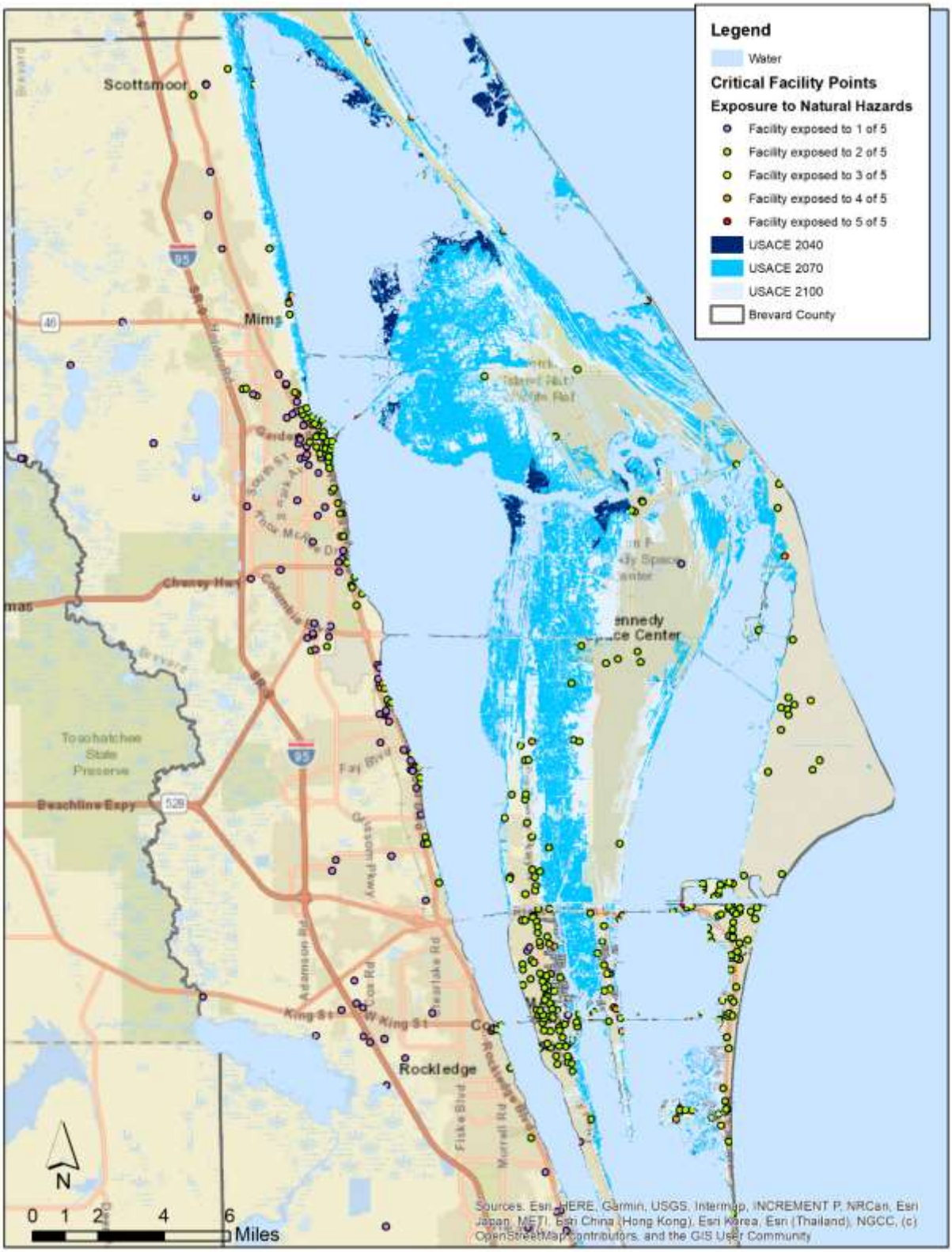


Figure 25: Critical Facilities Impacted by USACE 2013 Sea Level Rise: Central Brevard

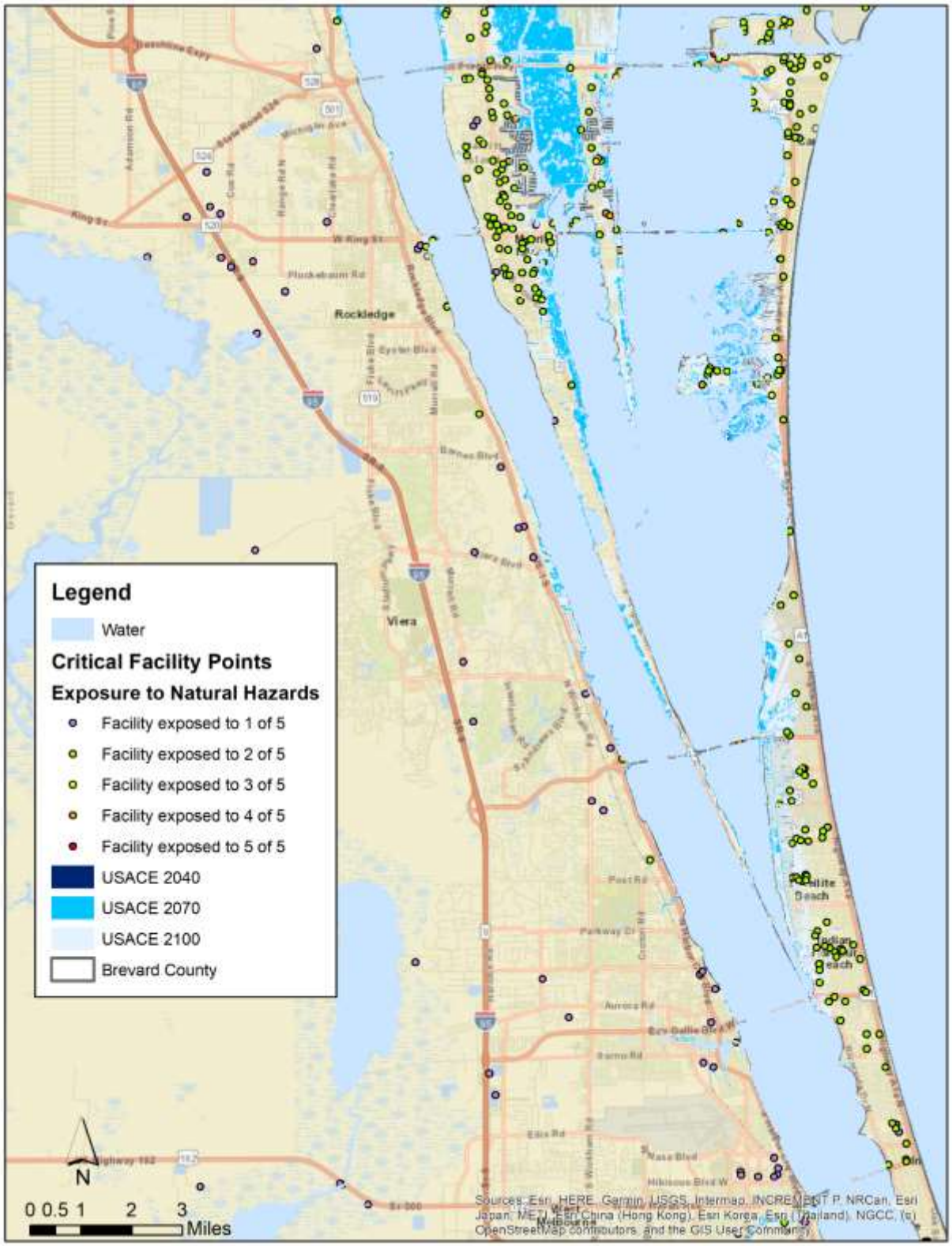


Figure 26: Critical Facilities Impacted by USACE 2013 Sea Level Rise: South Brevard

E. Storm Surge with Sea Level Rise

The Tampa Bay Regional Planning Council developed an ArcGIS Add-In Tool to model how future sea level rise conditions effect surge based on new National Hurricane Center (NHC) SLOSH "super basins" that provide greater resolution of data for storm surge modeling. The model uses the latest South Florida Super Basin SLOSH data for Brevard County. The model allows users to analyze certain levels of sea level rise (ex: 4 feet) based on what horizon and what SLR curve they want to map. The model is agnostic and all that is required is to choose the future surface rise.

The model references NOAA tidal gauges for tidal variability and uses the future sea surface selected by project designers; however instead of being referenced to MHHW, the SLR was referenced against Mean Sea Level (MSL). SLOSH basin surge data is referenced to high tide, so it should be added to MSL to map surge on top of SLR.

The data the model uses is comprised of a Digital Elevation Model (DEM), SLOSH Basin, Sea Layer with hydrologic connectivity, and NOAA tidal gauges. It is important to see the effect sea level rise has on coastal and tropical storms. Sea level rise in the near term is not dramatic when viewed on its own. However, coastal storm run-up and storm surge can be pushed past a tipping point when sea levels are higher than today. A Category 1 storm could produce the flooding of a Category 2 or perhaps a Category 3 storm by today's standards. The analysis conducted for this vulnerability assessment focused on a base Category 3 storm with USACE 2013 High and NOAA 2017 High projection curves for 2040, 2070 and 2100. The maps on the following pages represent the model outputs for both projection curves.

Figure 27: Critical Facilities Impacted by NOAA Sea Level Rise to 2.85 feet with Cat 3 Storm Surge, 2070: North Brevard

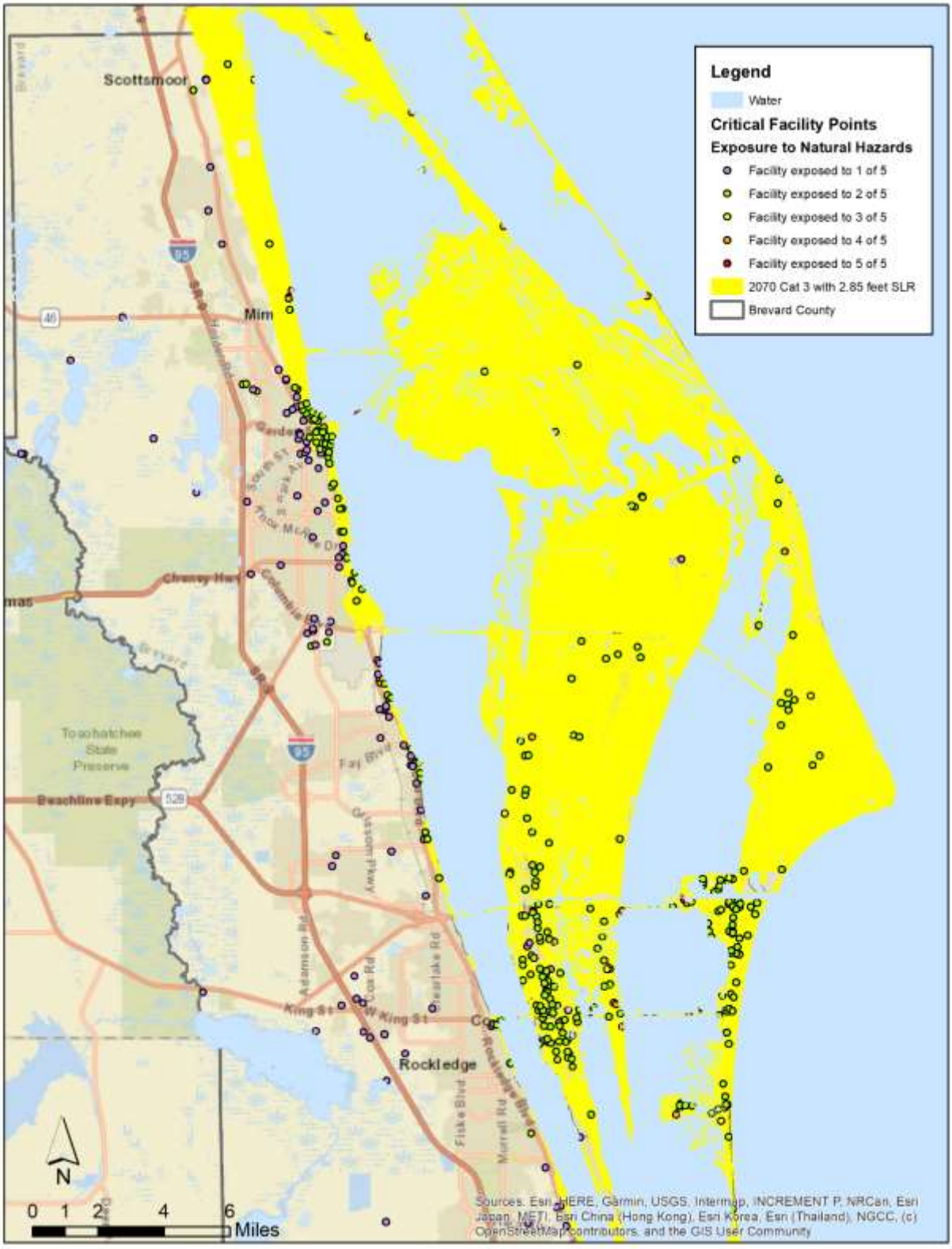


Figure 28: Critical Facilities Impacted by NOAA Sea Level Rise to 2.85 feet with Cat 3 Storm Surge, 2070: Central Brevard

Figure 29: Critical Facilities Impacted by NOAA Sea Level Rise to 2.85 feet with Cat 3 Storm Surge, 2070: South Brevard

Figure 30: Critical Facilities Impacted by NOAA Sea Level Rise to 4.47 feet with Cat 3 Storm Surge, 2070: North Brevard

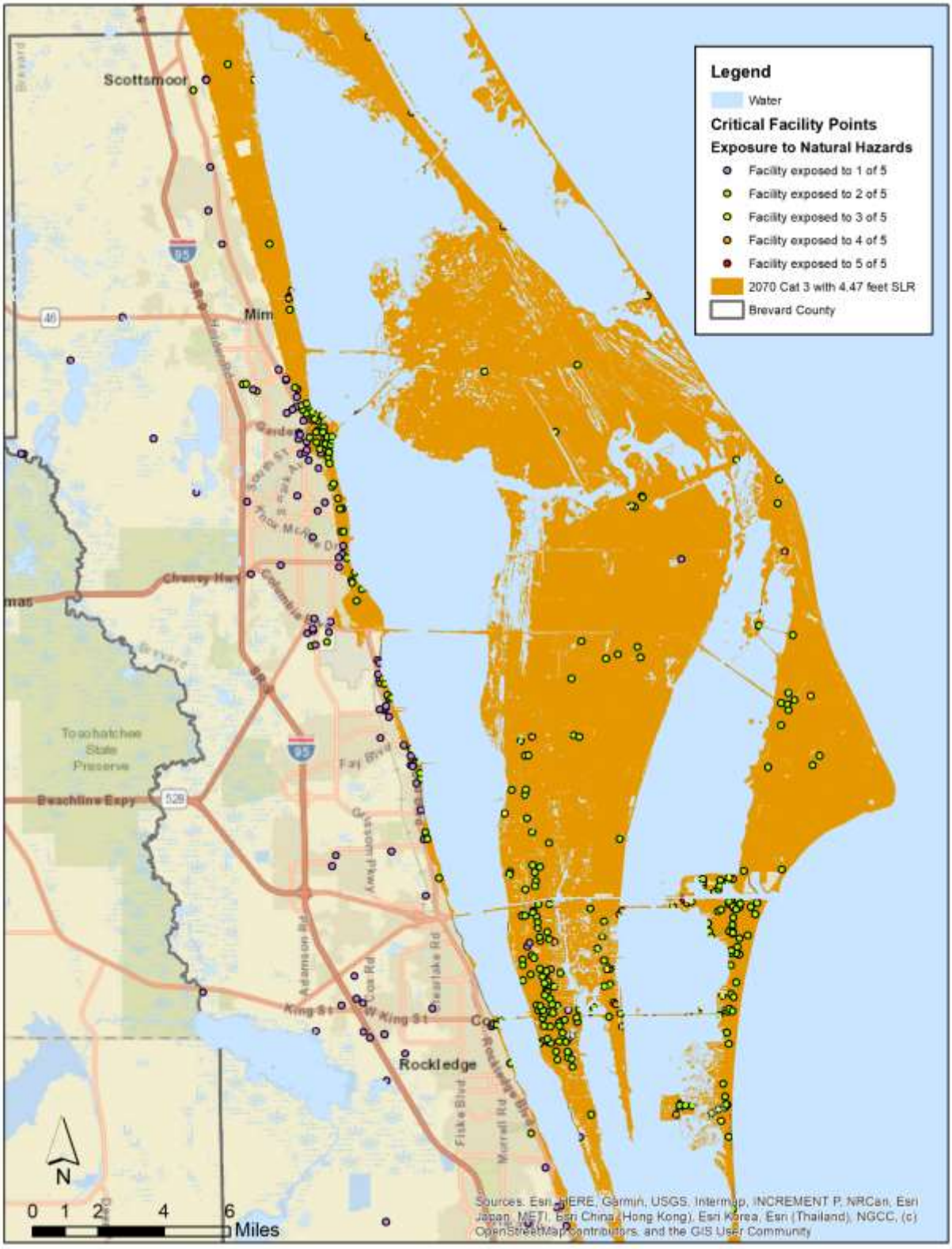


Figure 31: Critical Facilities Impacted by NOAA Sea Level Rise to 4.47 feet with Cat 3 Storm Surge, 2070: Central Brevard

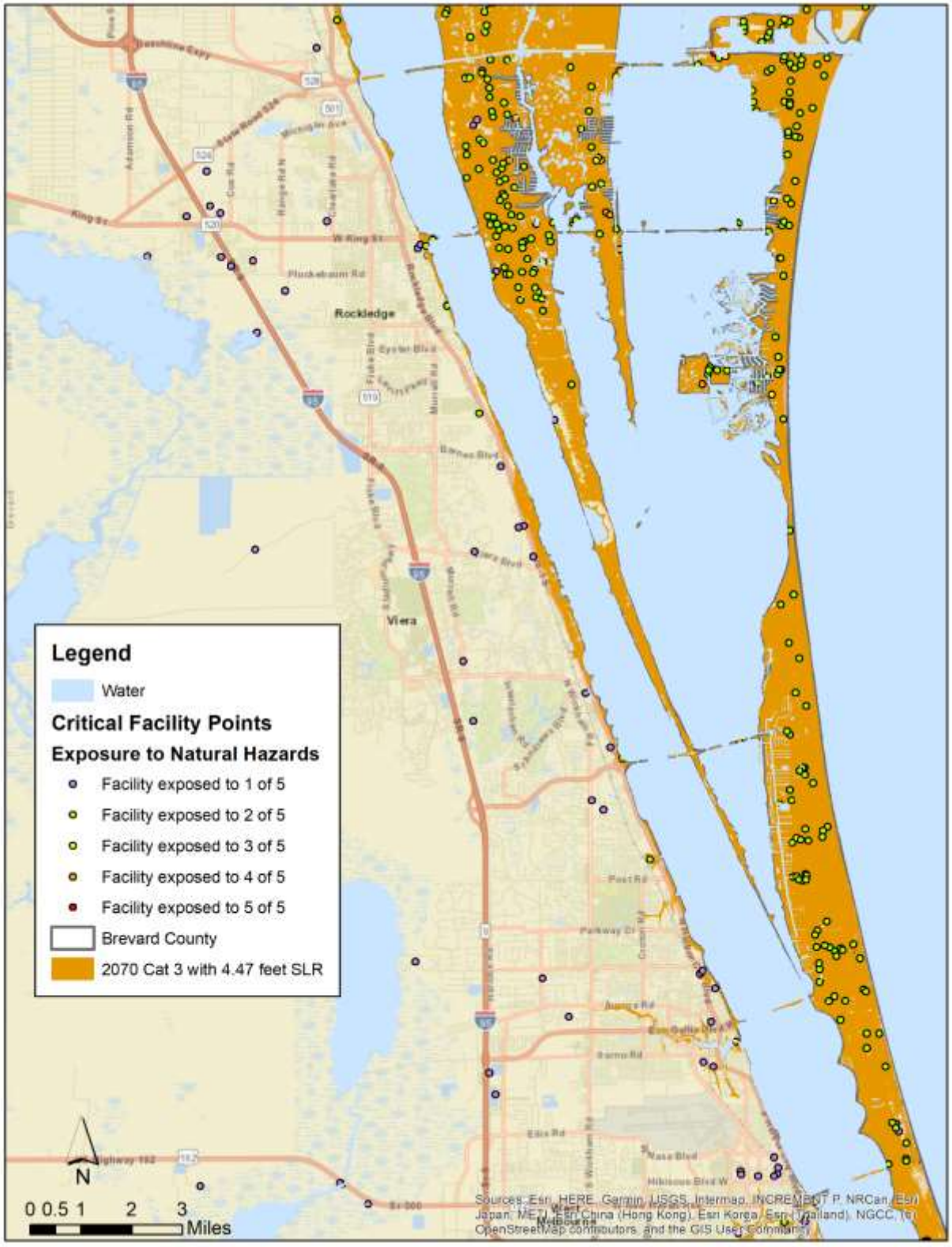
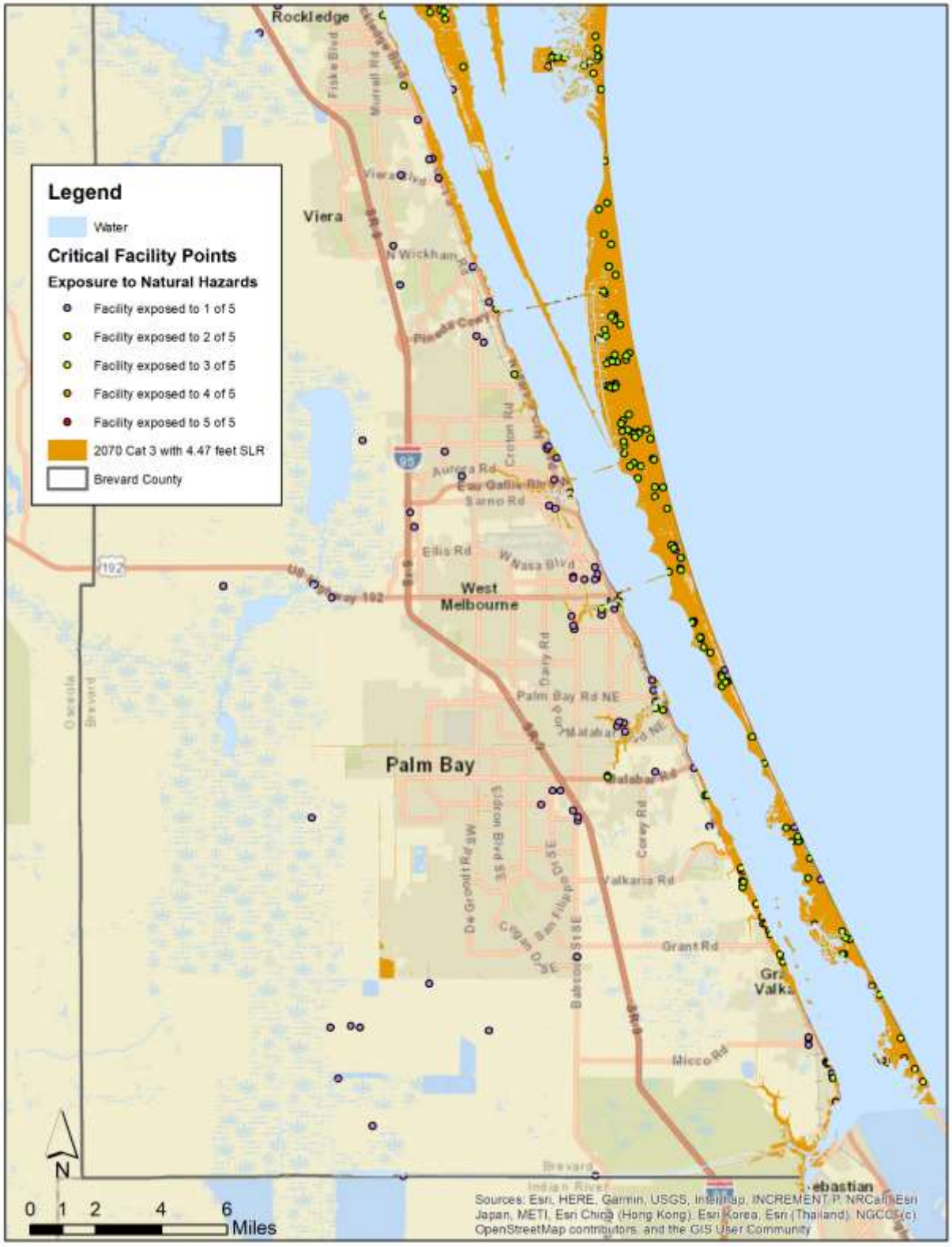


Figure 32: Critical Facilities Impacted by NOAA Sea Level Rise to 4.47 feet with Cat 3 Storm Surge, 2070: South Brevard



VI. Findings

The findings section of this report provides an overview, maps and tables of potential impacts to critical facilities, transportation infrastructure and takes a look at vulnerable land uses and their values. The hazards addressed include: 1) Shallow Coastal Flooding Areas 2) Storm Surge 3) Sea Level Rise 4) Future Storm Surge with Sea Level Rise and 5) FEMA 100--Year Flood Zone.

Shallow Coastal Flooding

Shallow coastal flooding areas are low lying areas that flood during higher-than-average tide events.

Storm Surge

Storm surge occurs when hurricanes and tropical storms raise water levels in coastal areas which is pushed on shore.

Sea Level Rise

Sea level rise is occurring at an alarming pace along Florida's east coast. This is a long-term hazard.

Surge + Sea Level Rise

Referred to as the "Combined Hazard Zone", this includes the long-term effects of surge plus sea level rise.

100-Year Flood

The 100-year flood zone depicts areas that have a 1% annual chance of flooding. FEMA provides this data.

A. Transportation Impacts

Roadways are susceptible to degradation from multiple impacts as a result of natural hazards. Some county-managed roadways are vulnerable to complete inundation during high tides as sea levels rise, or may experience periodic flooding from storm surge or intense rainfall. Roadway failure, however, can also occur from compromised substrate and erosion from exposure to flooding making roadways susceptible to the effects of sea level rise prior to the "horizon year" of roadway surface inundation noted the table below. Additionally, as roadways were not designed to be inundated, especially with salt water, even only a few inches of flood water for multiple days can put the integrity of roadways at risk and increase accessibility issues throughout the community impacting everyday activities, economic vitality of the area, and emergency operations. Further, inundation can cut off entire neighborhoods or even cities that rely on County roads. Impacts should not only just be considered to the roadway itself but also the utilities that are associated with the roadway in its rights-of-way (ROW) or underground.

This report summarizes the vulnerability of County-maintained roadways by hazard. Additional analysis was completed for the Space Coast Transportation Planning Organization (SCTPO) in 2017 for all roadways within the county along with other transportation facilities. Furthermore, the SCTPO is, at the time of this report, developing a Resiliency Master Plan. Brevard County staff is actively participating in this effort as a stakeholder. The County should utilize the information derived through this study and review the recommendations or policies that may be developed to ensure consistent use of data and approaches for resilient transportation planning across the county.

This image shows how erosion and flooding can begin to impair the integrity of roadways long before inundation occurs and also cause damage the underground utilities.

As centerline data was utilized for this assessment, the analysis determines when flooding would occur at the crown of the road (with a margin of error based on potential GIS overlay alignment). This is important to note because the crown of the road is generally the highest point of the roadway width thus impacts to travel lanes may be greater than reported in this analysis. This highlights the importance of the SCTPO detailed resilient transportation study to provide a more granular-level of assessment.

Table 2: Overview of Impacts to the County-Maintained Roadway Network

Summary of County-Maintained Roadways Vulnerable to Flood Hazards by Miles of Roadway														
2040		2070		2100		FEMA Flood Zone	2021 Storm Surge					Cat 3 Storm Surge	Cat 3 Storm Surge	Shallow Coastal Flood
1.22 feet	1.85 feet	2.85 feet	4.47 feet	5.15 feet	8.48 feet	100 Year Flood	Cat 1	Cat 2	Cat 3	Cat 4	Cat 5	2070 (2.85 feet SLR)	2070 (4.48 feet SLR)	
0.3	0.6	8.7	53	92	252	170	35	63	219	345	378	317	318	0.6

1. Shallow Coastal Flooding

Impacts specifically from shallow coastal flooding do not have notable impacts based on the vulnerability analysis.

2. Storm Surge

The Coastal High Hazard Area (CHHA) is defined as the area below the elevation of the Category 1 storm surge line. While minimal roadways are located in the CHHA (35 miles) when compared to higher surge levels, the County begins to see greater extensive mileage impacts to roadways with a Category 3 surge with nearly 220 miles of vulnerable roadway. As sea level rises, the extent and depth of storm surge is expected to increase, thus potentially changing the areas classified as the CHHA and other surge zones and impacting more roadways. This assessment anticipates that by 2070, under a category 3 surge, upwards of 318 of roadway can be inundated by a category 3 surge. This, again, is not just a hazard from inundation, but also potential damage to roadway beds and erosion of surrounding land.

When analyzing roadways within the 100-year flood plain, the greatest extent of these roadways is, as expected, located on the mainland, generally in the Viera area and between SR 405 and SR 528. While some of these roadways may be elevated out of the floodplain, as sea levels rise, floodplain elevations and extent may be altered thus

increase vulnerabilities to these facilities. The County and the SCTPO should assess the elevation of these roadways and work with other agencies to determine potential changes to the floodplain to further assess future risk to these roadways. FEMA only considers historical events when creating flood maps and do not take sea level rise into account and the 1% flood risk may change as sea levels rise. Additional analysis needs to occur in order to provide a full perspective of future floodplain risk and changes.

Figure 33: Roadways Vulnerable to Sea Level Rise – NOAA 2013 High

3. Sea Level Rise

The County can expect up to a total of 1 mile of roadway to be impacted by inundation from sea level rise by 2040, 53 miles by 2070 and over 250 miles by 2100. These numbers represent total mileage which is comprised of various small segments of roadway, thus essentially the area of impact will be more extensive than the small identified segments due to the nature of roadway design. However, the results of this assessment highlight the majority of impacted roadways to sea level rise are located in Merritt Island. Additional vulnerable areas include the barrier island and portions of the northern mainland.

B. Land Use Impacts

Brevard County's privately-held and publicly-owned properties are at risk to a diverse range of natural hazards, with figures exceeding $2.7 billion dollars in taxable value. The table below provides a summary assessment of unincorporated Brevard County future land use categories vulnerabilities to current and future flood hazards. The data represent the percent each land use category comprises of the total vulnerable land area, only in unincorporated Brevard County. It is important to point out that the percentages may not increase as the hazard increases (ex. Sea level rise) due to taking into account more acreage and varying land uses. Therefore, the percent of allocation of a land use may change under each hazard and scenario. The sections below provide more detail into each hazard.

Table **3**: Summary of Future Land Uses Vulnerable to Flood Hazard by % of Vulnerable Acreage

Summary of Future Land Uses Vulnerable to Flood Hazards by % of Vulnerable Acreage															
Future Land Use	2040		2070		2100		FEMA Flood Zone	2021 Storm Surge					Storm Surge	Storm Surge	Shallow Coastal Flood
	1.22 feet	1.85 feet	2.85 feet	4.47 feet	5.15 feet	8.48 feet	100 Year Flood	Cat 1	Cat 2	Cat 3	Cat 4	Cat 5	Cat 3 2070 (2.85 Feet SLR)	Cat 3 2070 (2.85 Feet SLR)	
AGRIC	7.17%	7.04%	4.56%	3.42%	3.08%	2.18%	67%	5.1%	4.1%	2.1%	1.5%	3.8%	1.8%	1.8%	5.7%
CC	2.04%	0.83%	0.55%	0.72%	1.09%	2.84%	14%	0.5%	0.8%	2.1%	4.3%	4.0%	3.5%	3.5%	0.2%

DRI 1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	35%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%
DRI 3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
FMU	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	37%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
IND	0.02%	0.01%	0.08%	0.17%	0.17%	0.13%	42%	0.2%	0.2%	0.1%	0.3%	1.3%	0.1%	0.1%	0.0%
NC	0.47%	0.24%	0.26%	0.37%	0.58%	1.07%	21%	0.3%	0.5%	1.1%	1.7%	2.1%	1.3%	1.3%	0.2%
PI	0.92%	0.50%	1.21%	1.41%	1.43%	1.35%	36%	1.5%	1.4%	1.3%	1.3%	1.3%	1.3%	1.3%	0.8%
PORT	10.15%	3.72%	1.79%	1.14%	1.05%	1.82%	27%	3.3%	4.0%	2.3%	2.2%	1.8%	2.5%	2.8%	0.8%
PRIV-CONS	3.60%	3.78%	2.20%	1.63%	1.47%	1.00%	97%	2.0%	1.6%	0.8%	0.6%	1.9%	0.8%	0.8%	2.8%
PUB	1.76%	0.86%	1.71%	1.94%	2.14%	2.31%	22%	2.3%	2.4%	2.3%	2.6%	2.3%	2.4%	2.3%	0.7%
PUB-CONS	28.26%	55.37%	37.54%	29.81%	27.42%	19.69%	84%	31.7%	28.6%	17.7%	13.1%	15.5%	16.8%	17.0%	47.4%
REC	5.65%	3.15%	2.76%	2.62%	2.80%	2.61%	59%	2.7%	2.6%	2.3%	2.2%	2.0%	2.5%	2.6%	2.2%
RES 1	15.15%	9.01%	25.26%	28.96%	28.75%	26.19%	38%	18.5%	19.9%	29.4%	28.5%	25.9%	27.0%	26.5%	23.9%
RES 1:2.5	2.13%	2.29%	6.18%	8.88%	9.41%	8.60%	38%	12.6%	12.8%	10.9%	8.8%	7.3%	8.7%	8.4%	3.8%
RES 10	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
RES 15	4.67%	2.23%	2.33%	3.06%	3.62%	6.96%	26%	3.6%	5.0%	5.6%	7.9%	7.1%	7.8%	7.7%	1.5%
RES 2	1.43%	2.33%	4.65%	5.96%	6.17%	6.23%	39%	4.6%	4.7%	7.6%	6.7%	6.5%	6.4%	6.3%	3.7%
RES 4	10.52%	5.18%	5.11%	6.16%	6.53%	8.58%	27%	7.2%	7.4%	8.2%	9.2%	8.1%	8.9%	9.0%	3.4%
RES 6	1.22%	0.76%	0.67%	0.85%	1.02%	4.20%	24%	0.9%	0.9%	2.8%	4.3%	3.4%	4.1%	4.2%	0.5%
RES12_DIR	0.17%	0.08%	0.04%	0.07%	0.09%	0.19%	6%	0.0%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.0%
RES2_DIR	0.00%	0.00%	0.00%	0.02%	0.05%	0.06%	16%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
RES3_DIR	4.57%	2.58%	3.08%	2.79%	3.09%	3.53%	32%	3.1%	2.9%	2.6%	3.8%	3.1%	3.5%	3.4%	2.1%
RES30_DIR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	27%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RES4_DIR	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RES5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RES6_DIR	0.02%	0.01%	0.00%	0.00%	0.00%	0.07%	2%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
RES8_DIR	0.09%	0.04%	0.03%	0.03%	0.04%	0.29%	0%	0.1%	0.1%	0.3%	0.6%	0.9%	0.4%	0.4%	0.0%

1. Shallow Coastal Flooding

A total of 4,078 acres (1%) of future land use in unincorporated Brevard County can expected to be impacted by shallow coastal flooding based on data from NOAA. This means that these areas can be inundated by water from high tides currently and in the near future. As would be expected from other analysis, public conservation and residential 1 make up over 70% of the vulnerable future land uses, followed by agriculture, Res1:2.5 and Res 2. These open space and low density land uses provide opportunity for the County to investigate and implement various nature-based solutions in these areas to reduce flood impacts. Higher density land uses have minimal exposure to high tide flooding.

Table 4: Top 5 Land Uses Vulnerable to Shallow Coastal Flooding

Top 5 Land Uses Vulnerable to Shallow Coastal Flooding		
FLU	**Acres**	**Percent of Total FLU Category**
Public Conservation	**1932**	**1%**
Res 1	**977**	**6.70%**
Agriculture	**233**	**0.30%**
Res 1:2.5	**156**	**1.10%**
Res 2	**151**	**1.30%**

Shallow coastal flooding will impact roughly 12,500 parcels of the Unincorporated area of Brevard County. NOAA defines shallow coastal flooding as "flooding that occurs in low-lying coastal areas during extreme high tides." Essentially, this area of Unincorporated Brevard County which totals roughly $2.7 billion in taxable value can expect to see some level of inundation a few times per year during extreme high tide events. These extreme high tide events normally occur when the sun, moon, and earth are all in alignment causing wave action to push further into land as compared to normal high tide. Of the affected parcels, the most built structures that will be impacted were those constructed from the construction boom era in Florida around the 1968-2001 time frame, with a total of 5,511 structures totaling $1.3 billion in taxable value facing some level of inundation.

Table 5: Shallow Coastal Flood Impacts by Financial Exposure

				Built Pre-1968	Built 1968-2001	Built 2002 - Present
Zone	# Parcels in Zone	Parcels w/ Buildings	Taxable Value	# Buildings Total Value	# Buildings Total Value	# Buildings Total Value
Shallow Coastal Flooding Area	12454	2757	$2,799,144,273	1712 $369,693,823	5511 $1,366,019,476	2092 $766,102,264

Source: 2021 Brevard County Property Appraiser Office

2. Storm Surge

Between 2 and 11% of unincorporated Brevard County land uses has potential to be impacted with surge from category 1-5 storms. Major future land uses impacted by surge vary as surge increases. Under a category 1 surge, Public Conservation is impacted to the greatest extent, making up over 30% of vulnerable uses, followed by residential 1:2.5. Under a category 5 scenario, residential 1 future land uses have the greatest vulnerability at 26% of impacted lands, followed by public conservation at 16%. What is interesting to note is that while Res 2 -DIR, Res 3-DIR, Res 4-DIR, Res 12-DIR, Res 30- DIR and Res 10 make up in total less than 4% of vulnerable uses, nearly 82-100% of total properties in these categories are expected to be impacted with a category 5 storm surge. While most of these categories increase from the 40-55% range of impact under a category 3 surge, Res 2-DIR is expected to be fully vulnerable at 100% with by at Cat 3 surge.

Table **X** represents the impacts of storm surge on parcels located within Unincorporated areas of Brevard County. The table shows areas which surge reaches just by each individual category of storm event. Naturally, a category 5 storm will have the most severe impacts of the land value of the county, as surge will inundate all the areas covered by category 1-4 storm events. If all the financial data for each category was stacked, under a category 5 event a total of $8 billion in assessed land value would be inundated by surge. However, as each storm event stands alone in this table, a Category 1 storm

event has the greatest financial impact alone, with about 12,000 structures facing inundation with an assessed value of close to $4 billion.

Table 6: Surge Impacts by Financial Exposure

						Built Pre-1968	Built 1968-2001	Built 2002-Present
Storm Surge Zone	# Parcels in Zone	Number of Buildings	Land Value	Assessed Value	Taxable Value	# Buildings Total Value	# Buildings Total Value	# Buildings Total Value
Category 1	14585	11971	$1,834,375,096	$3,797,709,640	$3,008,144,758	2787 $624,200,450	6866 $1,963,958,470	2318 $1,209,550,720
Category 2	3495	3167	$316,654,930	$806,488,280	$614,525,496	1376 $183,879,400	1466 $351,984,240	325 $197,983,960
Category 3	12265	10714	$813,083,380	$1,237,561,640	$1,073,652,476	3821 $438,943,750	5671 $1,098,912,640	1222 $435,602,460
Category 4	10804	9619	$733,179,760	$1,905,401,110	$1,543,046,218	2809 $356,887,950	5696 $1,073,225,270	1114 $401,377,090
Category 5	3163	2398	$148,936,080	$337,661,630	$267,373,364	677 $65,230,470	1,368 $162,215,430	353 $77,587,750

3. Sea Level Rise

Unincorporated Brevard County is projected to see sea level rise impact upwards of 7% of its land by 2100. Public conservation, by 2070, comprises the largest acreage of future land use (28-38%) expected to face impacts from sea level rise. By 2100, it falls slightly behind Res 1 which makes up 26-28% of total impacted future land use acreage. Low density land uses (Res1:2.5 and Res 4) are the next most vulnerable future land uses in 2070. When looking out to 2100, low density land uses still generally constitute the most vulnerable residential future land uses. However, Res 15 increases dramatically (15%) in the number of acres vulnerable to 8.45 feet of sea level rise from 4.47. The following table illustrates the top five (5) vulnerable future land uses and the percent of those land uses that are vulnerable to sea level rise by 2070. While public conservation makes up the greatest acreage of vulnerable uses, which is a positive aspect as it reduces impacts to tax bases and infrastructure, only 3% of public conservation is vulnerable to sea level rise. As would be expected, up to 86% of Port Future Land Use is expected to be impacted by sea level rise due to its function and location.

Table 7: Top 5 Land Uses Vulnerable to Sea Level Rise by 2070

Top 5 Land Uses Vulnerable to Sea Level Rise by 2070		
FLU	**Acres**	**Percent of Total FLU Category**
Public Conservation	**4313-5015**	**3%**
Res 1	**2902-4872**	**12-19%**
Res 1:25	**710-1493**	**5-10%**
Res 4	**588-1036**	**3-5%**
Port	**534-1003**	**46-86%**

Table 8 represents the impacts of different scenarios of sea level rise on the parcels in Unincorporated Brevard County. As the US Army Corps scenarios provide relatively smaller levels of inundation (1.22 feet, 2.85 feet, and 5.15 feet respectively) the total impacts of sea level rise are naturally lower under these estimates. The impacts of inundation near 10,000 total structures and eclipses $4 billion in total value by the 2070 army corps scenario of sea level rise. Comparatively, under the NOAA scenarios, impacts are felt by a greater number of built structures by every eclipse date, with nearly 27,500 affected by the 2100 NOAA scenario of 8.48 feet of sea level rise, equating to $7.3 billion in total value of the parcels in this area facing inundation.

Table 8: Sea Level Rise Impacts by Financial Exposure

				Built Pre -1968	Built 1968 - 2001	Built 2002 - Present
Horizon Year	# Parcels in Zone	Total Number of Buildings	Value of Parcels in Zone	Buildings Total Value	Buildings Total Value	Buildings Total Value
2040 *USACE Curve*	8338	6879	$3,239,854,790	1566 $368,372,010	3922 $1,187,490,480	1391 $671,190,200
2070 *USACE Curve*	12144	9587	$4,264,182,400	1875 $427,960,680	5745 $1,583,541,550	1967 $904,229,500
2100 *USACE Curve*	18836	15439	$5,287,752,880	4039 $695,665,750	8701 $2,107,087,360	2699 $1,084,885,120
2040 *NOAA Curve*	9162	7471	$3,505,009,190	1622 $383,506,340	4354 $1,291,126,050	1495 $715,307,410
2070 *NOAA Curve*	15911	12,777	$4,813,948,650	3077 $580,480,350	4326 $1,851,791,430	2374 $995,138,310
2100 *NOAA Curve*	31544	27,059	$7,390,097,160	17,300 $1,822,754,670	14602 $3,175,593,680	3829 $1,515,284,220

Source: Brevard County Future Land Use

Table 9 outlines the percentage of landmass of Unincorporated Brevard County which will face inundation of a category 3 storm surge event plus sea level rise at each eclipse (2040, 2070, and 2100) for both NOAA and USACE scenarios. Under both scenarios for the 2040 eclipse date, roughly a quarter of the total unincorporated area of Brevard County would face some level of inundation under a category 3 storm surge event. Overall, the biggest jump in impact is found under the NOAA 2100 scenario of 8.48 feet of sea level rise where almost half of the unincorporated county will have flooding during a category 3 storm.

Table 9: Change in Category 3 Storm Surge Impact Area with Sea Level Rise

Zone	Acres	Percent Change	Percent of Unincorporated County
2017 Category 3	**107,342.19**		
Category 3 ***1.22 foot SLR (USACE 2040)***	**124,928.36**	**16%**	**25.99%**
Category 3 ***1.85 foot SLR (NOAA 2040)***	**125,624.45**	**3%**	**22.33%**
Category 3 ***2.85 foot SLR(USACE 2070)***	**127,156.52**	**2%**	**26.45%**
Category 3 ***4.47 foot SLR(NOAA 2070)***	**129,265.81**	**%**	**26.89%**
Category 3 ***5.15 foot SLR(USACE 2100)***	**129,578.27**	**2%**	**26.96%**
Category 3 ***8.48 foot SLR(NOAA 2100)***	**221,265.69**	**70%**	**46.03%**

Source: Brevard County Future Land Use

Table 10 provides an analysis into the financial impacts to parcels by a Category 3 storm surge event over the course of the three eclipse dates of 2040, 2070, and 2100. This analysis provides a look into the impacts of inundation at each NOAA and USACE scenario for sea level rise at these three eclipse dates on top of the Category 3 storm surge event. This outlines the most serious impacts of sea level rise to future development as the additional permanent inundation of sea level rise creates more problems further inland when storm surge events occur. Through the NOAA scenario for sea level rise at the 2100 eclipse date, nearly 42,500 structures in Unincorporated Brevard county will face some level of inundation by a category 3 storm surge event. This will impact nearly $10 billion worth of assessed property value.

Table 10: Change in Category 3 Storm Surge Property Impacts with Sea Level Rise

						Built Pre-1968	Built 1968-2001	Built 2002 - Present
Zone	# Parcels in Zone	Number of Buildings	Land Value	Assessed Value	Taxable Value	# Buildings Total Value	# Buildings Total Value	# Buildings Total Value
2021 Category 3	12265	10714	$510,277,130	$1,732,387,960	$1,460,783,515	3821 $380,005,760	5671 $988,248,470	1222 $364,133,730
Category 3 *1.22 foot SLR (USACE 2040)*	36003	31018	$4,098,468,050	$8,161,325,000	$5,895,939,058	9717 $1,294,421,490	16940 $3,603,712,580	4361 $1,671,943,560
Category 3 *1.85 foot SLR (NOAA 2040)*	37354	32227	$4,156,422,710	$8,375,658,330	$6,086,101,127	9977 $1,324,450,130	17715 $3,727,951,160	4535 $1,720,171,940
Category 3 *2.85 foot SLR (USACE 2070)*	39462	34089	$4,258,327,130	$8,701,636,570	$6,366,945,019	10493 $1,377,340,190	18806 $3,918,803,850	4790 $1,783,861,800
Category 3 *4.47 foot SLR (NOAA2070)*	40889	35344	$4,346,618,310	$8,936,689,100	$6,576,538,641	10829 $1,418,800,270	19599 $4,053,146,240	4916 $1,826,901,440
Category 3 *5.15 foot SLR (USACE 2100)*	41190	35598	$4,360,582,570	$8,982,755,540	$6,616,944,141	10891 $1,425,636,910	19752 $4,073,858,390	4955 $1,843,346,370
Category 3 *8.48 foot SLR (NOAA 2100)*	54098	42223	$4,686,580,890	$9,841,371,200	$7,295,887,003	11736 $1,456,530,070	24094 $4,523,316,580	6393 $2,128,176,290

4. 100-Year Flood Zone

In January of 2021, FEMA released new flood zone data for Brevard County. Using that data, approximately 234,000 acres in unincorporated Brevard County are located within the 100-year flood zone, or over 61% of unincorporated county. Public conservation accounts the for the greatest future land use category at 84%, followed by agriculture at 67%. This is a positive as it decreases the vulnerability to infrastructure and private property. These future land uses up over 80% of the vulnerable area, followed by residential, typically low density.

As land use changes proceed and future conditions are evaluated as part of the process, it is hopeful that these percentages do not fluctuate as a strategy to reduce impacts to flood should be the movement of development out of these vulnerable areas and increasing open space acreage to serve for mitigation strategies as well as public access and eco-tourism opportunities. Unfortunately, however, according to this analysis, one-quarter to one-third of various land uses are located within the 100-year floodplain. Interesting to note, almost 100% of private conservation is located within the flood zone. It may be advantageous for the County to re-assess development allowances in the 100-year flood and work with developers to protect upland habitats equally with floodplain habitats to allow for wildlife and ecosystem migration.

Table 11: Top 5 Land Uses in the 100-Year Floodplain

Top 5 Land Uses in the 100-Year Floodplain		
FLU	**Acres**	**Percent of Total FLU Category**
Public Conservation	**131,398**	**84%**
Agriculture	**62,153**	**67%**
Res 1	**9,500**	**38%**
Res 1:2.5	**5580**	**38%**
Res 4	**5726**	**27%**

Source: Brevard County Future Land Use

C.Critical Facility Impacts

The critical facilities analysis in this report details the risk posed to government operations and facilities vital to community safety, quality of life, public health, and the continuity of operations county-wide following storm events. There are 53 different types of facilities included in this analysis. The following table provides an overview of the number of total hazards impacting critical facilities by type. **Figures 34, 35, and 36** provide an overview of the locations of the identified critical facilities within the county identified by the number of hazards that impact them. Discussion of the impacts to critical facilities by hazard follow the maps provided below. Due to the volume of maps, detailed maps of each hazard impacting critical facilities is located in Appendix **XI**. Note total hazards include: Storm Surge (Cat 1-5), Shallow Coastal Flooding, Sea Level Rise (NOAA 2070), SLR + Surge (NOAA 2070 + Cat 3), and FEMA 100 Year Flood.

Facility Types	Total Hazards by Facility				
	1	2	3	4	5
ADULT FAMILY CARE HOME	-	12	-	-	-
AIRPORT	-	8	-	-	-
AMBULATORY SURGICAL CENTER	2	24	-	-	-
ASSISTED LIVING FACILITY	16	92	12	-	-
BOAT RAMP	32	20	36	112	20
BULK FUEL STORAGE	-	4	-	-	-
BUS TERMINAL	-	4	-	-	-
CALL CENTER	2	16	-	-	-
COAST GUARD	-	4	-	-	-
COLLEGE	6	4	-	-	-
COMMERCIAL PORTS	-	8	-	-	-
COMMUNITY CENTER	-	12	-	-	-
DAY CARE	28	140	12	8	-
DISASTER RECOVERY CENTER	6	-	-	-	-
ELECTRIC POWER PLANT	4	-	-	-	-
ELECTRIC SUBSTATION	12	32	-	-	-
EMERGENCY MEDICAL SERVICE	6	28	-	-	-
END-STAGE RENAL DISEASE	2	12	-	-	-
FAITH-BASED FACILITY	32	140	-	-	-
FIRE STATION	8	84	-	-	-
HAZARDOUS MATERIALS FACILITY	63	196	6	24	-
HELIPORT/HELIPAD	-	2	6	-	-
HOSPITAL - ACUTE CARE	2	4	-	-	-
JUVENILE CORRECTIONAL INSTITUTION	-	4	-	-	-
LAW ENFORCEMENT	2	40	-	-	-
LIBRARY	2	20	-	-	-
LOCAL GOVERNMENT FACILITY	-	32	-	-	-
MARINA	-	4	-	24	-
MOBILE HOME PARK	29	114	-	32	-
NATIONAL GUARD	2	-	-	-	-
POINT OF DISTRIBUTION	4	16	6	-	-
PRIVATE SCHOOL	12	80	6	-	-
PUBLIC SCHOOL	10	100	12	-	-
PUBLIC WATER SUPPLY - PLANT	42	52	39	48	-
RELIEF AGENCY	-	8	-	-	-
RURAL HEALTH CLINIC	-	4	-	-	-
RV PARK	4	36	6	8	-
SHELTER	8	28	-	-	-
SKILLED NURSING FACILITY	6	16	-	-	-
SOLID WASTE FACILITY	14	60	6	8	-
STADIUM	2	-	-	-	-
STATE GOVERNMENT FACILITY	-	4	-	-	-
TRANSPORTATION OPERATIONS	2	8	-	-	-
WASTEWATER FACILITY	17	96	-	24	-
Grand Total	**377**	**1568**	**147**	**288**	**20**

Figure 34: Critical Facilities Exposure to Natural Hazards – North Brevard

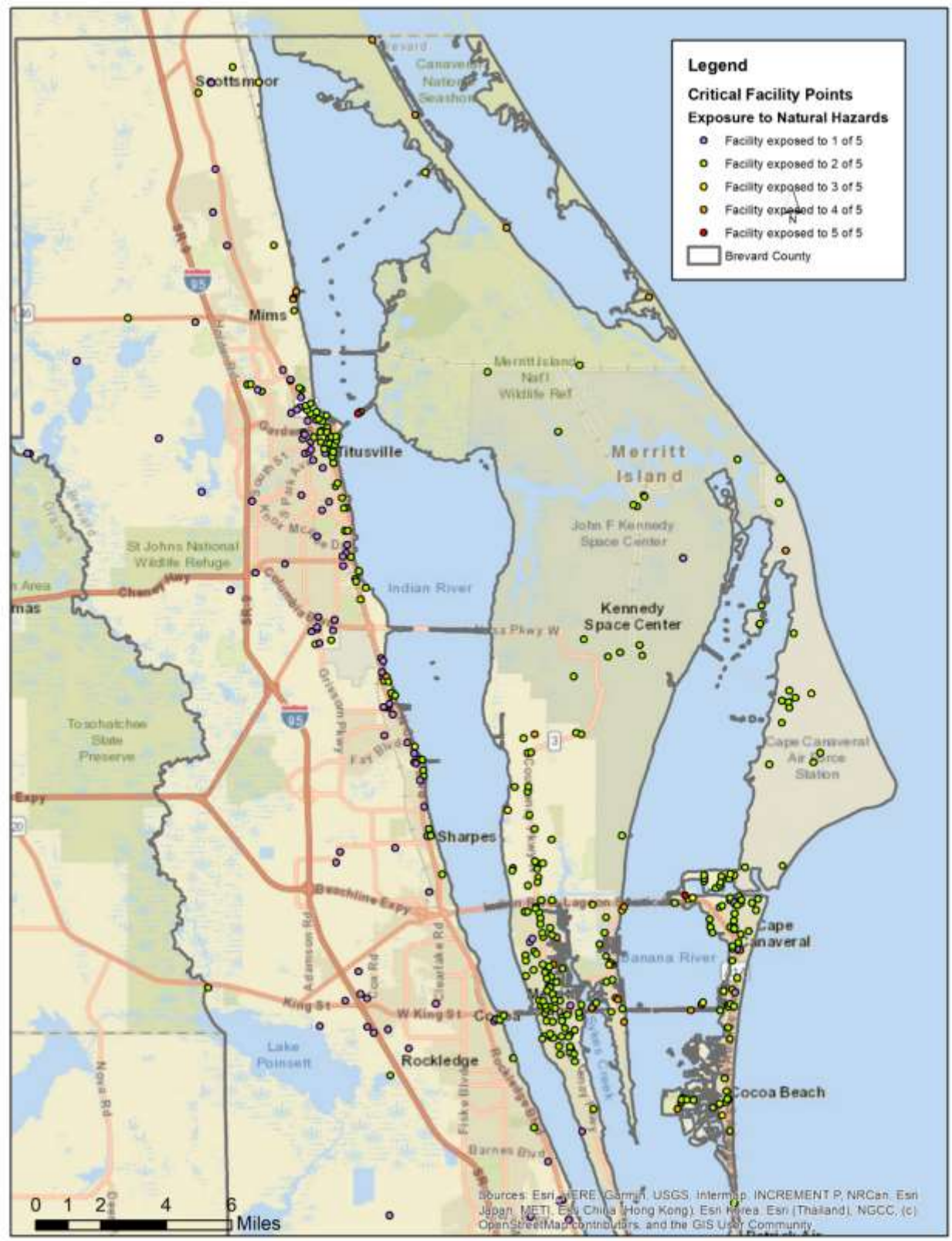


Figure 35: Critical Facilities Exposure to Natural Hazards – Central Brevard

Figure 36: Critical Facilities Exposure to Natural Hazards – South Brevard

1. Shallow Coastal Flooding

Shallow Coastal Flooding in Brevard County can be expected to impact 6 critical facilities. Four of which are Boat Ramps, and the other two are Hazardous Material Facilities under the control of NASA. The Shallow Coastal Flooding data utilized was acquired from NOAA.

In this scenario, 947 critical facilities will be impacted.

2. Storm Surge

Storm surge is caused primarily by strong winds as a result to a hurricane or tropical storm. Storm Surge of Category 1-3 may affect up to 490 critical facilities across coastal areas of Brevard County. More severe Strom Surge, like Category 4 and 5, may affect an additional 937 critical facilities. A Category 5 Storm Surge is projected to affect a total of 1427 facilities across the coastal and inland areas of Brevard County. Hurricane and Tropical Storm mitigation efforts will be crucial in preventing damages to both these critical facilities and their inhabitance.

3. Sea Level Rise

As previously indicated, two (2) Sea Level Rise predictions were utilized in developing this analysis. The USACE and NOAA both have Sea Level Rise benchmarks for the years 2040, 2070, and 2100. Because the NOAA prediction is projected to have a greater impact on these facilities, utilizing this data can help prepare Brevard County of the Sea Level Rise "worst-case scenario".

As shown in the table, 12 facilities are impacted between now and the 2040 benchmark. This number increases to 106 when you add the additional 94 critical facilities impacted by the 2070 benchmark. By 2100, the number of critical facilities increases to a total of 588 impacted facilities by sea level rise. This number includes the critical facilities affected by each of the benchmarks.

Table 12: Summary of Critical Facilities by Hazard

Summary of Critical Facilities, by Exposure to Natural Hazards															
Facility Types	Number of Facilities	FEMA 100 Year Flood	2021 Storm Surge					USACE Sea Level Rise			NOAA Sea Level Rise			Shallow Coastal Flood	NOAA 2070 SLR + Surge Cat 3
			Cat 1	Cat 2	Cat 3	Cat 4	Cat 5	2040	2070	2100	2040	2070	2100		
ADULT FAMILY CARE HOME	22	-	-	-	2	4	-	-	-	-	-	-	6	-	6
AIRPORT	20	-	-	-	4	4	1	-	-	-	-	-	4	-	8
AMBULATORY SURGICAL CENTER	36	-	2	-	-	12	8	-	-	2	-	-	4	-	12
ASSISTED LIVING FACILITY	244	8	2	-	16	40	6	-	-	4	-	4	32	-	48
BOAT RAMP	90	68	35	12	4	2	-	4	20	24	10	32	12	4	60
BULK FUEL STORAGE	2	-	-	-	-	2	-	-	-	-	-	-	-	-	2
BUS TERMINAL	4	-	-	-	-	2	-	-	-	-	-	-	-	-	2
CALL CENTER	20	-	2	-	2	6	1	-	-	-	-	-	6	-	6
COAST GUARD	2	-	2	-	-	-	-	-	-	-	-	-	-	-	2
COLLEGE	16	2	-	2	-	6	-	-	-	-	-	-	2	-	4
COMMERCIAL PORTS	4	-	2	-	-	2	-	-	-	-	-	-	-	-	4
COMMUNITY CENTER	26	-	-	-	2	4	-	-	-	2	-	-	2	-	6
CRISIS STABILIZATION UNIT	4	-	-	-	-	-	2	-	-	-	-	-	-	-	-
DAY CARE	392	6	4	10	10	81	20	-	-	8	-	6	32	-	72
DISASTER RECOVERY CENTER	20	2	-	-	-	4	1	-	-	-	-	-	-	-	-
ELECTRIC POWER PLANT	6	-	-	-	-	4	-	-	-	-	-	-	-	-	-
ELECTRIC SUBSTATION	76	2	2	2	6	27	3	-	-	2	-	-	10	-	24
EMERGENCY MEDICAL SERVICE	70	4	2	-	6	11	4	-	-	2	-	-	8	-	14
EMERGENCY OPERATIONS CENTER	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
END-STAGE RENAL DISEASE	18	-	-	-	2	6	1	-	-	-	-	-	-	-	6
EVACUATION RECEPTION AREA	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FAITH-BASED FACILITY	320	12	2	-	12	77	18	-	-	2	-	-	30	-	66
FIRE STATION	150	6	4	4	18	33	5	-	-	4	-	-	24	-	48
HAZARDOUS MATERIALS FACILITY	542	40	18	15	40	107	35	-	4	8	-	6	60	2	126
HELIPORT/HELIPAD	14	2	1	-	2	-	2	2	-	-	2	-	-	-	4
HOSPICE	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOSPITAL	8	-	-	-	-	-	1	-	-	-	-	-	-	-	-
HOSPITAL - ACUTE CARE	12	-	-	-	-	4	-	-	-	-	-	-	2	-	2
HOSPITAL - TRAUMA	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-
JUVENILE CORRECTIONAL INSTITUTION	4	-	-	-	2	-	-	-	-	-	-	-	-	-	2
LAW ENFORCEMENT	62	-	4	-	4	14	4	-	-	-	-	-	8	-	16
LIBRARY	36	-	-	2	2	8	3	-	-	-	-	-	4	-	10
LOCAL CORRECTIONAL INSTITUTION	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LOCAL GOVERNMENT FACILITY	32	-	2	-	4	10	-	-	-	2	-	-	6	-	12
MARINA	8	6	8	-	-	-	-	-	2	6	-	6	2	-	8
MOBILE HOME PARK	216	22	4	10	23	51	11	-	-	14	-	8	30	-	57
NATIONAL GUARD	16	-	-	-	6	2	-	-	-	-	-	-	6	-	6
POINT OF DISTRIBUTION	26	4	-	2	-	8	2	-	-	2	-	2	-	-	10
PRIVATE SCHOOL	212	4	2	2	8	40	14	-	-	4	-	2	20	-	42
PUBLIC SCHOOL	240	10	-	6	12	40	9	-	-	4	-	4	22	-	42
PUBLIC WATER SUPPLY - PLANT	190	50	30	10	2	39	10	-	4	14	-	12	32	-	60
RELIEF AGENCY	6	-	-	-	-	6	-	-	-	-	-	-	-	-	6
RESIDENTIAL TREATMENT FACILITY	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REST AREA	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RURAL HEALTH CLINIC	6	-	-	-	-	2	1	-	-	-	-	-	2	-	2
RV PARK	58	6	8	4	4	9	4	-	-	8	-	2	14	-	24
SHELTER	144	4	-	-	2	18	4	-	-	2	-	-	6	-	12
SKILLED NURSING FACILITY	40	-	-	-	4	10	2	-	-	-	-	-	4	-	8
SOLID WASTE FACILITY	112	10	2	2	24	20	2	--	2	10	-	4	26	-	40
STADIUM	10	2	-	-	-	-	1	-	-	-	-	-	-	-	-
STATE GOVERNMENT FACILITY	24	-	-	-	2	2	1	-	-	-	-	-	-	-	4
TRANSPORTATION OPERATIONS	20	-	-	-	6	2	-	-	-	-	-	-	6	-	6
WASTEWATER FACILITY	164	16	8	10	20	32	9		-	8	-	6	30	-	58
Grand Total	3794	286	146	93	251	751	186	6	32	132	12	94	452	6	947

4. Summary of all Hazards

Table 13 summarizes the extent in acreage within the entirety of Brevard County vulnerable to the hazards examined in this report. These data include the area of impact in municipal boundaries as well as unincorporated Brevard.

Table 13: Summary of Natural Hazard and Impacted Acreage

Hazard	Acres
Category 1 Storm Surge	52,014
Category 2 Storm Surge	69,870
Category 3 Storm Surge	110,735
Category 4 Storm Surge	137,422
Category 5 Storm Surge	155,534
100 Year Flood	392,655
Shallow Coastal Flood	67,142
2040 Sea Level Rise (1.85 feet)	27,344
2070 Sea Level Rise (4.47 feet)	76,720
2100 Sea Level Rise (8.45 feet)	129,199

VII. Policy Audit

A. Summary of Policy Recommendations

The overall purpose of this project was to provide recommendations for way Brevard County could become resilient to the impacts of natural hazards such as flooding, storm surge, shallow coastal flooding, and sea level rise. Part of this effort was also ensuring that the County has the policy framework to enable resiliency in its land use planning and zoning code to develop in a manner resilient to flooding by aligning with the Peril of Flood statutes. An audit of the County's current comprehensive plan goals, objectives, and policies and land use regulations was conducted to outline what the County currently has in place and to offer recommendations for strategies to close any policy gaps.

The overall strategy of the policy audit was to:

- Identify where current objectives and policies within the Coastal Management Element currently meet the Peril of Flood standards, and to which of the principals it aligns.
- Identify where objectives and policies from other parts of the Comprehensive Plan, such as the Conservation Element, Capital Improvements Element, and Future Land Use Element, could be brought into the Coastal Management Element that meet the Peril of Flood requirements.
- Provide recommendations for larger initiatives to be undertaken through future action that would influence or be influenced by current and proposed Coastal Management objectives and policies.

B. Coastal Management Element: Meeting Peril of Flood Requirements

One of the main objectives of this project was to ensure that Brevard County's comprehensive plan will be updated to ensure compliance with Peril of Flood policy and requirements.

Emphasis in this audit was placed on the first three (3) of the six (6) Peril of Flood requirements; where principles 5 and 6 were met were also denoted.

1. Include development and redevelopment principles, strategies, and engineering solutions that reduce the flood risk in coastal areas which results from high-tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea level rise.

2. Encourage the use of best development practices and redevelopment principles, strategies, and engineering solutions that will result in the removal of coastal real property from flood zone designations established by the Federal Emergency Management Agency.

3. Identify site development techniques and best practices that may reduce losses due to flooding and claims made under flood insurance policies issued in this state.

4. Be consistent with, or more stringent than, the flood resistant construction requirements in the Florida Building Code and applicable flood plain management regulations set forth in 44 C.F.R. part 60.

5. Require that any construction activities seaward of the coastal construction control lines established pursuant to section 161.053, F.S., be consistent with chapter 161.

6. Encourage local governments to participate in the National Flood Insurance Program Community Rating System administered by FEMA to achieve flood insurance premium discounts for their residents.

Recommendations have been provided in the Coastal Management Element with proposed policy revisions denoted as **additions**, ~~**deletions**~~, and RECOMMENDATIONS FOR FURTHER CONSIDERATION THAT MAY ADD TO OVERALL RESILIENCE, BUT IS NOT A REQUIREMENT TO MEET PERIL OF FLOOD REQUIREMENTS**.**

Please note the text provided includes revisions made through the Objections, Recommendations, and Comments review not directly related to addressing Peril of Flood requirements. Revisions provided through previous reviews are in ~~strikethrough for deletions~~ and underline for additions as well as highlighted in yellow.

The Coastal Management Element and Policy Crosswalk is provided in the Appendix.

VIII. Further Recommendations

The strategies presented in this Report are based on input from public engagement activities, findings from the vulnerability analysis, review of the Coastal Management Element of the County's Comprehensive Plan and research on best management practices from regional, state, and national efforts. The ECFRPC offers recommendations for next steps based on the input and information collected through this process.

Recommended strategies presented here may take the form of policies, ordinances, land development codes, or the creation of other plans or processes and are based on education, land use and building practices, mitigation, adaptation and relocation.

Resilient Nature Based Practices

Based on the feedback and comments through the engagement process, resilient nature-based practices rose to the top of the recommended resilient strategies. The community was provided five (5) strategies to consider:

1. ***Resilient Natural Practices & Protections***
2. ***Adopt Growth Patterns that Support Nature***
3. ***Beach Quality & Quantity***
4. ***Land Use to Protect Surface Water***
5. ***Conservation Lands***

Creating more resiliency through creating more conservation lands is a strategy that would facilitate the County protecting the hydrology of natural areas. This strategy pends the funding and availability of parcels align for acquisition and long-term maintenance. It is recommended the County examine potential conservation lands by the environmental and public health and safety potential and identify creative partnerships to fund their acquisition and designation depending on the timeframe of projected impacts.

Where acquisition is not possible or in the public interest, designing and developing to avoid, minimize, and when necessary, to mitigate impacts from flooding, storm surge, coastal erosion, and sea level rise should be prioritized. Consider the concept of designing to "live with water" – protection from and preservation of.

These strategies include implementing more "green", "blue", and Low Impact Design-based infrastructure practices. These are man-made features that mimic the environmental services nature provides but with the purpose of minimizing the risk of

flood, maintain and / or improve water quality, to break storm surge before it comes inland, and so forth.

To support this objective, it's recommended to develop a process to implement Low Impact Design into the design practices within the county and identify where they'd be most effective against natural hazards. The following is a some more information to be considered as the County implements this concept.

Low Impact Design

LID is a term used to describe a land planning and engineering design approach to managing stormwater runoff. The main three (3) principles of LID are summarized in the adjacent graphic. LID emphasizes conservation and use of on-site natural features to protect water quality. This approach implements engineered small-scale hydrologic controls to replicate the pre-development hydrologic regime of watersheds through infiltrating, filtering, storing, evaporating, and detaining runoff close to its source.

LID is a type of smart growth that simultaneously conserves green space and manages stormwater effectively. Unlike traditional land use designs, LID promotes natural stormwater management techniques that minimize runoff and help prevent pollutants from getting into the runoff. In some cases, these practices decrease the size of traditional retention and detention basins and can be less costly than conventional stormwater control mechanisms.

Developmental and design elements of LID include in urban and suburban development include:

Conserved Green Space
Natural terrain protects soils from disturbance and compaction.

Permeable Pavement
Hard, yet penetrable, surfaces reduce runoff by allowing water to
move through them into groundwater below.

Reduced Roadway Surfaces
Reducing roadway surfaces results in more permeable land area.

Disconnected Impervious Areas
Separate localized detention areas help limit the velocity and amount of water that must be handled by end-of-pipe water quality and quantity facilities.

Vegetated Swales
An alternative to curb and gutter systems, vegetative swales convey water, slow runoff, and promote infiltration. Swales may be installed along residential streets, highways, or parking lot medians.

Green / Eco-roof Systems

These systems can significantly reduce the rate and quantity of runoff from a roof and provide buildings with thermal insulation and improved aesthetics.

Bio-Retention Basins & Rain Gardens

Small vegetated depressions in the landscape collect and filter stormwater into the soil.

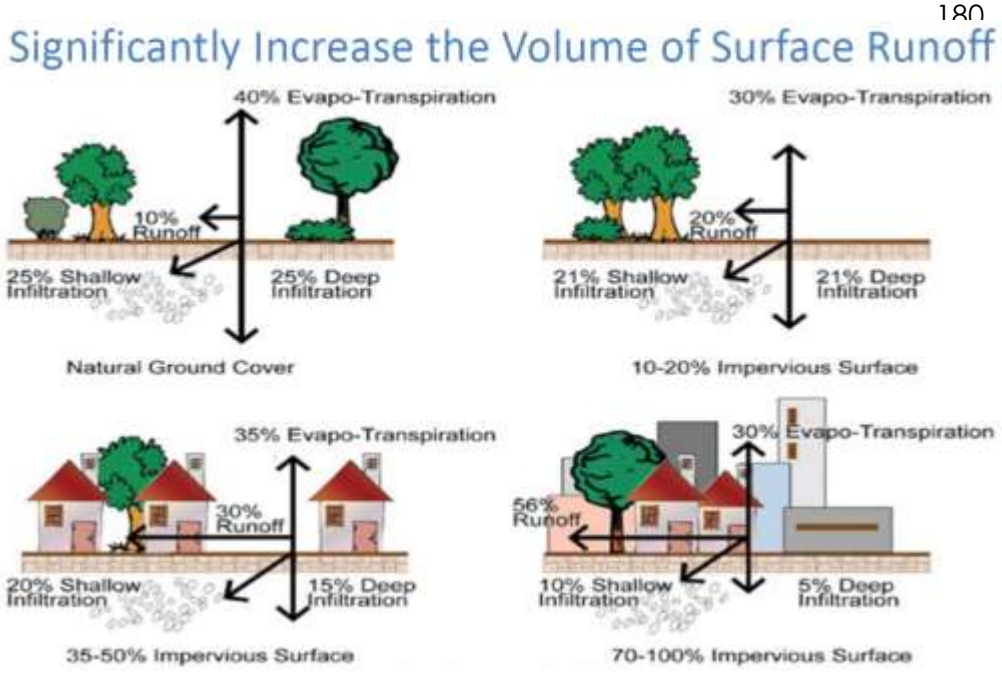
Clustered Homes

Concentrating structures to smaller areas preserves more open space and natural areas to be used for recreation, visual aesthetics, and wildlife habitat.

Stormwater Reuse

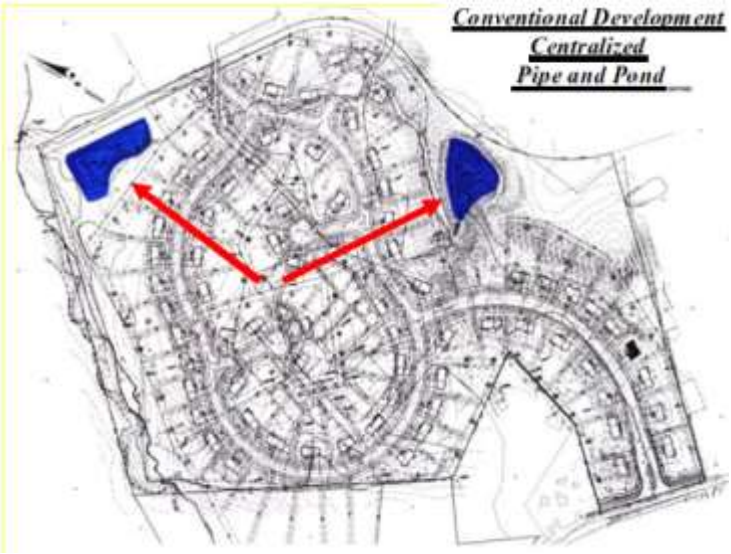
Surface ponds, underground catchment devices, or surficial aquifers store rainfall for future irrigation reuse. Smaller scale reuse systems include cisterns and rain barrels.

The implementation of green / LID practices offers benefits in terms of reduced surface water runoff through design features such as reduced impervious surfaces and increased permeable pavement and increased evapotranspiration through increased vegetation. The graphic below gives a good example of some potential offsets for LID implementation.



Water cisterns capture roof runoff to be reused or treated before percolating into the soil which provides conservation of water, reduction of stormwater, and natural treatment.

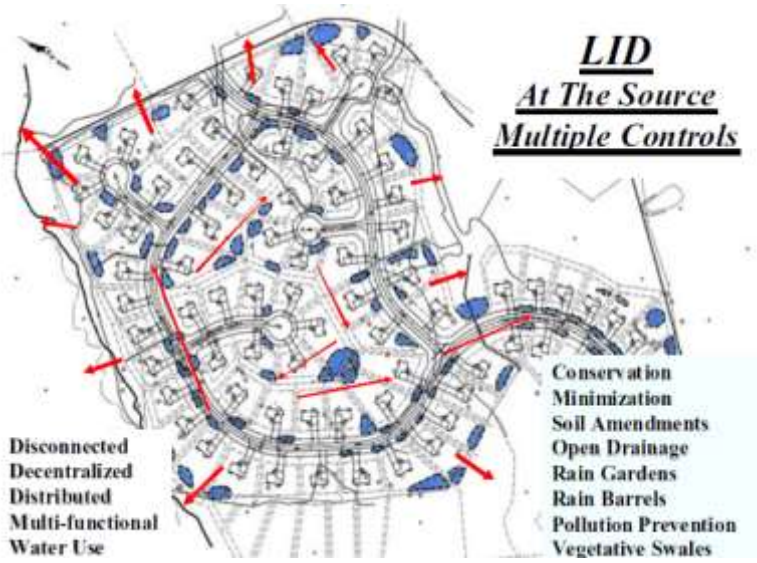
Conventional land development practices require clear cutting, mass grading and the use of impervious surfaces, gutters, pipes and ponds to collect and treat runoff. It requires altering and destroying the natural hydrology and the ability of the landscape to absorb rainwater and capture pollutants.



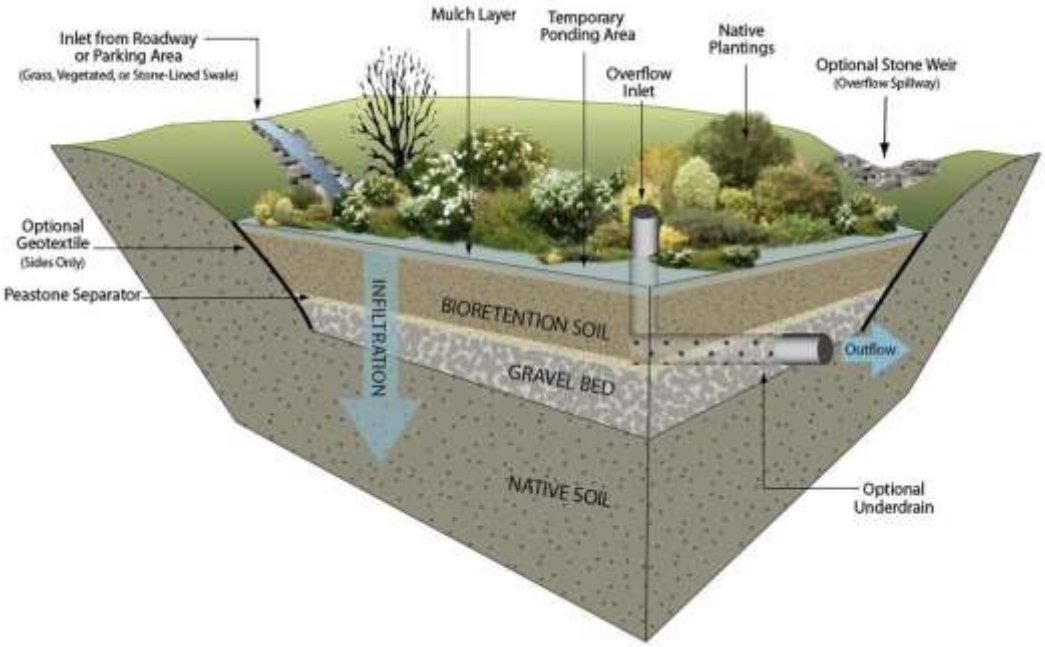
LID Site Design Techniques:

- *Conservation of natural hydrology, trees, & vegetation*
- *Minimized impervious surfaces*
- *Dispersal of stormwater runoff*
- *Conservation of stream & wetland buffers*
- *Ecological landscaping*
- *Clustering of subdivided lots to preserve open space and green infrastructure*

Clustered land development techniques offer many benefits over the conventional land development practices.

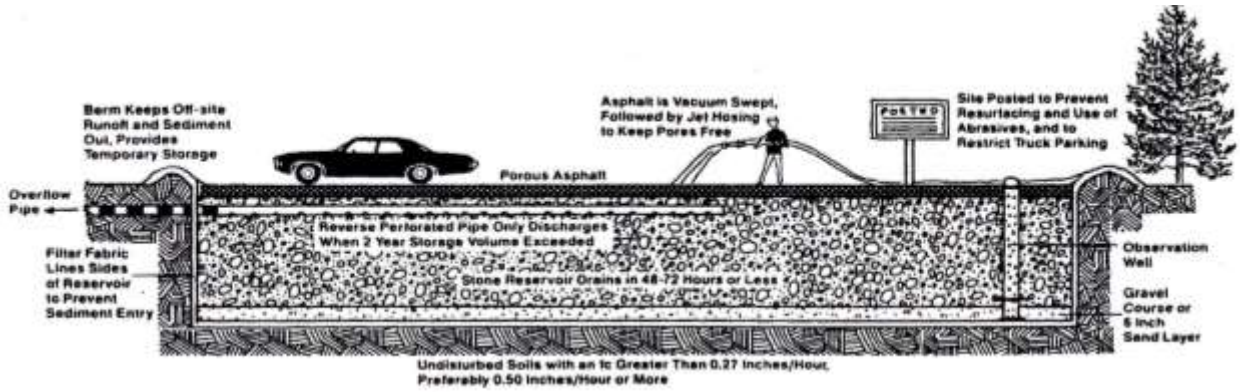


The LID approach uses a wide array of techniques that work with the landscape, soils, drainage patterns and vegetation to minimize impacts. Integrated management controls retain, detain, infiltrate and filter runoff by mimicking the predevelopment hydrology. Often, LID designs increase lot yield and reduce infrastructure cost.



Elements of better site design on roadways and driveways that limit impact including

- *Narrower streets*
- *Alternative cul-de-sacs*
- *Shared driveway*
- limiting pavement
- Using permeable materials
- Limiting curb and gutter



Low Impact Natural Stormwater Management Practices work with the ecosystem services to help attenuate flows as well as support water quality improvement through bioretention. These practices are excellent adjacent to small parking lots and roadways and provide the opportunity for more water storage. Some examples of some practices include:

- *Small-scale stormwater controls*
- *Distributed throughout site*
- *Maintain flow patterns, filter pollutants, and recreate or maintain hydrology*
- *Vegetated Swales, Conveyance, and Treatment*

Bioretention is a useful LID technique for retrofitting urban areas to be less impactful and more resilient to flooding by capturing rainfall and attenuating stormwater. Below is an example of a few green islands that provide native vegetation as part of the landscaping that also provides ecosystem services.

When implementing this LID technique, here are some considerations for the County's Land Development Codes:

- Shared or off-site parking with parking lot landscape to function as stormwater areas
- Permit permeable materials for parking

- Promote green roofs
- Promote planter boxes for rainwater harvesting
- Encourage reduced roadway footprint
- Work with the SJRWMD to ensure credit is allowed to entice green development practices

Resilient Development

Based on the community's feedback on recommended strategies to ensure development in Brevard County is more resilient, it is recommended the County develop incentives for owners, developers, and builders to construct projects with less risk to flooding and/ or with design features to accommodate / protect from flood. It is also recommended the County utilize the results of vulnerability analysis and consider developing more strict standards for higher risk areas and areas of known hazards.

It is also recommended the County re-examine buffer criteria for water quality as well as reduction of risk to loss of property and life to ensure no net loss of environmental services based upon future flood and storm surge conditions.

Public Health & Equity

The community survey asked respondents to provide their ranking and comments regarding five (5) strategies to further support public health and continue to ensure equitable distribution of services during and following a shock event. Based on the feedback from the survey, it is recommended County examine creating a land use category or overlay area that provides guidance on development criteria, location, and

densities that addresses the same functions as "adaptation action areas" in focusing specific resiliency strategies depending on the type and timing of vulnerabilities that protect people and property from the risk of and direct impact from flooding, coastal erosion, storm surge, and sea level rise. Strategies within these areas could include conservation of lands, transfer of densities to less vulnerable areas, phasing out of septic tanks, and prioritization of the use of green, blue, LID, and / or nature-based infrastructure.

Note that in the policy recommendations provided through this study, the term 'Coastal Planning Areas' has been recommended for discussion purposes. This term may be similar to existing County-defined terms and, as such, could be renamed for clarity.

To this point, it is also recommended the County examine the consistency of use of locally-defined terminology as well as state and federally-defined terminology throughout all elements of the Comprehensive Plan, the Comprehensive Plan's Glossary, and all associated ordinances and regulation.

The County currently has Transfer of Development Rights (TDR) policies in its comprehensive plan that could be examined and expanded for use as a strategy to limit development of real property in current or future areas of natural hazards.

To support implementation of resilient infrastructure projects, it is recommended the County examine updating the Capital Improvements Plan (CIP) to implement Green, Blue, and Resilient Grey Infrastructure including Low Impact Design (LID) and nature-based projects.

Capital Improvements Planning

The CIP framework can be used to identify existing assets that need to be relocated, retrofitted, or assigned altered maintenance regimes based on climate risk. It can also be used to ensure that new facilities and infrastructure – including any climate adaptation projects – are designed and located to be resilient to risks expected over the asset's lifetime, including flooding, precipitation, and elevated temperatures.[1]

Integrating Resilience into Local Capital Improvement Programs *University of Maryland Environmental Finance Program*

It is also recommended the County develop a risk-informed project prioritization process, starting with facilities necessary to maintain health and safety, and including the lifespan of the facility / improvement, the projected year of impact, and the type of impact.

Having a CIP that is responsive to the dynamics of flooding, storm surge, coastal erosion, and sea level rise can offer Brevard County significant benefits by providing the opportunity for projects to be bundled, coordinated, funded, and phased together, and

to meet multiple goals and objectives at once. Including green, blue, and resilient grey infrastructure in capital improvement projects as well as phasing out maintenance and improvement of property within hazardous areas provides Brevard County the opportunity to reduce costs on capital projects by "digging once" and reducing risk as risks change. It also provides the opportunity for find innovative project funding. An excellent example would be incorporating green infrastructure elements into road repair projects or LID into stormwater improvement projects.

CIPs enable a community to proactively identify needs based on strategic goals and objectives, and implement responses before assets fail or property is damaged. Recovery, often in a state of emergency, is more expensive than avoidance. Further, the CIP fosters a proactive procurement process whereby communities have ample time to solicit and select the most competitive bids.

Public Services & Safety

The strategies under this quality-of-life factor in Brevard County are similar to those noted in the recommendations above; however, they were also supported by the community to support the provision and maintenance of public services and safety during and recovering from the impacts of shock events, flooding, and storm surge.

To further support this factor, it is recommended the County further examine the Post Disaster Redevelopment Plan and recovery events to consider areas that may not be suitable for redeveloped due to repetitive losses and / or major current and / or future vulnerabilities.

Additionally, is recommended the County update the building footprint and elevations data to support planning for implementing flood risk reduction, adaptation, and retreat measures.

Finally, if Stetson University is awarded the Florida Sea Grant Project, it is recommended that the County fully participate as a key stakeholder. It will be important for the County to be engaged in the process from the beginning to provide subject matter experts concerning data, ecosystems and direction for final outcomes. The results of the project will provide insight into where and how ecosystems within the county may respond to future changes in sea level rise and how current and future development may be impacted by or will impact these ecosystem changes. Additionally, the results will yield conversations concerning assessing open space requirements and future acquisitions through a resilience lens to mitigate flood impacts and protect beneficial ecosystem services while reducing vulnerabilities to existing development.

I. APPENDIX II: CRITICAL FACILITY IMPACTS BY HAZARD

The following are detailed maps of the location of critical facilities within the county and the respective hazards impacting them by each of the analysis curves: NOAA and USACE.

Figure A-1: Critical Facilities Impacted by Multiple Hazards: North Brevard

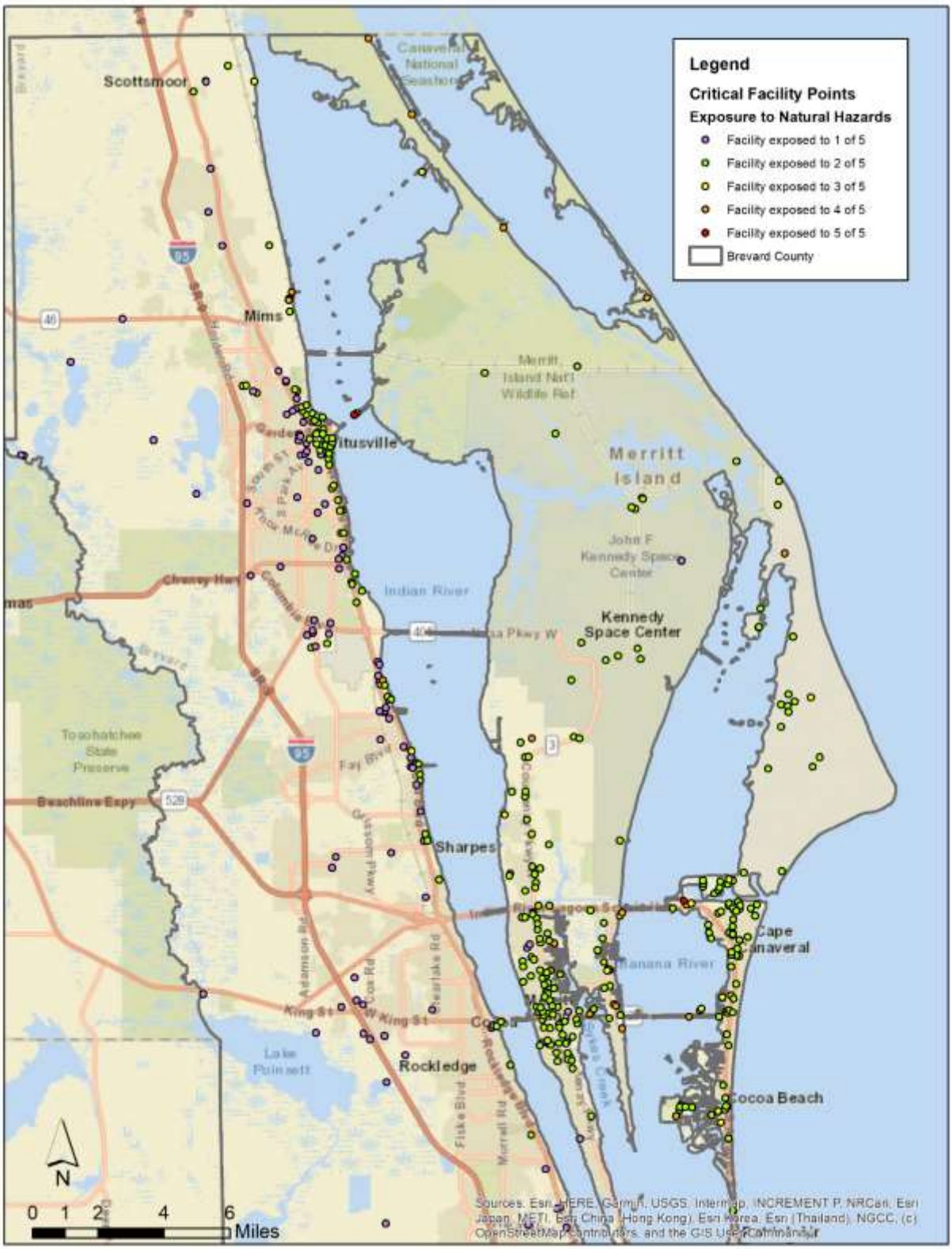


Figure A-2: Critical Facilities Impacted by Shallow Coastal Flooding: North Brevard

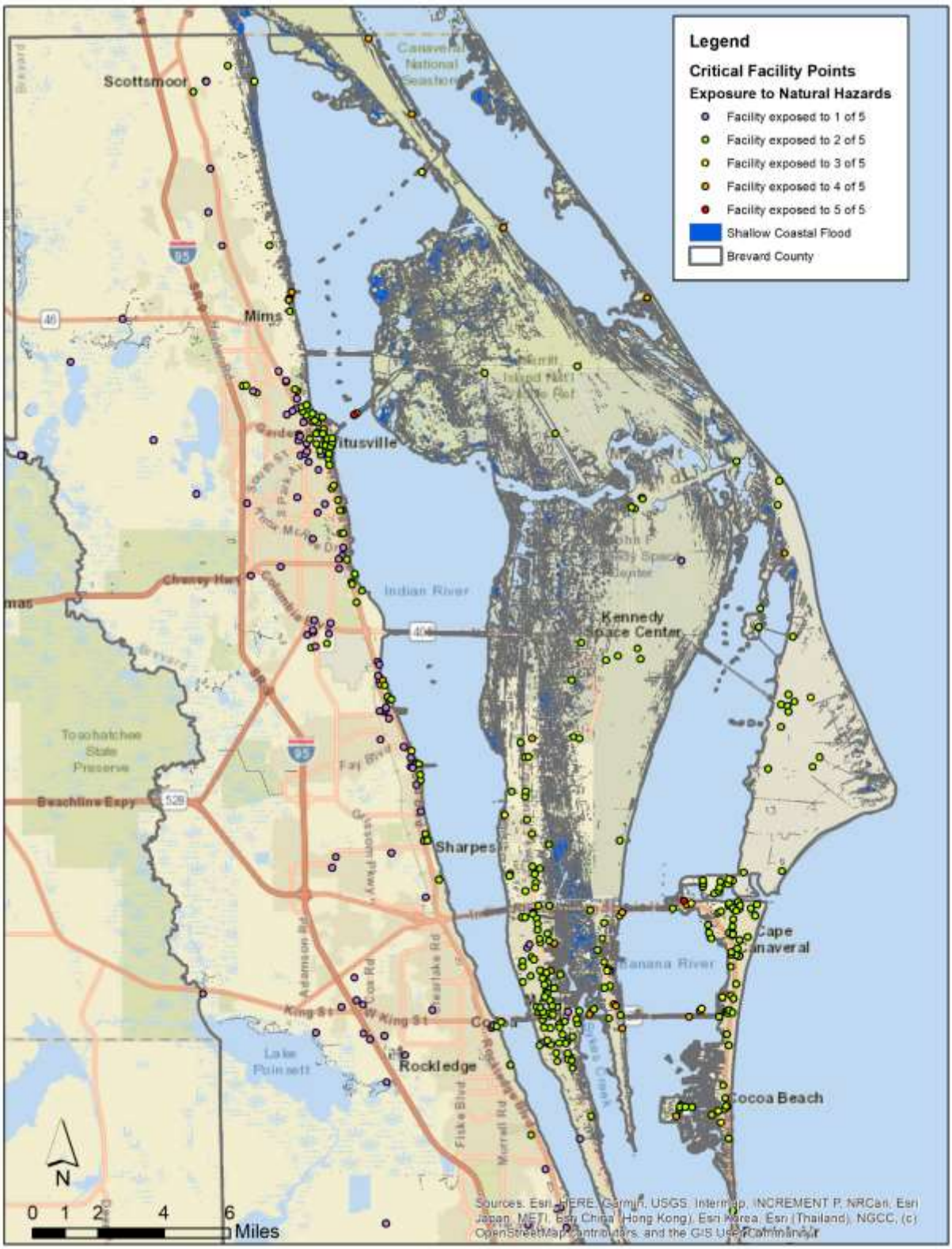


Figure A-3: Critical Facilities Impacted by Multiple Hazards: Central Brevard

Figure A-4: Critical Facilities Impacted by Shallow Coastal Flooding: Central Brevard

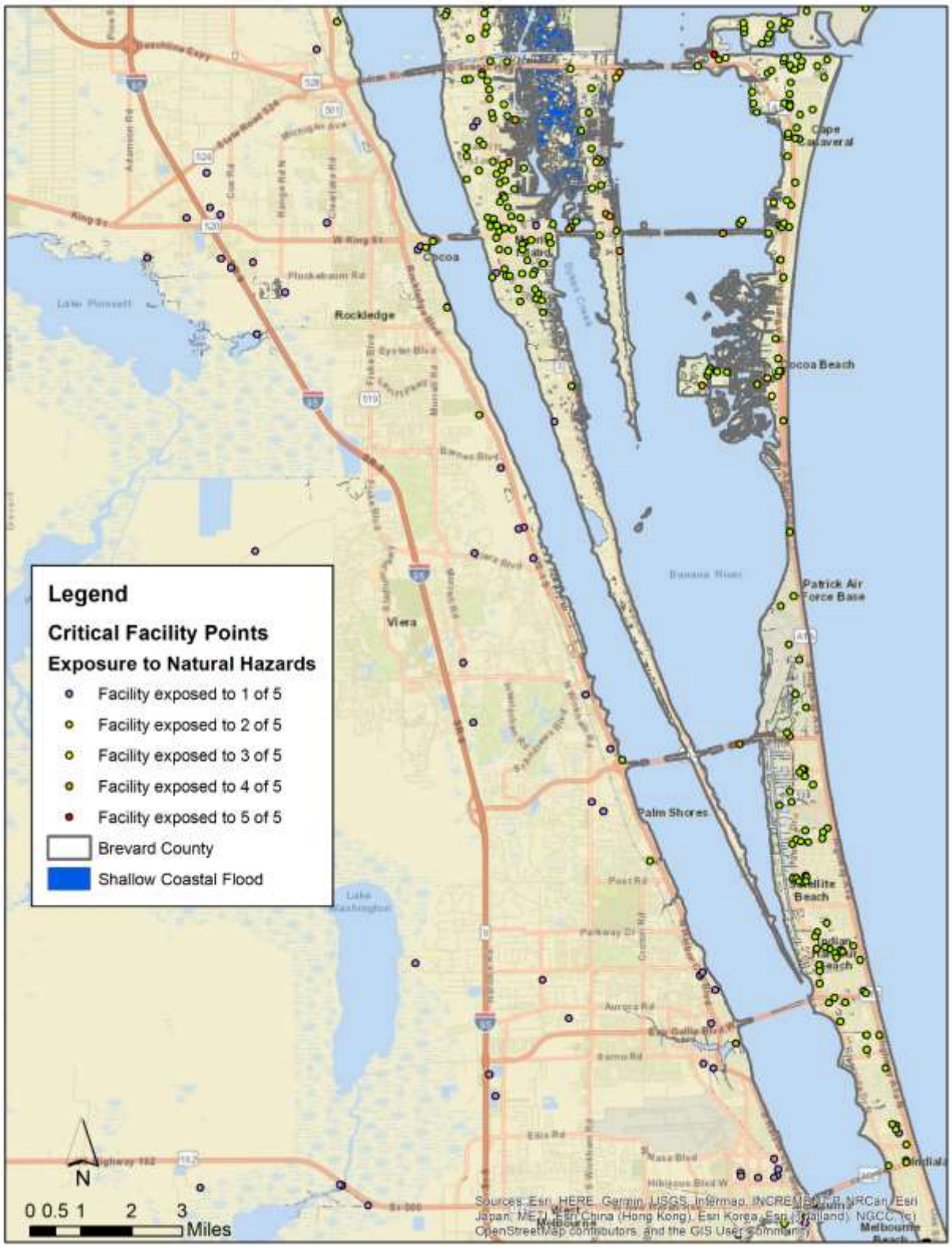


Figure A-5: Critical Facilities Impacted by Multiple Hazards: South Brevard

Figure A-6: Critical Facilities Impacted by Shallow Coastal Flooding: South Brevard

Figure A-7: Critical Facilities Impacted by Storm Surge: North Brevard

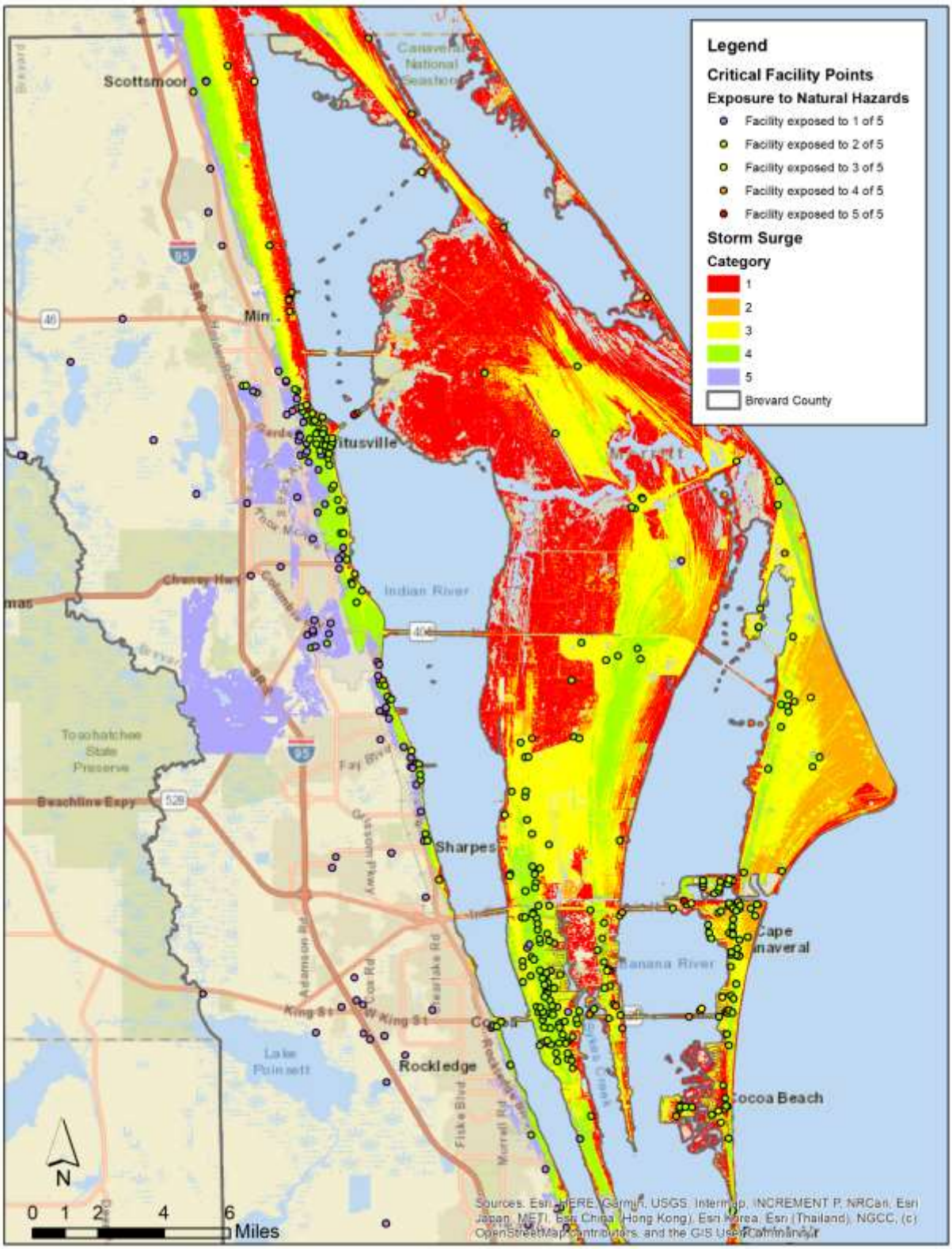


Figure A-8: Critical Facilities Impacted by Storm Surge: Central Brevard

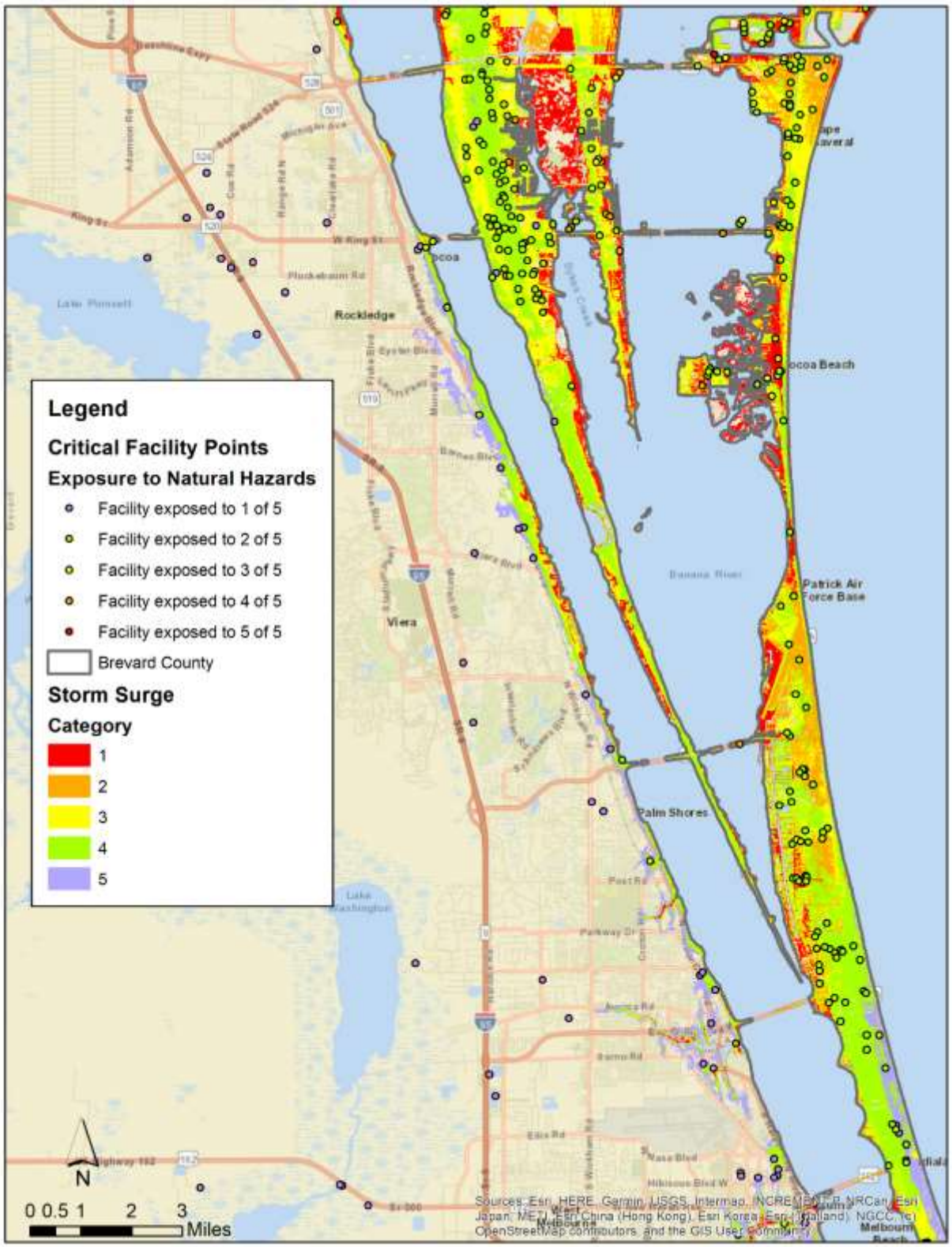


Figure A-9: Critical Facilities Impacted by Storm Surge: South Brevard

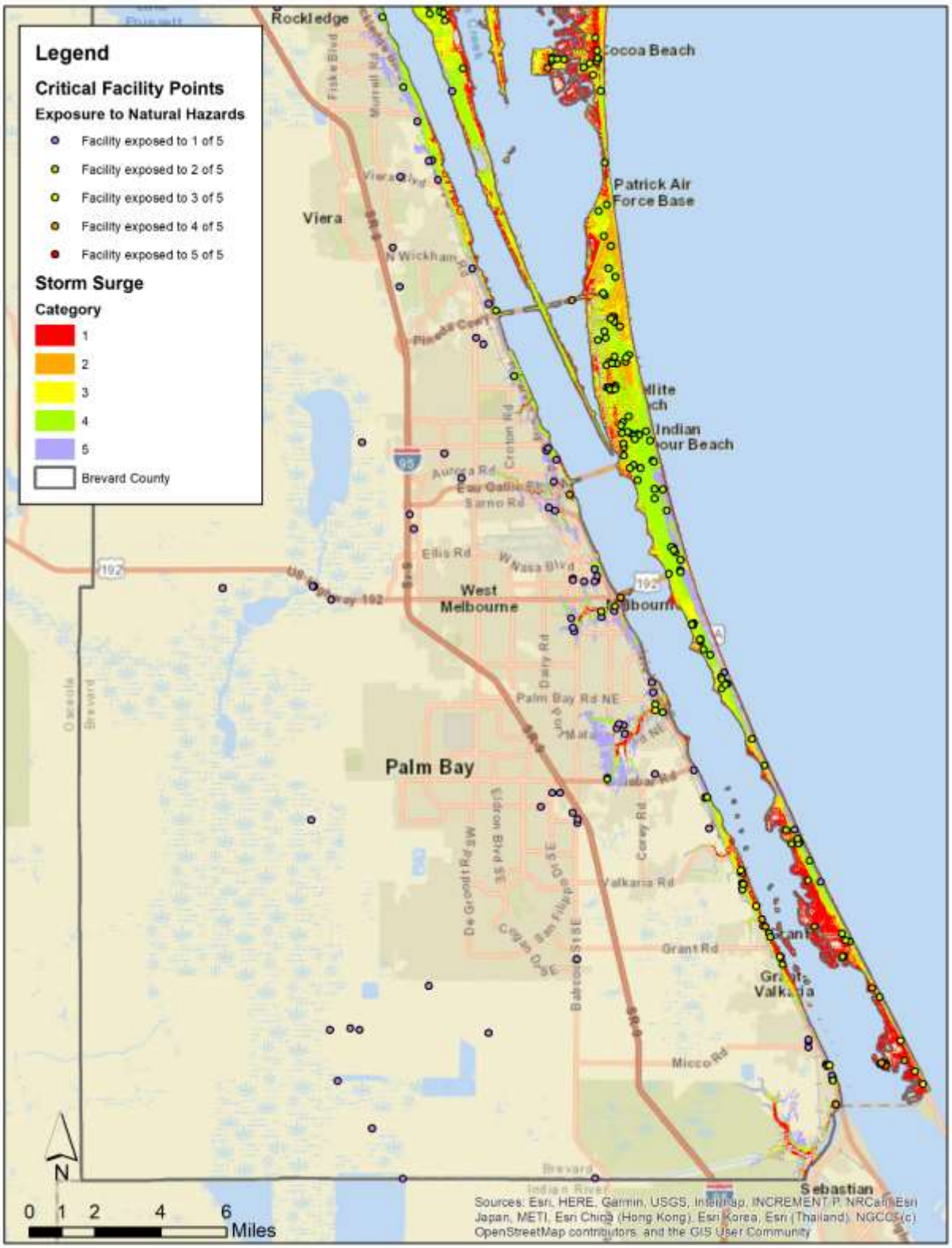


Figure A-10: Critical Facilities Impacted by 100-Year Floodplain: North Brevard

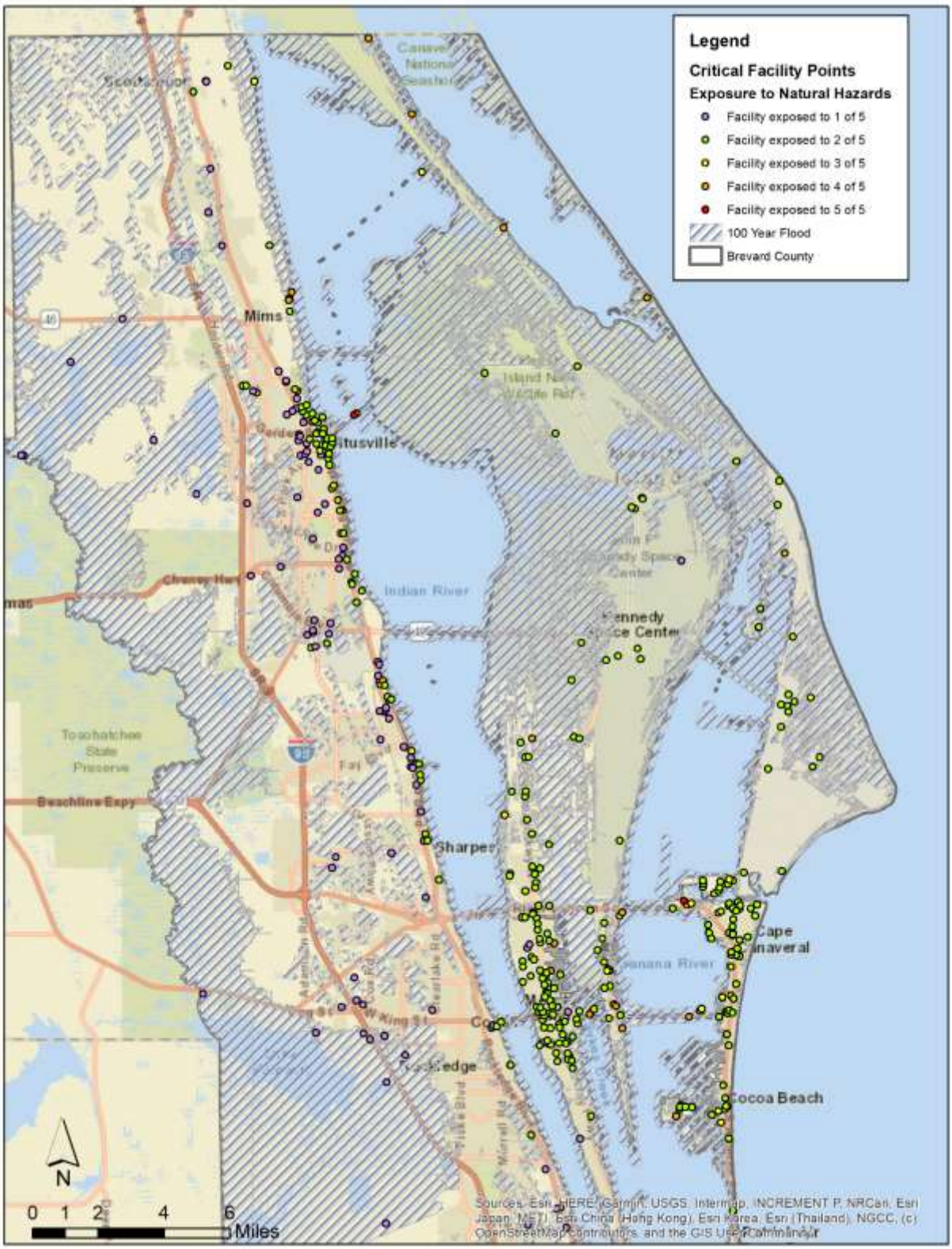


Figure A-11: Critical Facilities Impacted by 100-Year Floodplain: Central Brevard

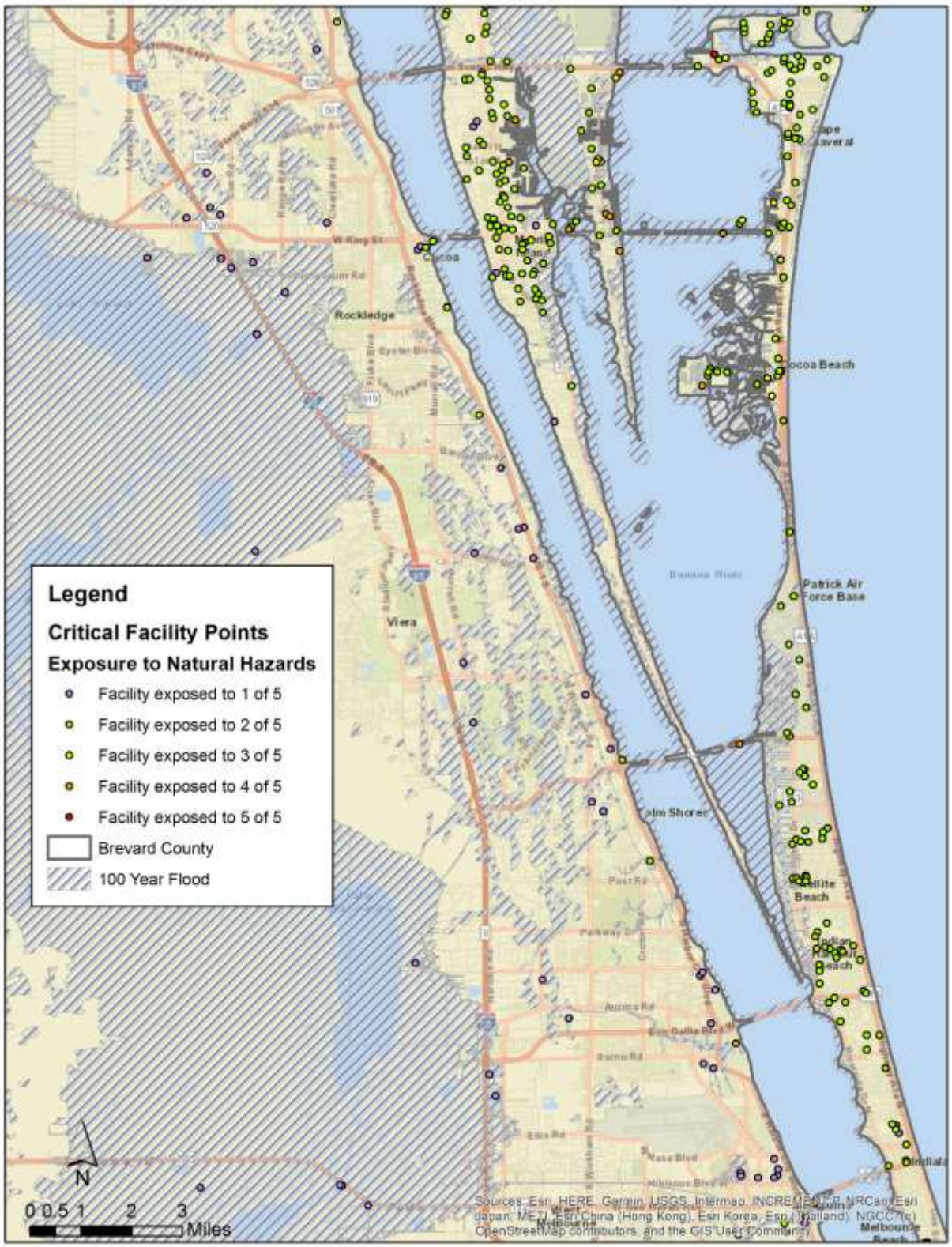


Figure A-12: Critical Facilities Impacted by 100-Year Floodplain: South Brevard

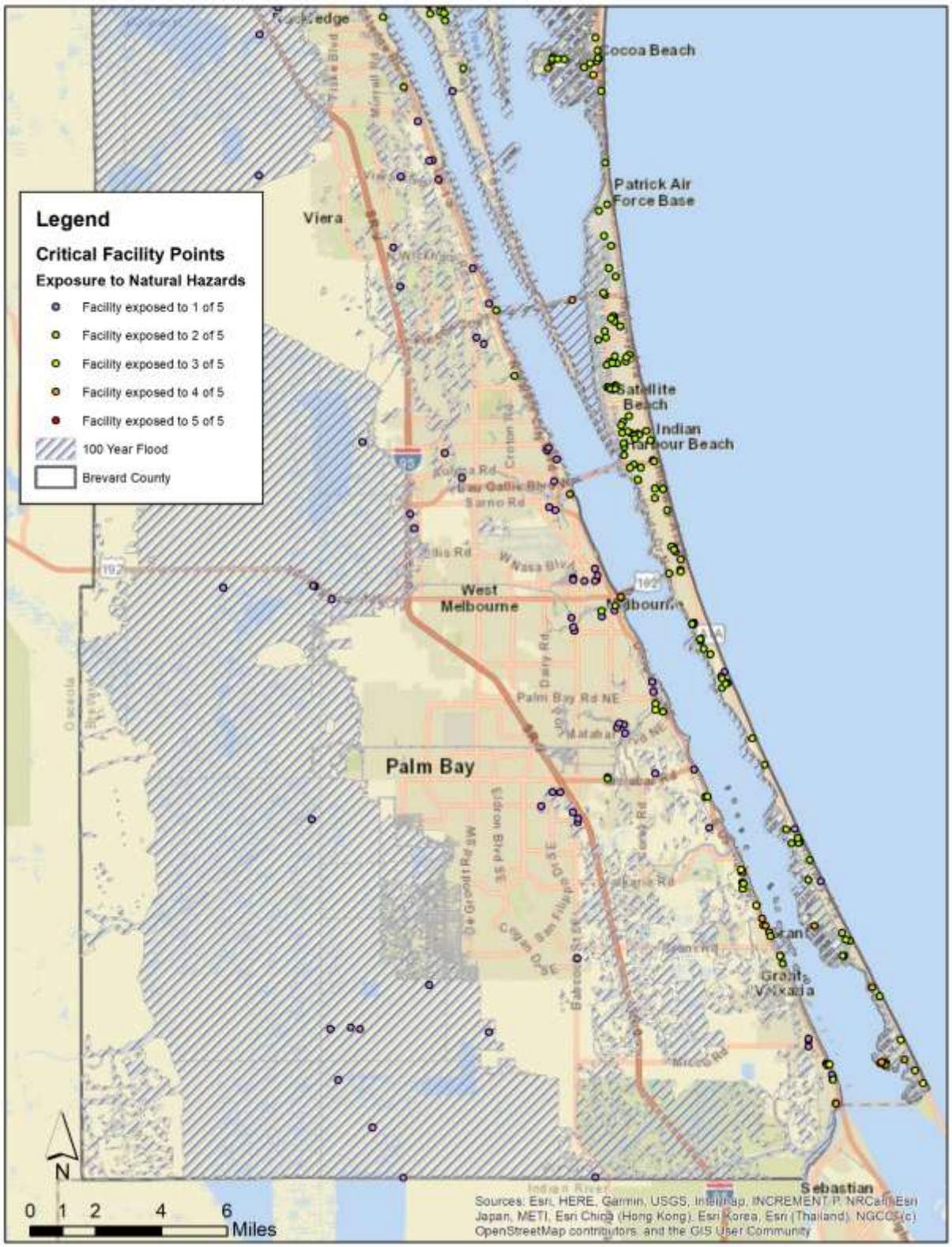


Figure A-13: Critical Facilities Impacted by NOAA Sea Level Rise: North Brevard

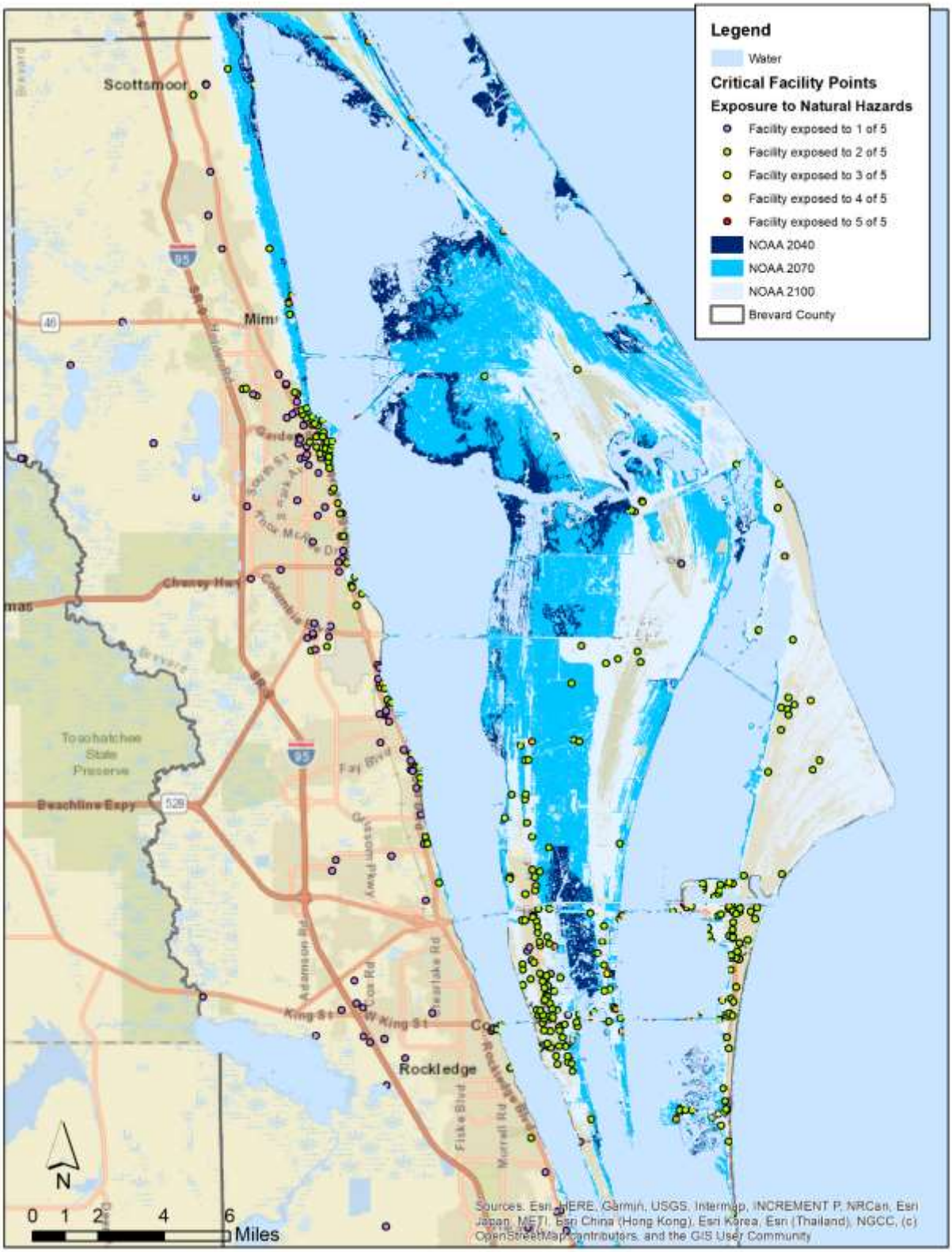


Figure A-14: Critical Facilities Impacted by NOAA Sea Level Rise: Central Brevard

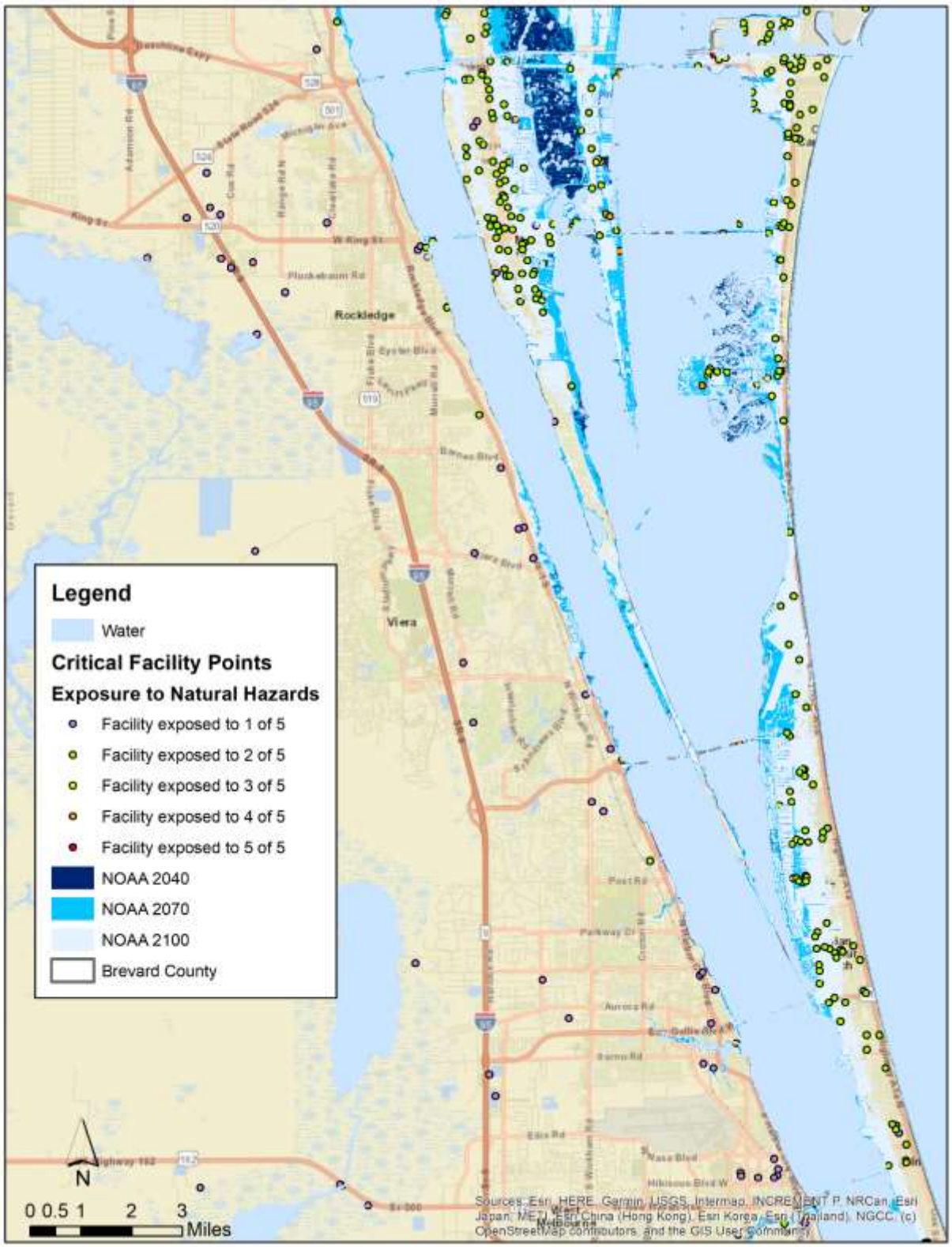


Figure A-15: Critical Facilities Impacted by NOAA Sea Level Rise: South Brevard

Figure A-16: Critical Facilities Impacted by USACE Sea Level Rise: North Brevard

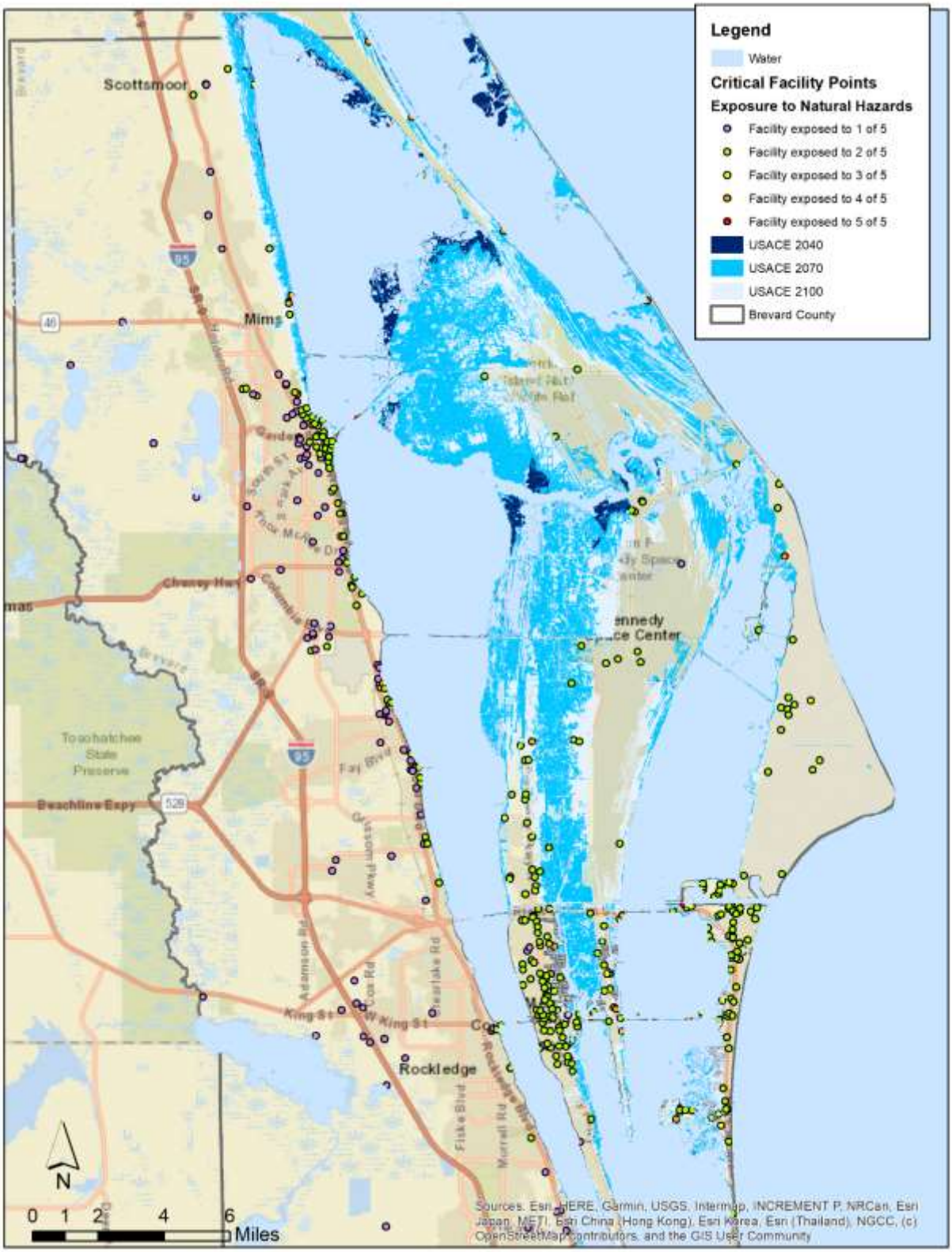


Figure A-17: Critical Facilities Impacted by USACE Sea Level Rise: Central Brevard

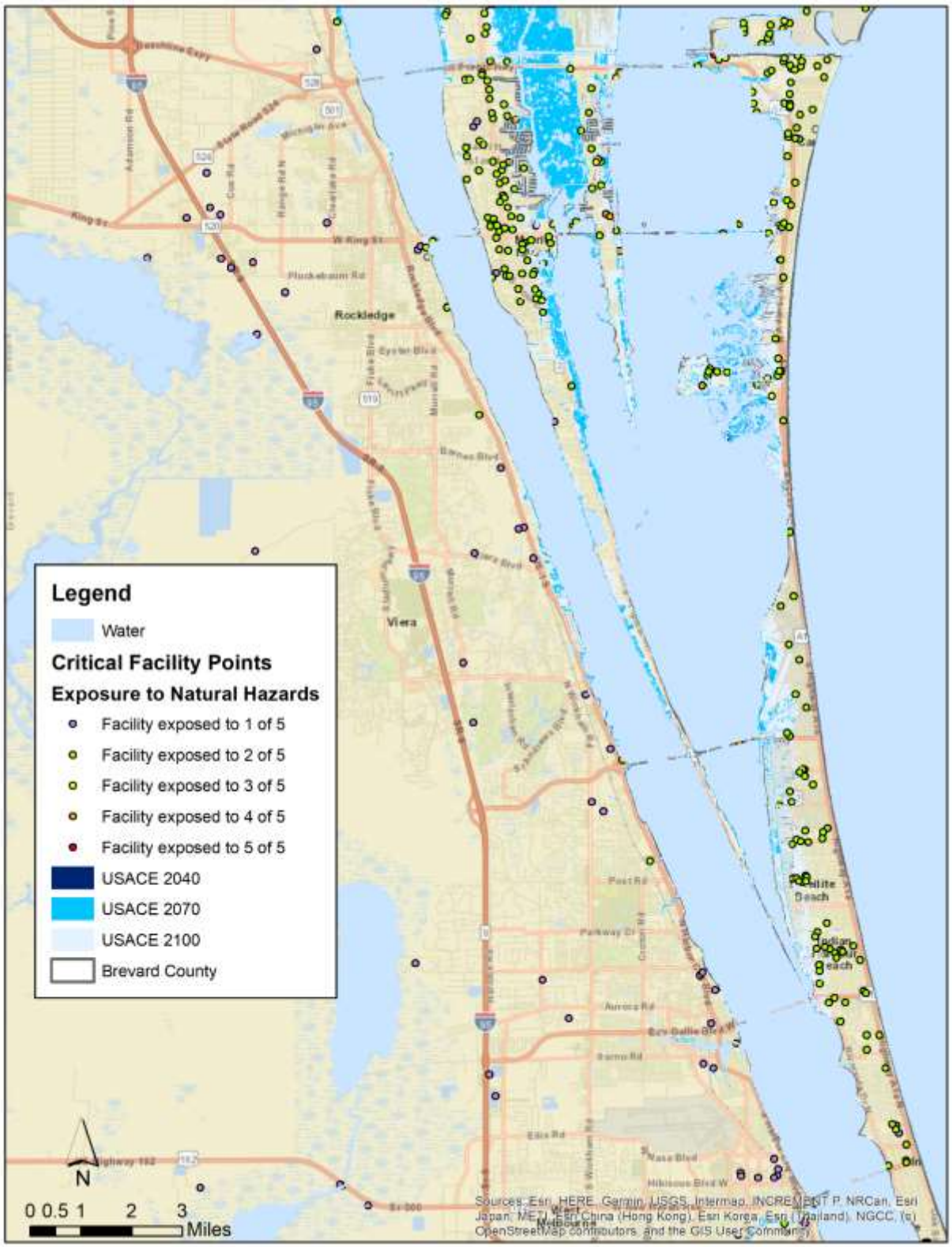


Figure A-18: Critical Facilities Impacted by USACE Sea Level Rise: South Brevard

Figure A-19: Critical Facilities Impacted by NOAA Sea Level Rise to 2.85 feet with Cat 3 Storm Surge, 2070: North Brevard

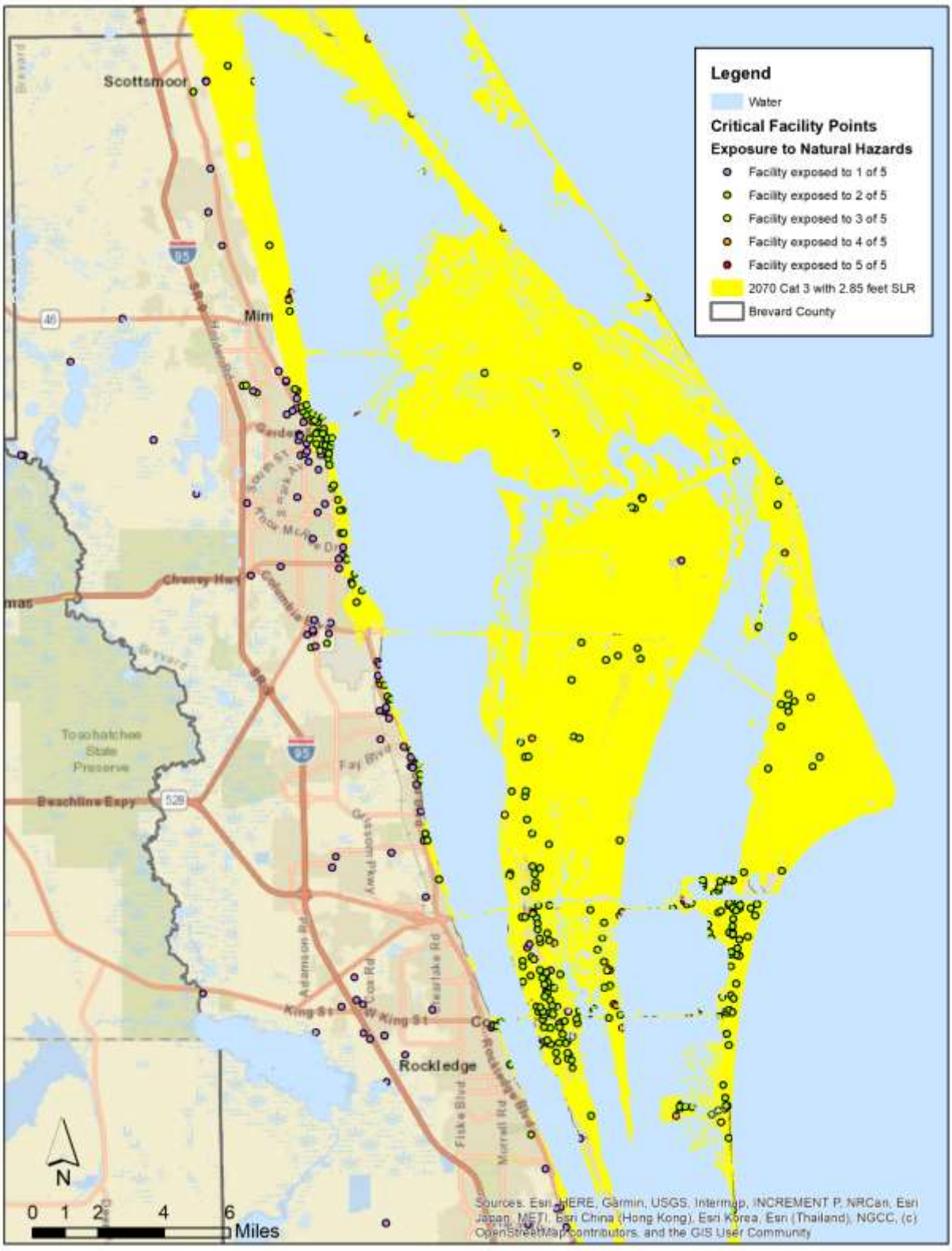


Figure A-20: Critical Facilities Impacted by NOAA Sea Level Rise to 4.47 feet with Cat 3 Storm Surge, 2070: North Brevard

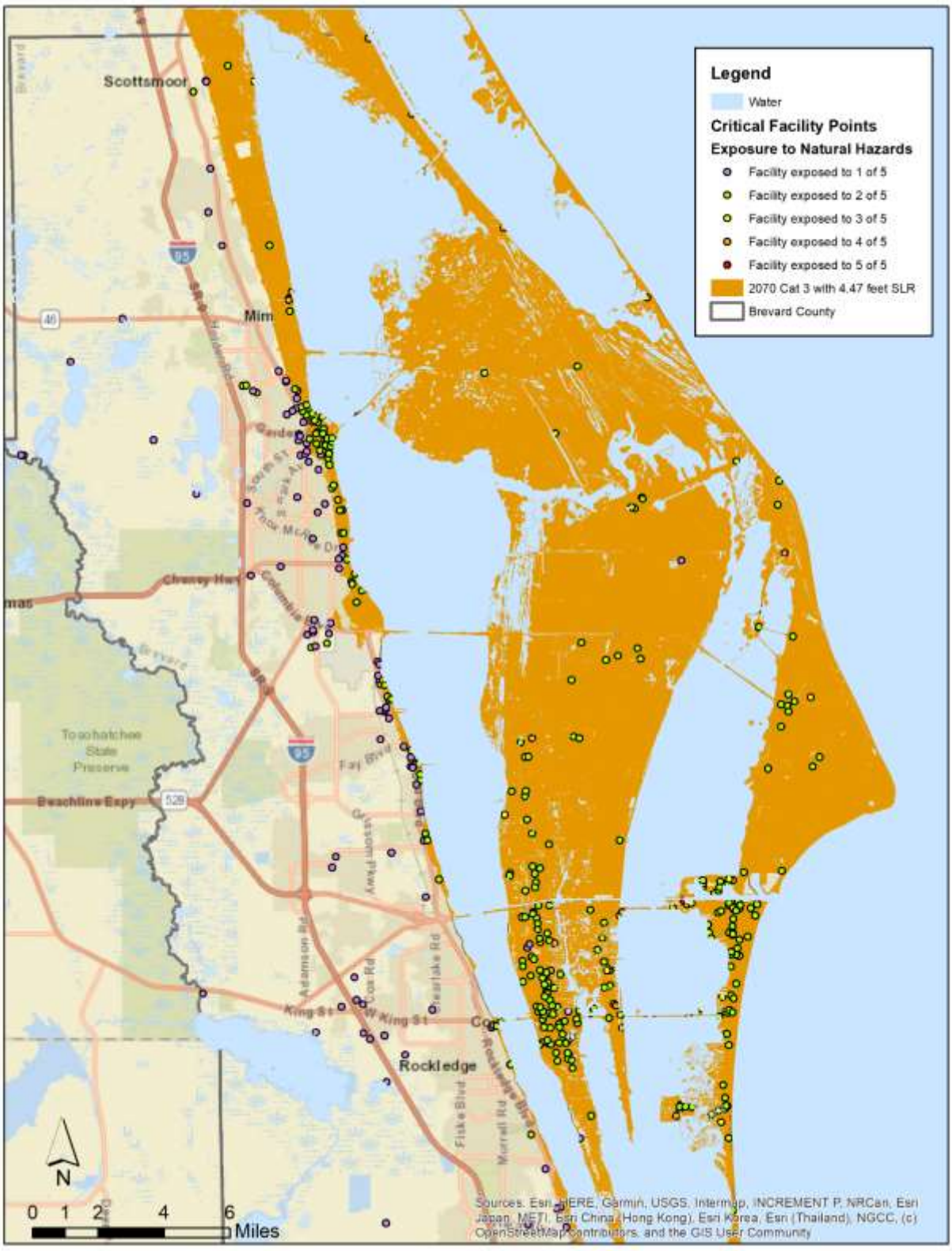


Figure A-21: Critical Facilities Impacted by NOAA Sea Level Rise to 2.85 feet with Cat 3 Storm Surge, 2070: Central Brevard

Figure A-22: Critical Facilities Impacted by NOAA Sea Level Rise to 4..47 feet with Cat 3 Storm Surge, 2070: Central Brevard

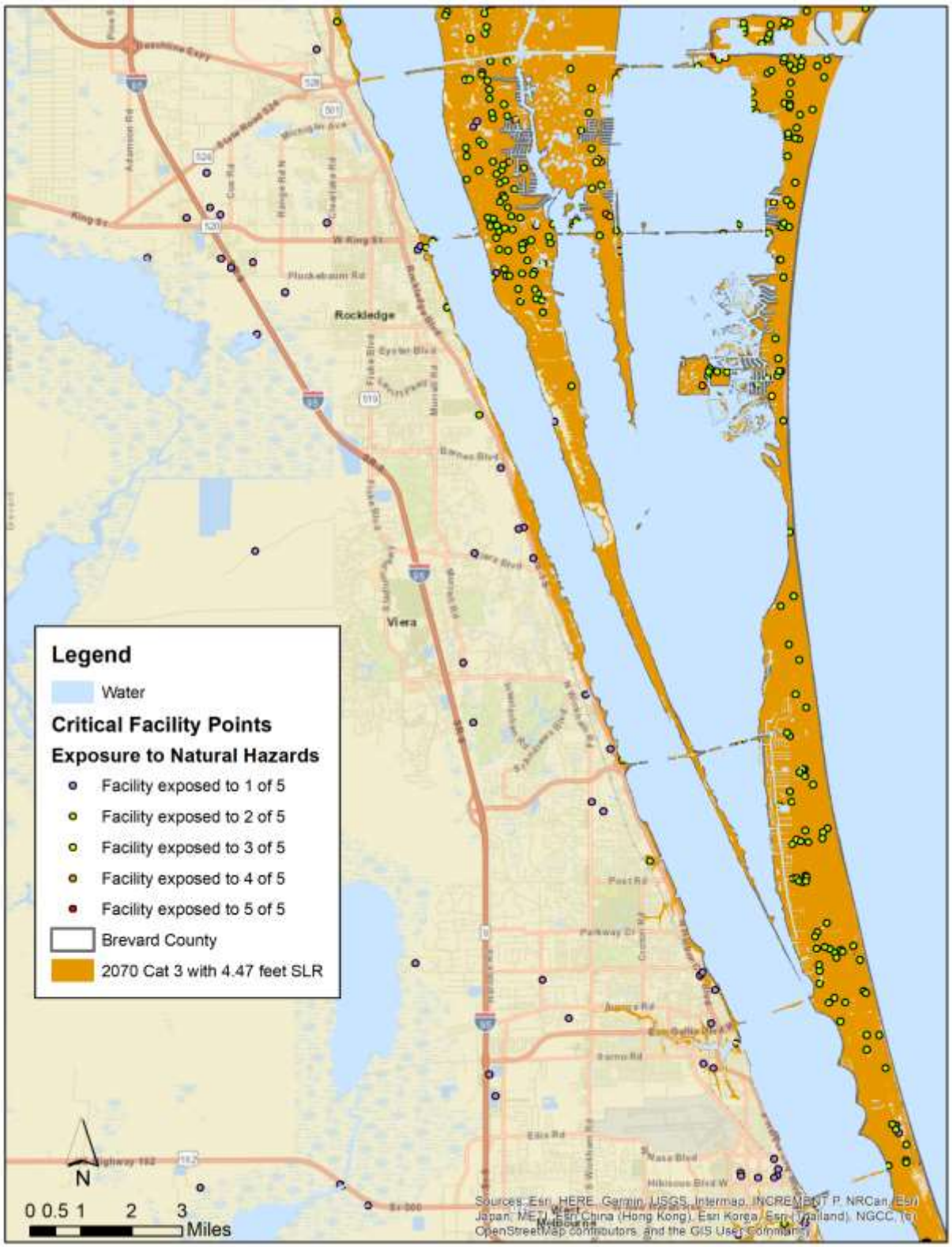
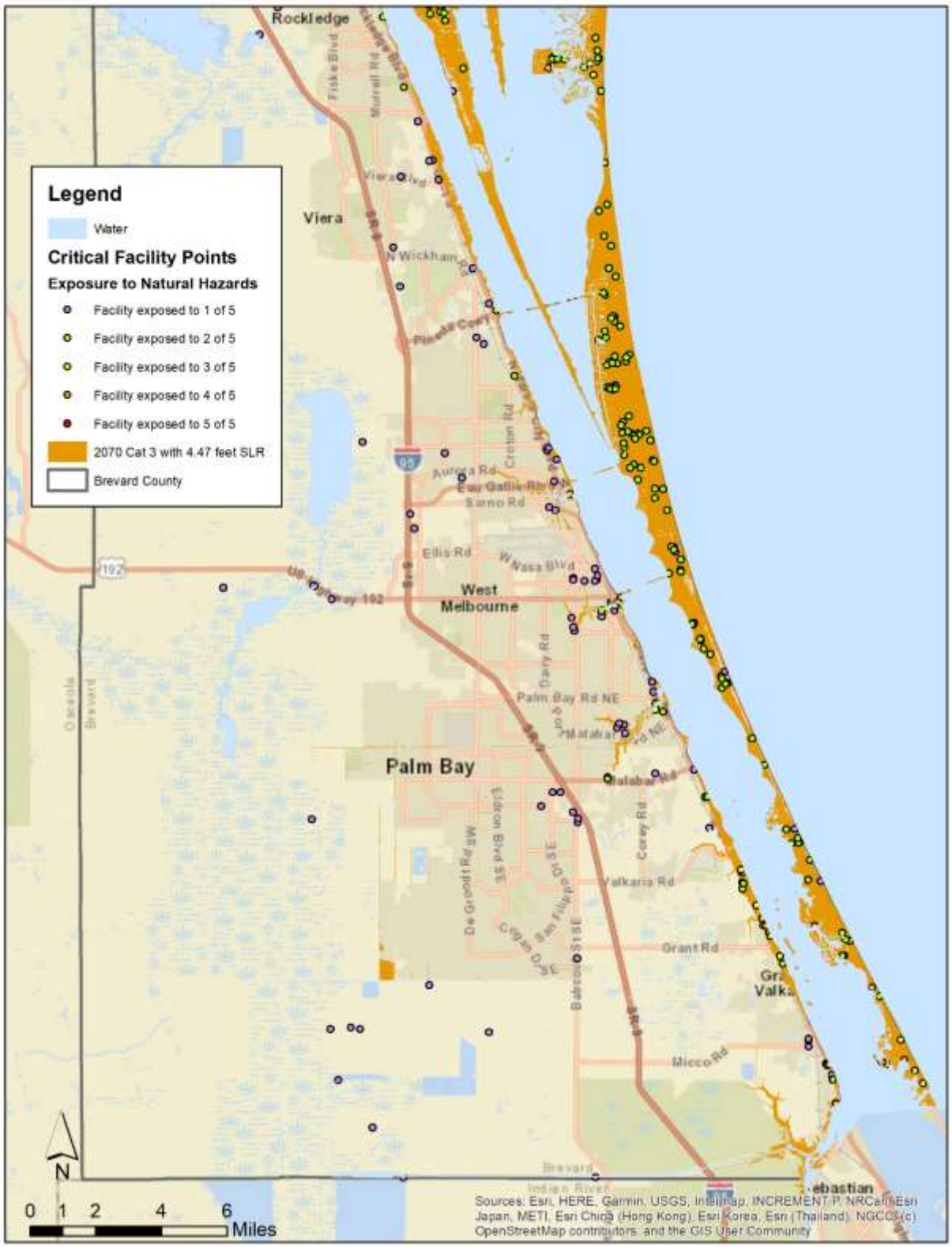


Figure A-23: Critical Facilities Impacted by NOAA Sea Level Rise to 2.85 feet with Cat 3 Storm Surge, 2070: South Brevard

Figure A-24: Critical Facilities Impacted by NOAA Sea Level Rise to 4.47 feet with Cat 3 Storm Surge, 2070: South Brevard



PLANNING FOR RESILIENCE

R2112: TASK 1 DELIVERABLES
PUBLIC ENGAGEMENT REPORT

This report was prepared for the Brevard County, FL by the East Central Florida Regional Planning Council under Florida Department of Environmental Protection grant agreement number: R2112 , titled: Planning for Resilience, published April 2021

II. Public Engagement

Engaging the public and private sector, as well as the many levels and specializations in the Brevard County government were paramount in the development of actionable strategies to make Brevard County more resilient to the impacts of environmental hazard and gauge what the community prioritizes in terms of hazards and responses. Several opportunities and styles to engage were provided. Below is a summary of the community engagement opportunities conducted through the course of this analysis.

A. Public Engagement Summary

The following is a summary of activities, discussion, and findings from the public engagement activities that took place in the course of this study. Comments and feedback from the community are also discussed in the Further Recommendations as part of the Vulnerability Analysis. The comments from the community are included in their entirety in associated appendices.

1. Community Workshop #1 | February 8, 2021

An online community workshop was held February 8, 2021 where members of the community were provided the opportunity to hear an overview of the project purpose and need, as well as weigh in on draft objectives, goals, and strategies that may support the County's efforts to avoid, minimize, and mitigate the impacts of natural hazards. An online survey was also developed prior to this event and then discussed in greater detail as part of the meeting. The presentation is provided in Appendix I, as well as the registration list, and the comments provided in the chat.

2. Community Workshop #2 | April 12, 2021

An online community workshop was held for April 12, 2021. During this workshop, members of the community were provided an overview of the vulnerability analysis findings as well as next steps. The presentation is provided in Appendix II, as well as the registration list, and the comments provided in the chat.

3. Infomercial – English & Spanish

"Infomercials" consisting of recorded descriptions of the purpose and need for the study as well as the intended participation by the community were developed and posted for the community to have 24/7 access to the basic study information. The slides delivered for the infomercial as well as the talking points are provided in Appendix III.

4. Public Online Survey – English & Spanish

Engagement with the community and understanding vulnerability from the community's perspective was a key component of this project. The survey sought to identify community-supported strategies that will make Brevard County more resilient to the impacts of natural hazards. To accomplish that objective, a survey was developed to be administered online through the MetroQuest platform.

The survey was administered in two (2) timeframes:

- ***December 24, 2020 – January 22, 2021***
- ***February 9, 2021 - February 28, 2021***

The original intent was to hold one survey session, however, analyzing the results of the first round it was decided to reopen the survey and target groups that were underrepresented in the respondents.

The survey was administered in English and Spanish to ensure that the large portion of Spanish-speaking residents within the County had the opportunity to also voice their feedback. The survey and all project information were / are hosted on the project page as well as sent to a diverse distribution list of community members, leaders, and business representatives.

The project page is: www.perilofflood.net/resilient-Brevard

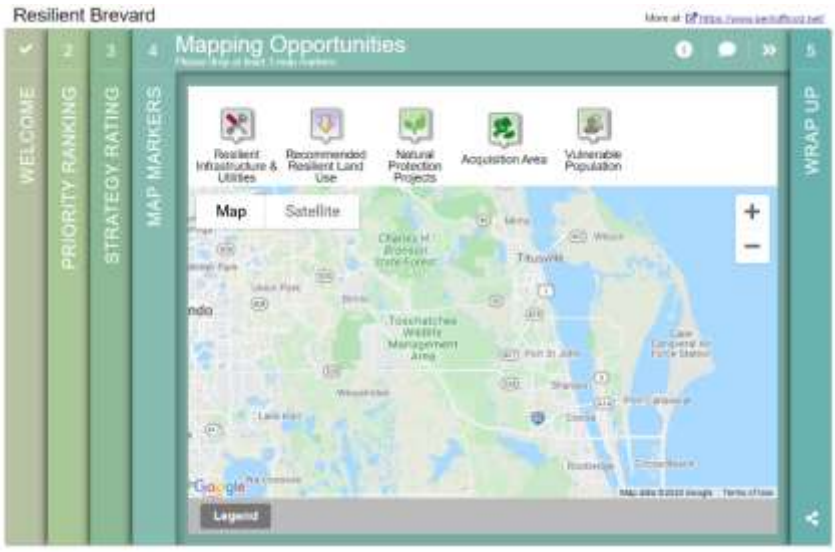
Given the focus of the Peril of Flood policies including developing engineering solutions to combat the risk and impact of flooding and sea level rise, the survey was sent directly to members of the engineering community to solicit more feedback on the 2nd round. In total, 758 people participated in the survey.

The Resilient Brevard Community survey consisted of five (5) screens providing respondents the opportunity to provide input across a range of items from quality of life to resilience strategies. The first screen focused on five (5) major "Quality of Life" objectives. Participants were able to rank their top three (3) out of the five (5) quality of life factors and were then able to provide feedback on a collection of potential strategies to support to those Quality-of-Life Factors.

Those factors are:

1. Public Health & Equity
2. Public Services & Safety
3. Economic Resiliency
4. Resilient Development
5. Resilient Nature Based Practices

The Community Survey provided participants the opportunity to rank potential strategies to preserve and protect Brevard County – strategies like green or nature-based improvements, fortifying critical facilities, and implementing land use policies to shift development out of high-hazard areas. Respondents were then provided the opportunity to indicate on a digital map of the County where they would apply recommended strategies to address vulnerabilities from their perspective and / or knowledge-base. A geodatabase of the mapping points is provided in a separate geodatabase for mapping and identification purposes.



The survey results from both periods of distribution were aggregated to provide an overall ranking of strategies and then their relative ranks against each other. As can be seen in the table below, "Resilient Nature-Based Practices was ranked the highest of the strategies and the most frequently. Following that, members of the community ranked Public Health & Equity highest 2nd and 3rd most frequently, with Resilient Development ranked 2nd the next most often. This gives an indication of the community's levels of concern and support for interventions in the quality-of-life factors in Brevard County.

Rank the Resilient Brevard Quality of Life Factors

Number of Responses by Selection

	Question	Ranked 1 (top)	Ranked 2	Ranked 3	Average
1	Public Health & Equity	112	168	166	2.12
2	Public Services & Safety	152	155	147	1.99
3	Resilient Nature Based Practices	282	124	123	1.70
4	Economic Resiliency	96	107	151	2.16
5	Resilient Development	95	175	137	2.10

Of the responses, Resilient Nature Based Practices received 2,145 responses; Public Health & Equity received 1,805 responses; and Public Services & Safety received 1,758 responses. Resilient Development received 1,593 responses, and Economic Resiliency finalized the list with 1,292 responses. A summary of the results is provided in the table below:

Strategies for a Resilient Brevard

Number of Responses per Category

	Category	Responses
1	Public Health & Equity	1805
2	Public Services & Safety	1758
3	Resilient Nature Based Practices	2145
4	Economic Resiliency	1292
5	Resilient Development	1593

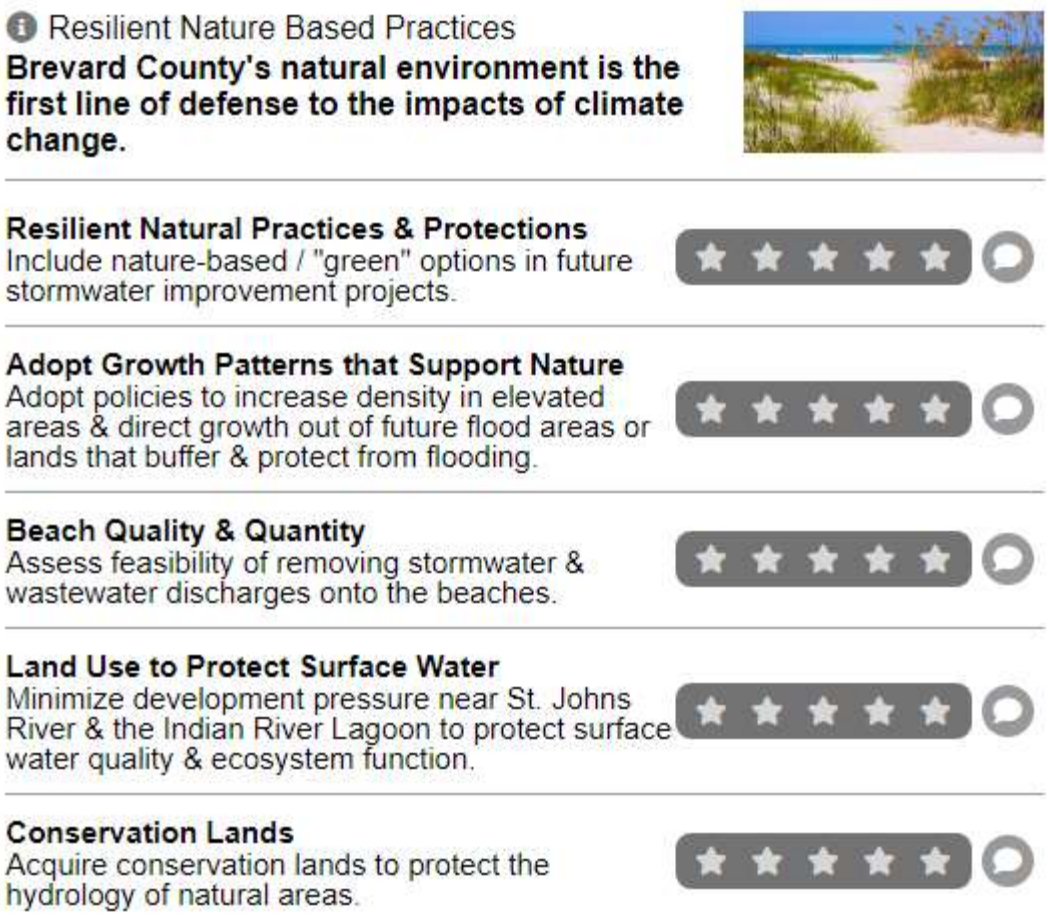
Resilient Nature Based Practices Major Objectives and Strategies

Five (5) strategies were provided under Resilient Nature Based Practices that could be first steps to increasing Brevard County's resiliency, but through more "green", "blue", and Low Impact Design-based infrastructure. These are man-made features that mimic the environmental services nature provides but with the purpose of minimizing the risk of flood, maintain and / or improve water quality, to break storm surge before it comes inland, and so forth. The rankings of the individual strategies was then used in the policy and further study recommendations.

Respondents were provided more information about Resilient Nature Based Practices on the screen via the following text:

> *Protecting the undeveloped natural environment from incompatible development & maximizing green infrastructure such as native vegetation, wetland restoration, & use of natural groundcover to facilitate water detention, absorption, & cleaning, as well as buffering during storm events.*

The strategies were explained in more detailed in the subsequent screen, and then respondents were asked to rank on a scale of 1 to 5 stars. If they had further comments, they were then asked to provide them in the comment bubble following the respective strategy (See image below).



The results of the ranking are provided in the table below:

Resilient Nature Based Practices

Number of Responses by Selection

	Question	1 Star	2 Stars	3 Stars	4 Stars	5 Stars	Average
1	Resilient Natural Practices & Protections	3	7	21	66	337	4.68
2	Adopt Growth Patterns that Support Nature	8	9	41	67	304	4.52
3	Beach Quality & Quantity	13	15	43	69	285	4.41
4	Land Use to Protect Surface Water	1	2	18	58	351	4.76
5	Conservation Lands	6	6	25	58	332	4.65

What this indicates is that the community supports land use strategies that protect surface water quality, such as the Indian River Lagoon, Banana River, and St. Johns River an average of 4.76 stars. Second to that, the community supports Resilient Natural Practices and Protections an average of 4.68 stars. The third highest ranked strategy is the acquisition and preservation of Conservation Lands.

Comments provided by the community are provided in full detail in Appendix **X**. Some comments are provided below as provided by the respective strategy.

Land Use to Protect Surface Water:

- *Tourists don't want to see dead dolphins and manatees washing ashore. Improving the lagoon is a must*
- *Create natural parks and other walk and bikeways with natural landscapes and projects that emphasize good land management practices.*
- *I think you should provide some education about what these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks*
- *Housing plots should be broken up more and growth areas kept between housing units and apartments. These are natural barriers and also help slow air and water flow during storms. These also reduce community stress by isolating the areas. Vegetation actually helps collect surface water during rains and as the morning dew covers the vegetation. giving it pathways to return and slowly drains the water down the stems.*
- *Clean drinking water for the entire county should be a number #1 priority.*
- *Lake Washington and our poisoned drinking water, specifically the 2019 issues with Chloramine, because of the amount of glysophate used along this and surrounding areas is evidence enough this is life and death urgency already...*

Resilient Natural Practices & Protections:

- *We should educate homeowners on creating rain gardens and natural retention areas in their yards and discourage grass-based landscapes that use water, pesticides and fertilizer. We should study what is being done in NC (https://www.nccoast.org/project/nbss/) and other coastal states.*
- *I think you should provide some education aboutwhat these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks*
- *Canals and Ditches need to be kept deep and cleaned out... this provides drainage to allow water to leave the areas quickly and keeps water from building up in areas. It also provides a habitat for the animals and places for the public to enjoy the waterways in our areas.*

- *There are so much good research on this LID, tree tracts et.c.*
- *Mandate LID*

Conservation Lands

- *Overdevelopment will accelerate the impact of climate change and destroy our greatest assets - the lagoon and beaches*
- *Protect the natural wetland areas, work with the Everglades restoration and St Johns management projects. Stop the use of biosolids on all farms and other properties in Brevard.*
- *I think you should provide some education aboutwhat these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks*
- *Conservation is important but it needs to include green corridors and a variety of land types and ecosystems, such as wetlands and uplands, fresh and brackish waterways, etc.*
- *We must have adequate recharge areas to protectour aquifer. If we don't have enough clean water, all of our best practices are moot.*

Adopt Growth Patterns that Support Nature

- *Protecting upland habitat is also important. We can't all live high and dry unless we also protect those areas for endangered species such as Scrub Jays and Gopher Tortoises.*
- *This needs more elaboration. Elevated areas also have significant importance for wildlife and water quality such as Scrub Habitat. I wouldn't agreewith further development on these highly endangered areas. Redevelopment is the way of the future sustainability. Using land that has already been developed on will ensure natural lands are kept protected for humans to enjoy, and wildlife to have a place to live.*
- *I support this when critically endangered upland habitat (Florida scrub) are protected. Avoiding wetland habitat and disturbing natural hydrologicpatterns is important to increase resiliency.*
- *Density should NOT be increased. We already have too many people living in too little space for the available resources.*
- *Reusing urban areas in need of redevlopment isalready developed is VERY inportant to sucessful resilience*
- *We need to STOP building in the county, period.Our leaders have rapes this county ans state to their own benefit for far to long. Enough!*

Beach Quality & Quantity

- *This is 10 stars to me. We have got to stop thepollution into our waters*
- *Stormwater systems need improvement to not be designed to dump directly into the rivers. Example: merritt island*
- *We put way too much money into constant beach restoration instead of understanding how to better work with the ocean!*
- *I think you should provide some education aboutwhat these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks*
- *Not sure what is meant by this: discharging onto the beach, or cleaning up after any inadvertant discharges?*

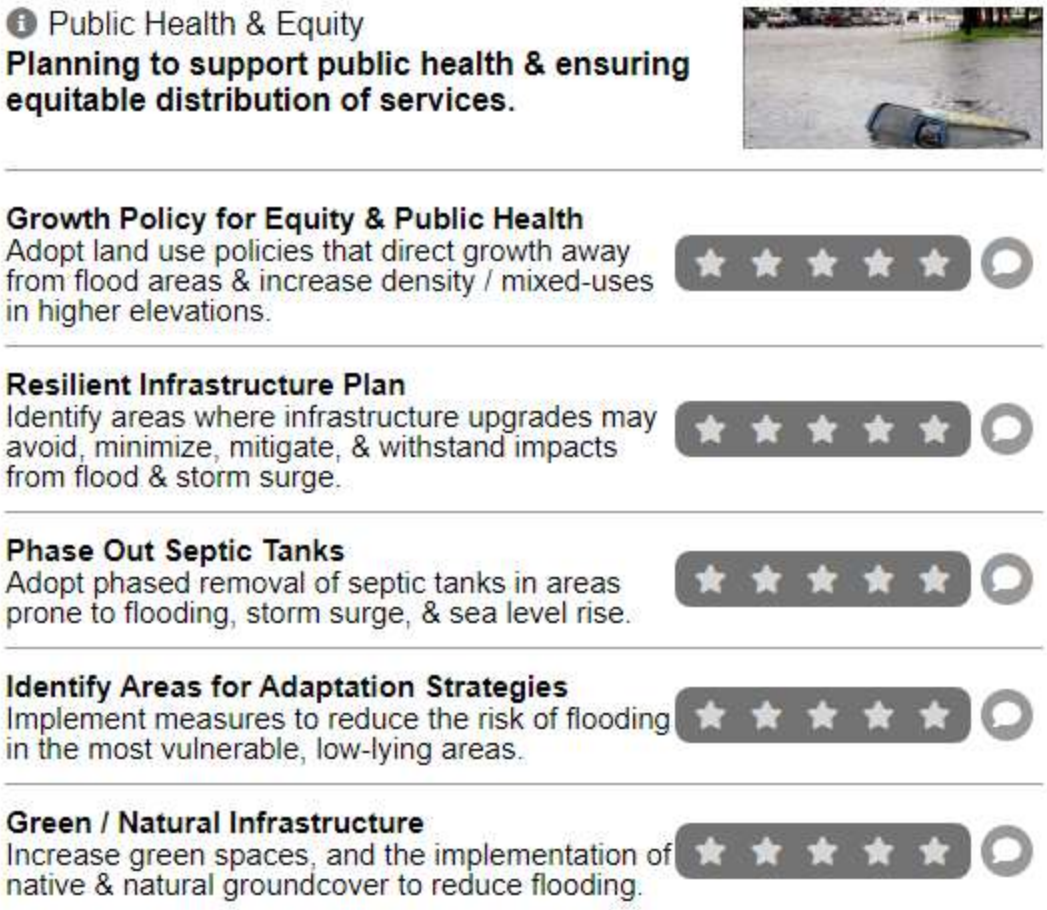
Public Health & Equity Major Objectives and Strategy Ranking

The 2nd highest ranked major objective and implementing strategies was Public Health and Equity. Five (5) strategies were then provided that could be first steps to increasing Brevard County's resiliency in the provision of public health and equity.

Respondents were provided more information about the objective of planning for Public Health & Equity on the screen via the following text:

> *Planning for the services & infrastructure to support public health & ensuring equitable distribution of services is a key concern with planning for a community to withstand the acute and long-term impacts of climate change.*

The strategies were explained in more detailed in the subsequent screen, and then respondents were asked to rank on a scale of 1 to 5 stars. If they had further comments, they were then asked to provide them in the comment bubble following the respective strategy (See image below).



The results of the rankings are provided in the table below:

Public Health & Equity
Number of Responses by Selection

	Question	1 Star	2 Stars	3 Stars	4 Stars	5 Stars	Average
1	Growth Policy for Equity & Public Health	5	10	52	95	198	4.31
2	Resilient Infrastructure Plan	3	9	41	103	205	4.38
3	Phase Out Septic Tanks	13	8	38	53	253	4.44
4	Identify Areas for Adaptation Strategies	9	15	64	87	180	4.17
5	Green / Natural Infrastructure	6	9	24	58	267	4.57

Overall, the respondents support the implementation of Green / Natural Infrastructure, averaging 4.57 stars, following by Phasing Out Septic Tanks in areas prone to flooding, storm surge, and sea level rise, averaging 4.44 stars. Then respondents ranked developing a Resilient Infrastructure plan, averaging 4.38 stars; Establishing Growth Policy for Equity & Public Health next, averaging 4.31 stars; followed by support for identifying areas for adaptation strategies 4.17 stars out of five (5).

What this indicates is strong support for implementing land use practices and design practices that support low impact and green infrastructure. Respondents provided more detailed comments, some of which are provided below.

Green / Natural Infrastructure

- *Green infrastructure reduces temperature and heat illness risks while reducing AC costs by 20%. Trees sequester cO2 and have been proven to reducecrime and increase property values. Give us more accessible parks in Cocoa, Titusville, Cape Canaveral.*
- *The current Best Managment Practices that business owners should be following are not monitored. There is no benefit for the business owner. Create tax incentives or some other means to reward the business or homeowner. City, county and stateregulations should all be equal in expectations.*
- *Is there any guidance for lawn maintenance andless harmful fertilizers for individuals or HOAs over 55 communities using professional lawn care services?*
- *Green area isour strongest link. And definitely needs measures if extended procreation."*
- *This is critical! Including NOT replacing structures that have been razed, but instead turning them into green spaces (e.g. the corner of MinutemanCswy and northbound A1A where the Surf stood). Restoring native and natural groundcover and shoreline foliage are essential for our beachside ecosystems.*

Phase Out Septic Tanks

- *This will have a huge impact on lagoon health and better tourism*
- *And quit allowing any new construction with septic!*
- *Yes, inspections were overturned in 2010. Tenyears later we reap lower h20 quality and brown algal blooms. New development should not be incurring with Septic tanks.*
- *Easier to require on new construction. Owners may accept if at no cost to them.May have exceptions where City or County water unavailable or impractical.*
- *We have been beating this dead horse for too long. No more septic tanks...and remove those that exist NOW....been paying the sales tax and don't see a return on my investment as a citizen or business owner.*
- *Would there be a plan to help low income homeowners, senior citizen for instance, to help them connect to the community's systems. I know I couldn't afford the removal of my system, nor pay to become part of the sewerage system.*
- *We should extend sewer lines and eliminate theuse of septic tanks*

Resilient Infrastructure Plan

- *"Provide and develop greenways and/or complete streets along transportation corridors to Jax, and Miami.*
- *Limit development along Banana River and Indian River. Install sewer systems for the county. Replace above ground utilities with underground to allow planting of trees. Develop School gardens for their community neighbors."*
- *Demand that beach condos install sea walls a yard higher than their base land, then cover the walls with green dunes.*
- *Going to have to let some of it flood...too much development in low areas...and headlands for the St. Johns already*
- *Again, basic education of what this concept isand that it is reality, as development speeds along, especially on the barrier island. This survey and glossary are great tools to help advance this.*

Growth Policy for Equity & Public Health

- *Protect wetlands and flood areas by creating buffers. Add buffers to the development permitting process.*
- *Again, only create higher density areas in moreelevated areas when critically endangered upland habitat (Florida scrub) is protected. Redevelopment of areas in high elevation that are already disturbed should be targeted for future development for high density.*
- *Also policies that direct less growth and support more green areas no matter of the elevation.*
- *I am grateful to see this in practice - it needs to be maintained.*
- *Southern Brevard needs an area where people canlive, work, and shop without having to get in a car. We need more single story townhouses for the elderly. We need zero lot housing developments that aren't solely for the impoverished. I would loveto take my bike from my home to a grocery store without having to bike for miles along busy roads. Or live a few doors down from a diner or coffee shop. Have a public community center nearby.*

Identify Areas for Adaptation Strategies

- *Children are the most vulnerable to heat, pollutant, flood stress exposures to mold and waterborne pathogens. African American populations are morelikely to receive late or no health care or be in communities vulnerable and without disaster insurance to adverse economic impacts of algal blooms, drought, flood, and mental health impacts of heatstresses. Identify with maps areas with low income and youth populations and change behaviors in these vectors.*
- *Identify flood risk areas that need to be purchased and turned into natural states that protect from erosion and flooding. Relocate buildings in flood risk areas.*

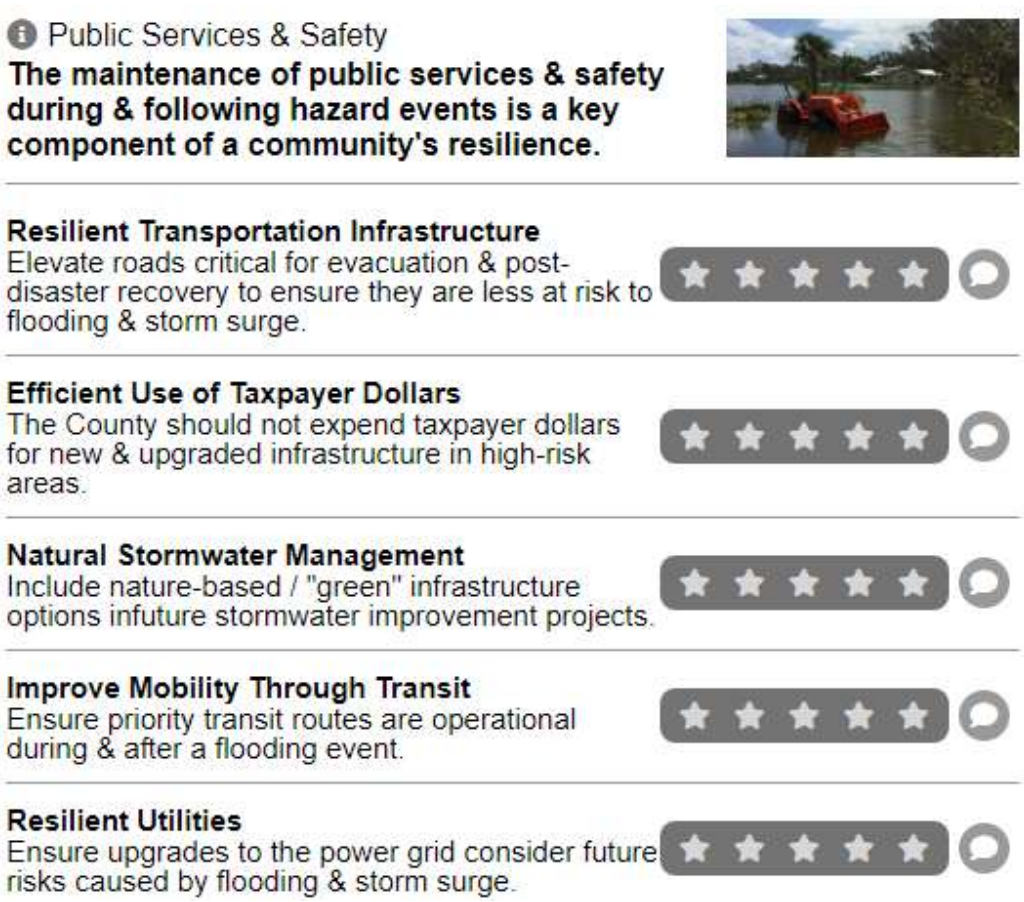
- *At some point low lying areas will not continueto benefit from measures to reduce flooding. Dollars spent to maintain something that sea level rise will continue to encroach is not sustainable.*
- *Flooding needs to happen periodically so low lying areas and flood plains should not be developed. Fighting nature is expensive!*
- *These areas have been identified for decades but we just continue to bring in fill and elevate causing once reasonable land to flood. Too much developement.*

Public Services & Safety Major Objectives and Strategy Ranking

The third highest ranked major objective and series of strategies was Public Services & Safety. Respondents were provided more information about the objective of planning for Public Services & Safety on the screen via the following text:

> *Ensure the delivery of public services such as clean water, open roads, power, etc, & their provision during & outside of climate events*

As noted to the public in the survey screen for the recommended strategies, "The maintenance of public services & safety during & following hazard events is a key component of a community's resilience." The recommended strategies are reflected in the image of the survey screen, below.



Respondents then ranked each strategy using the 1 – 5 star scale, and then provided their own feedback and comments. The results of the ranking are provided in the table below:

Public Services & Safety
Number of Responses by Selection

	Question	1 Star	2 Stars	3 Stars	4 Stars	5 Stars	Average
1	Resilient Transportation Infrastructure	13	16	59	93	173	4.12
2	Efficient Use of Taxpayer Dollars	49	35	84	39	139	3.53
3	Natural Stormwater Management	9	17	38	95	194	4.27
4	Improve Mobility Through Transit	16	12	66	93	163	4.07
5	Resilient Utilities	6	4	21	68	256	4.59

Of the five (5) strategies provided to implement the provision of Public Services and Safety, respondents ranked implementing Resilient Utilities the highest with an average of 4.59 stars, followed by the implementation of Natural Stormwater Management practices, averaging 4.27 stars, and then by implementation of Resilient Transportation Infrastructure, averaging 4.12 stars. The lowest two (2) strategies ranked 4.07 stars for

Improving Mobility Through Transit, and then 3.53 stars for Efficient Use of Taxpayer Dollars by not expending taxpayer dollars for new and upgraded infrastructure in high-risk areas.

A shortened list of direct comments regarding each strategy are provided below with the entire list of comments provided in the Appendix of this report.

Resilient Utilities

- *Use on-site power options like solar for areaswhere storms can disconnect areas from the main grid.*
- *This must be a driving factor as Brevard's new WISER Board identifies and recommends the first sites for the transition to renewables...*
- *After seeing how inadequate wind and solar power are in harsh conditions, I would strongly support upgrades using traditional means, e.g. hydro, oil, natural gas.*
- *"no question utilities are a priority. we shoulddo whatever it takes to minimize any power grid interruptions.*
- *Lives are at stake relating to ourpower sources lighting, heating, cooling, medical, food safety. Our standard of living would be in jeoparty"*

Natural Stormwater Management

- *Make Green Stormwater practices mandatory for the health and protection of people and the Economy.*
- *Yes, but inventive based.*
- *We have to mitigate added nutrients to the lagoon and Lake Washington through all means available.*
- *How can that be achieved in densely populated areas? Anything we can do that compliments nature with stormwater management is a plus. create retention overflow ponds, encourage nature to create a wetland. We destroyed the true Florida ecosystems back in 1900 for greed and riches. Like the everglades take it slow with development allowing natureto work side by side.*

Resilient Transportation Infrastructure

- *Not sure what is intended by "elevate" - could be entirely cost prohibitive.*
- *Create more bridges over historic and current wetlands that are cut off by current roads to allow water to flow.*
- *Due to projected sea level rise, any roads thatwill be at or below water level within 30 years should be ignored.*
- *Proactive planned evacuation does not require elevate roads.*

- *developments should be built after the roads, sewers, water lines, gas lines, have been completed anticipating the needs of the new development. Texas is a good example of not building your infrastructure suffiiecnt to the needs*

Improving Mobility Through Transit

- *There needs to be a paradigm shift to promote and incentivize higher densities for mobility through transit to be improved and efficient.*
- *Buses or public transport*
- *as climates change, cities will have to changeor relocate. I would recommend planning on a 10 - 20 - 30 - 50 year cycle updating the items that will need to be addressed every 5 years.*

Efficient Use of Taxpayer Dollars

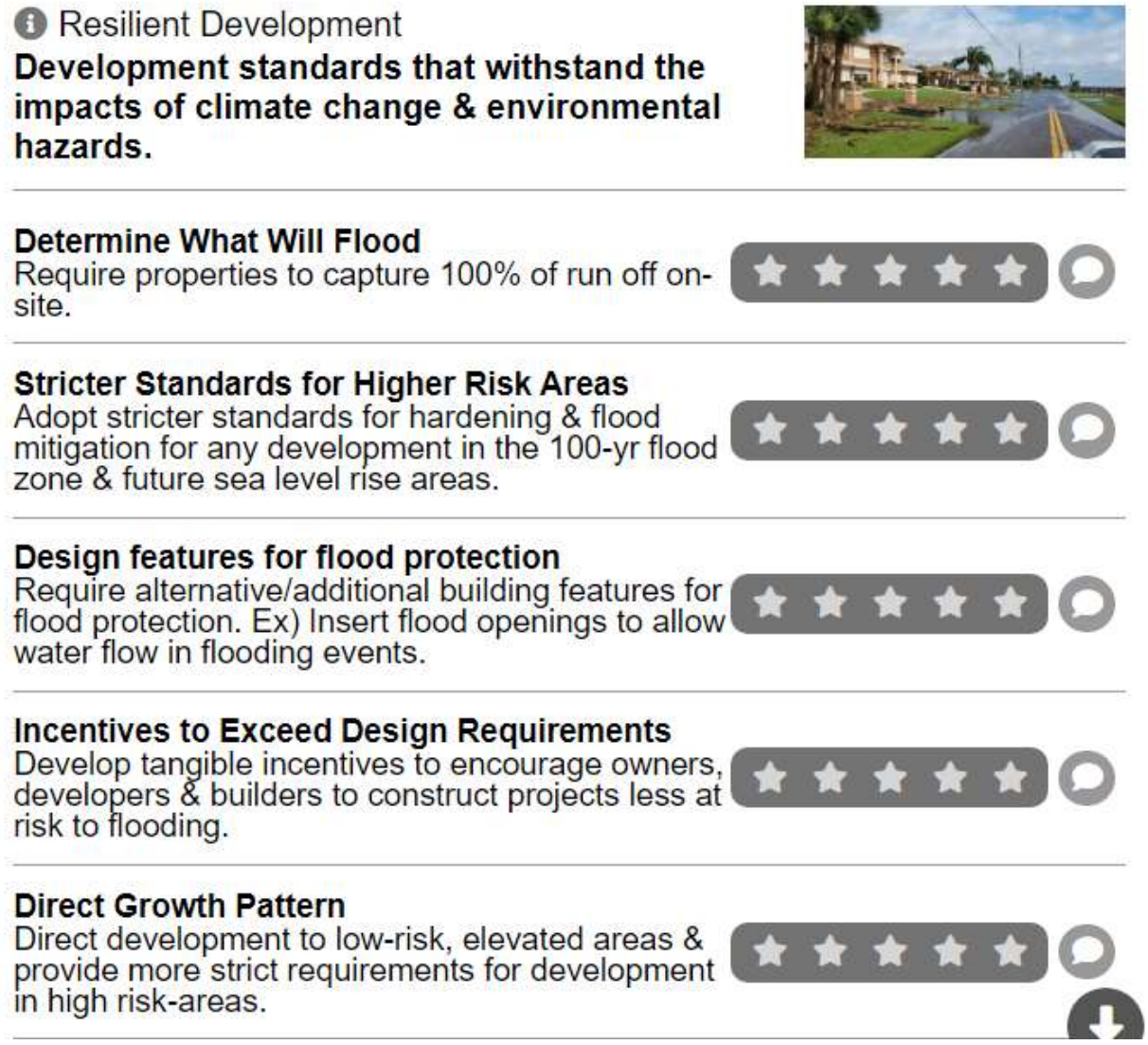
- *Taxpayer dollars should be used to invest in resilient infrastructure in high-risk areas for current residents and businesses, but investment may be limited based on a matching criterion or other economic savings.*
- *If new & upgraded infrastructure in high-risk areas are NEEDED and there are no other funds availiable, then wouldn't taxpayer dollers NEED to be used?*
- *Phasing out septic systems with well-functioning sewer and waste treatment systems (that do not impact our beaches, rivers, or drinking wells) should be a priority.*
- *Maintenance for existing use and current residents, planned with the reality of minimal decades of use even possible in these most vulnerable areas.*
- *If retreat is inevitable, we must spend on themountain not the valley. Development in less vulnerable areas should be encouraged.*

Resilient Development Major Objectives and Strategy Ranking

The fourth highest ranked major objective and series of strategies was Resilient Development. Respondents were provided more information about the objective of planning for Resilient Development on the screen via the following text:

> *Development that minimizes or withstands the risk from the impacts of climate change, sea level rise, flooding, coastal erosion, and storm surge.*

The strategies the community were asked to rank and comment on are intended to make Brevard more resilient through design that standards that are able to withstand the impacts of climate change and environmental hazards. The respective strategies are provided in the screen image below.



The results of ranking each strategy on a 1 to 5-star scale are provided in the table below:

Resilient Development
Number of Responses by Selection

	Question	1 Star	2 Stars	3 Stars	4 Stars	5 Stars	Average
1	Determine What Will Flood	28	20	62	83	123	3.80
2	Stricter Standards for Higher Risk Areas	12	10	38	83	178	4.26
3	Design features for flood protection	15	14	55	106	128	4.00
4	Incentives to Exceed Design Requirements	10	8	42	80	178	4.28
5	Direct Growth Pattern	6	6	36	63	209	4.45

Those that responded ranked Direct Growth Patterns an average of 4.45 out of five (5) stars, followed by Incentives to Exceed Design Requirements, averaged at 4.28 stars, and

then Stricter Standards for Higher Risk Areas very closely behind that with 4.26 average stars. Respondents ranked Design Features for Flood Protection an average of 4.00 stars. The lowest, though still mid-range average ranked strategy is supporting Determine What Will Flood, averaged at 3.80 stars.

A shortened list of direct comments regarding each strategy are provided below with the entire list of comments provided in the Appendix of this report.

Direct Growth Patterns

- *Sounds good but the devil is in the details asinevitably there may unintended consequences.*
- *Does this mean land that is natural is rezonedto development. At some point growth needs to slow until infrastructure has caught up to meet current demands. Our natural water source is in danger.*
- *We need more redevelopment , not new development!*
- *How about no development in high risk area....*
- *And reduce density and capacity limits for high-risk areas.*
- *Save more land for our future*

Incentives to Exceed Design Requirements

- *Why not just change the design requirements?*
- *Forget incentives, REQUIRE it!*
- *Yes, incentives are the key*
- *Sounds great. But would these "incentives" bepositive or negative (i.e., punitive)? Are you attempting to fool us?*

Stricter Standards for Higher Risk Areas

- *Sounds good in theory, but how much stricter should these standards be? Will they be economically feasible? Can they be enforced "gracefully," orwould you like to throw government weight around?*
- *We need to get out of these areas. The fact that Titusville is focusing CRA dollars on the downtown is not logical. It is a a very vulnerable area. The benefits to this area does not out weigh the risks.*
- *Again, redevelope urban ares-- they ARE high and dry*
- *Again, we cannot realistically achieve these goals. Restricting development will be less costly in the long run.*
- *The 100 year flood zone is for rare events. Much more practical would be 50 year flood zone.*

Determine What Will Flood

- *There can be more comprehensive approaches thatentail stormwater systems that extend outside a specific property's boundary but adequately manage drainage within an overall basin.*
- *Require? You mean, order me to build a dike? Ifthis seems like a foolish statement, it is no more so than this question. What kinds of properties,and what kinds of requirements?*
- *Capturing 100% may be difficult. One way or another the captured water will infiltrate or runoff to some watershed. Implementation of rain gardenswould put less pressure on residents to capture 100% of rain and allow for the slow infiltration ofstorm water runoff from overwhelming infrastructure. A mix of rain barrels, rain gardens, adoption of native vegetation replacing sod, and strict irrigation usage will greatly enhance the water quality of Brevard County.*
- *In a perfect world this would a benefit to ourwaterways and natural springs. I think city, county and state infrastructure should be institutingthis now. Money spent on beach re nourishment is an example of a continuous battle to stop sea level rise while causing damage to our natural environment. Money should be spent on relocation incentives.*
- *Sounds unrealistic . Easier to have best practices on new construction*

Design Features for Flood Protection

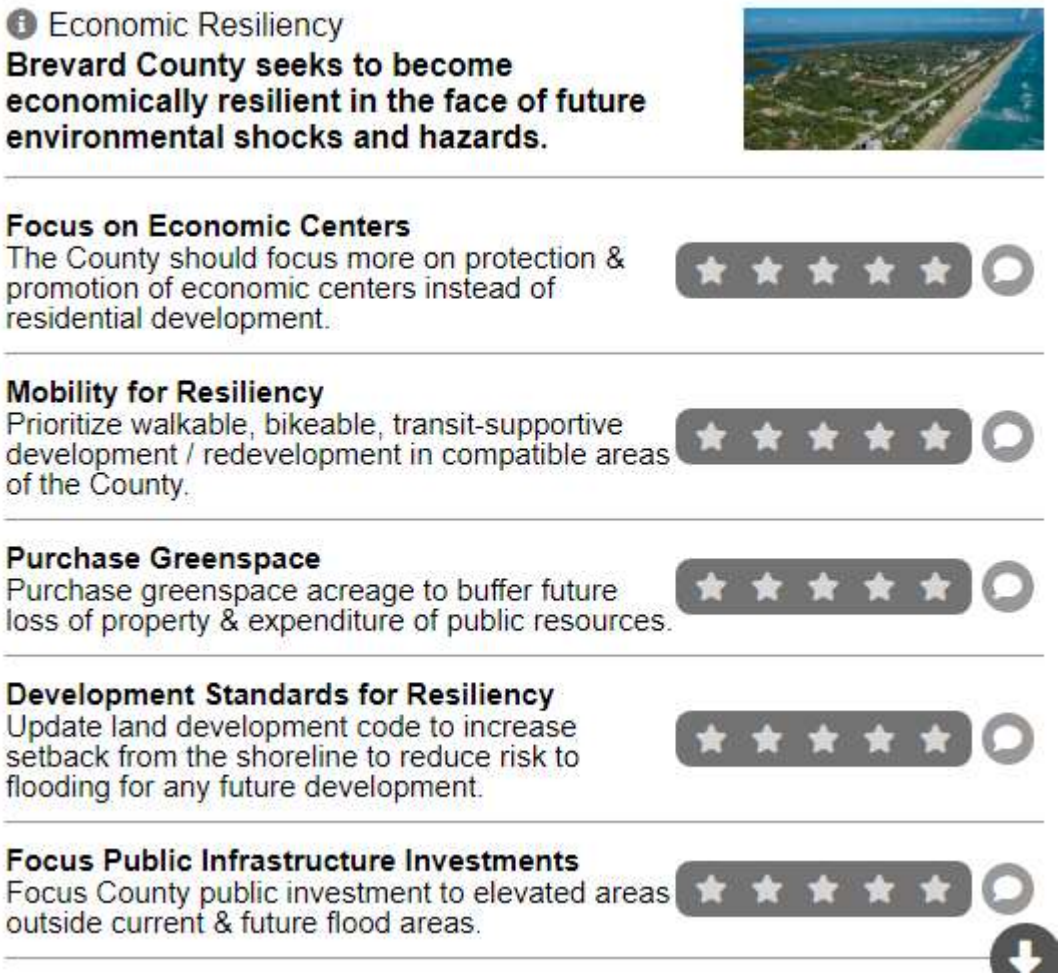
- *We have to stop building in these vulnerable areas.*
- *Increasing capacity to move volume downstream create and amplifies quantity management issues in downstream areas. This would need to be done selectively and cautiously.*
- *Maybe. Still think it's wiser to not have development there in the first place.*
- *Build reservoirs to prevent Crane Creek (Canal)from flooding downstream of airport and industrial areas on West Nasa Blvd., Evans, Hibiscus, etc.(Grumman, Harris, Collins, and others).*
- *I wish that the county could effectively correct the drainage issues in my neighborhood of Dalehurst Ranches. They have been wasting my taxpayer dollars for the past 1 1/2 years, and doing an incredibly bad job of it. So bad of a job that they nowhave returned to re-do a job they did poorly a year ago. I'm outraged as a taxpayer about this. Andon my street, it would simply take requiring one homeowner to replace their two crushed driveway pipes.*

Economic Resiliency Major Objectives and Strategy Ranking

A key objective of environmental resiliency is also to protect the economic resiliency of the community. The US Economic Development Agency defines economic resilience in terms of primary attributes, noted below

> "...economic resilience becomes inclusive of 3 primary attributes: the ability to recover quickly from a shock, the ability to withstand a shock; and the ability to avoid a shock all together." Brevard County seeks to become economically resilient in the face of future environmental shocks related to the effects of climate change.

With the objective of supporting and building the attributes of economic resilience through resilience to current and future environmental shocks and hazards in Brevard County, the community was asked for their feedback and commentary on five (5) implementing strategies. Those strategies are noted in the screen below:



The community was then provided the opportunity to rank each of these strategies on a 1 – 5 star scale. The results of those rankings are provided in the table below:

Economic Resiliency
Number of Responses by Selection

	Question	1 Star	2 Stars	3 Stars	4 Stars	5 Stars	Average
1	Focus on Economic Centers	16	22	83	62	74	3.61
2	Mobility for Resiliency	16	11	42	83	109	3.99
3	Purchase Greenspace	17	19	45	48	128	3.98
4	Development Standards for Resiliency	12	14	41	68	127	4.08
5	Focus Public Infrastructure Investments	15	13	68	63	96	3.83

What can be seen is that, overall, the community ranked these strategies lower than the previous quality of life objectives and strategies with only one strategy, Development Standards for Resiliency ranking above an average of four (4) stars at 4.08. The other strategies are close behind, but under four (4) stars. The second highest ranked strategy, implementing Mobility strategies for Resiliency, ranked an average of 3.99 stars, followed by Purchasing Greenspace, at 3.98 average stars, and then Focusing on Public Infrastructure Investments at 3.83 average stars. The lowest ranked strategy is Focusing on Economic Centers at an average of 3.61 stars out of five (5).

A shortened list of direct comments regarding each strategy are provided below with the entire list of comments provided in the Appendix of this report. It should be noted that this section had the fewest comments as well. One reason for the lower participation in this factor is that more community education on the topic and its importance is required.

<u>Development Standards for Resiliency</u>

- *This will preserve the spaces that drive tourism and economy*
- *And require best natural shoreline practices toreduce erosion and flooding.*
- *There are other approaches that should be explored that do not sacrifice the ability to development such lands in a responsible a s resilient manner.*
- *Gotta have figures how this will save money.*
- *I agree with this concept; however, how much ofour shoreline is currently undeveloped?*
- *Flooding is dependent on elevation not distance*

<u>Mobility for Resiliency</u>

- *Yes, but this will necessitate embracing and incentivizing higher density development for mobility to truly be efficient, sustainable and resilient.*
- *Need bike and walking access on major roads*

<u>Purchasing Greenspace</u>

- *If purchase occurs within Brevard*

- *Viera has been a model of this approach with the significant environmental set asides in perpetuity with a dedicated funding source for ongoing maintenance.*

Focusing on Public Infrastructure

- *This is a laudable strategy but is should be accompanied by incentives in places already designated for future development.*
- *This is not a feasible proposal. Eliminating public investment to non-flooding areas will place additional lives and properties at risk and will limit responses in emergency situations.*
- *Community growth vision should focus on conservation - clusters - corridors and countryside*

Focusing on Economic Centers

- *No, these are not mutually exclusive - to approach it in such a fashion is naive. The County needs to focus on growth and of both residential development and economic centers to support resiliency of each.*
- *Anything other than development is good. Density increases should have stricter guidelines. It is too easy to increase density on parcels and thushave High impact development in Brevard County*

III. APPENDIX I: PRESENTATIONS FROM COMMUNITY WORKSHOP #1, REGISTRANTS, & CHAT COMMENTARY

RESILIENT BREVARD

YOU CAN HELP BREVARD COUNTY BECOME MORE RESILIENT TO FLOODING & IMPACTS OF NATURAL HAZARDS

COMMUNITY MEETING #1
FEBRUARY 8, 2021
6:00 PM TO 7:30 PM

Brevard County

Florida Department of Environmental Protection

East Central Florida Regional Planning Council est.1962

Sea Grant Florida

RWParkinson Consulting, Inc.

www.perilofflood.net/resilient-brevard

HOUSEKEEPING

- Please keep your lines muted.
- Put questions & comments in the chat.
- There will a period for comments & questions following presentations.
- This meeting is being recorded.
- The meeting recording & a transcript of questions, comments, & responses will be provided on the project website at:

www.perilofflood.net/resilient-brevard

Lamentamos tener la presentación disponible sólo en inglés en estos momentos. Si prefiere comunicarse en español, por favor, escriba sus preguntas o comentarios con relación al proyecto en el chat de la reunión.

Estos serán incluidos junto con las respectivas respuestas en la página web del proyecto. También puede enviarnos un correo electrónico a resilientbrevard@ecfrpc.org o dejar un mensaje en el número telefónico (407) 245-0300. Un miembro del equipo le responderá en español.

PROJECT OVERVIEW

- Florida Department of Environmental Protection (FDEP) Grant Program
- Project initiated: July 1, 2020
- Project end: April 30, 2021

AGENDA

- Policy Opportunities
- Project Overview
- Vulnerability Analysis Preliminary Findings
- Regional Interconnectedness – Indian River Lagoon Action Plan
- Next Steps
- Comments

WHAT IS RESILIENCE?

The capacity of individuals, communities, institutions, businesses, and systems within a region to plan, sustain, adapt, recover, improve & grow collaboratively through specific actions and implementation strategies geared to address specific vulnerabilities.

east central florida
REGIONAL RESILIENCY ACTION PLAN

Resilience and Sea-Level Rise: The Challenging Road Ahead

Thomas Ruppert, Esq.
Florida Sea Grant Coastal Planning Specialist

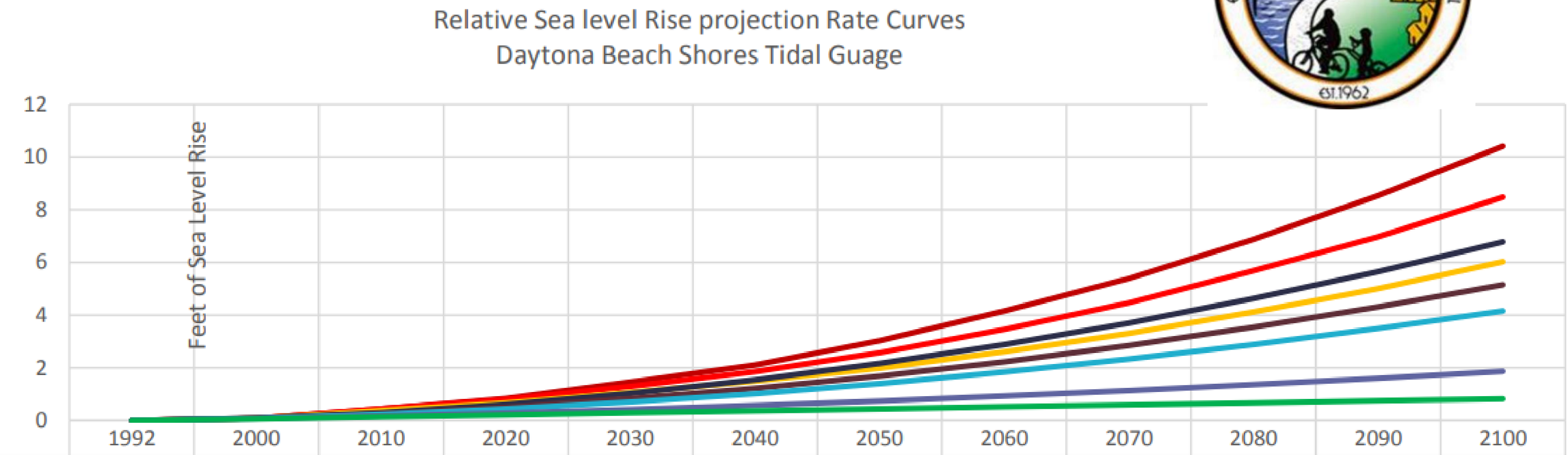
Florida Sea Grant College Program

Sea Grant Florida

Overview

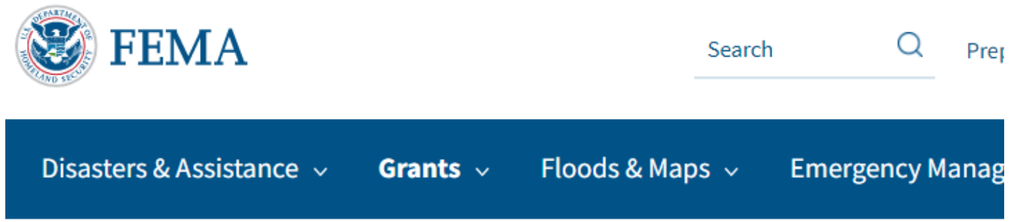
- Bad news and good news
- Examples from other local governments
  - Miami Beach
  - Monroe County
  - Pinellas County
  - Satellite Beach
  - Fort Lauderdale
  - Pensacola

The Bad News: SLR



	1992	2000	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
NOAA2017	0	0.08	0.44	0.83	1.46	2.11	3.03	4.15	5.39	6.87	8.54	10.41
NOAA 2017	0	0.08	0.44	0.8	1.29	1.85	2.57	3.46	4.47	5.69	6.97	8.48
NOAA2017	0	0.08	0.38	0.67	1.06	1.49	1.98	2.61	3.3	4.12	5	6.02
NOAA 2012	0	0.09	0.3	0.61	1.03	1.54	2.16	2.88	3.7	4.63	5.65	6.78
USACE 2013	0	0.09	0.26	0.5	0.83	1.22	1.69	2.23	2.85	3.54	4.31	5.15
NOAA 2012	0	0.08	0.23	0.44	0.7	1.02	1.4	1.84	2.33	2.88	3.49	4.16
USACE 2013 Int	0	0.07	0.17	0.28	0.42	0.57	0.74	0.93	1.14	1.36	1.6	1.86
USACE Low	0	0.06	0.14	0.21	0.29	0.37	0.44	0.52	0.59	0.67	0.75	0.82

The Good News



Building Resilient Infrastructure and Communities (BRIC)

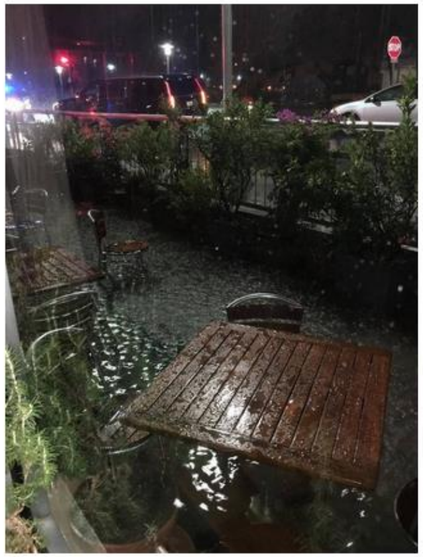
Gov. DeSantis announces $75m to bolster Florida's resilience to future storms
WTXL
Governor Ron DeSantis announced Wednesday that $75 million has been awarded to 30 communities through the Florida Department of Economic Opportunity's Rebuild Florida

- Funding
  - Increased state funding already happening; DeSantis proposing $1 billion.
  - Likely increases in federal support and funding as well.
- Examples from other local gov't's in Florida

Miami Beach

MIAMI BEACH NOVEMBER 16, 2016 7:37 PM

Flood claim denied for restaurant turned 'basement' after Miami Beach raised street



During a heavy rainstorm on the night of Oct. 3, the sidewalk outside Sardinia Enoteca Ristorante in Miami Beach flooded, spilling water into the business after the city failed to turn on nearby stormwater pumps. Sardinia Enoteca Ristorante

MIAMI BEACH JANUARY 28, 2017 7:00 AM

Miami Beach to begin new $100 million flood prevention project in face of sea level rise

Monroe County

The New York Times

Florida Keys Deliver a Hard Message: As Seas Rise, Some Places Can't Be Saved

Photo: Joe Raedle/Getty Images

This Florida Keys Neighborhood Has Been Flooded For Nearly 3 Months

npr

By **Greg Allen**
Published November 28, 2019 at 7:12 AM EST

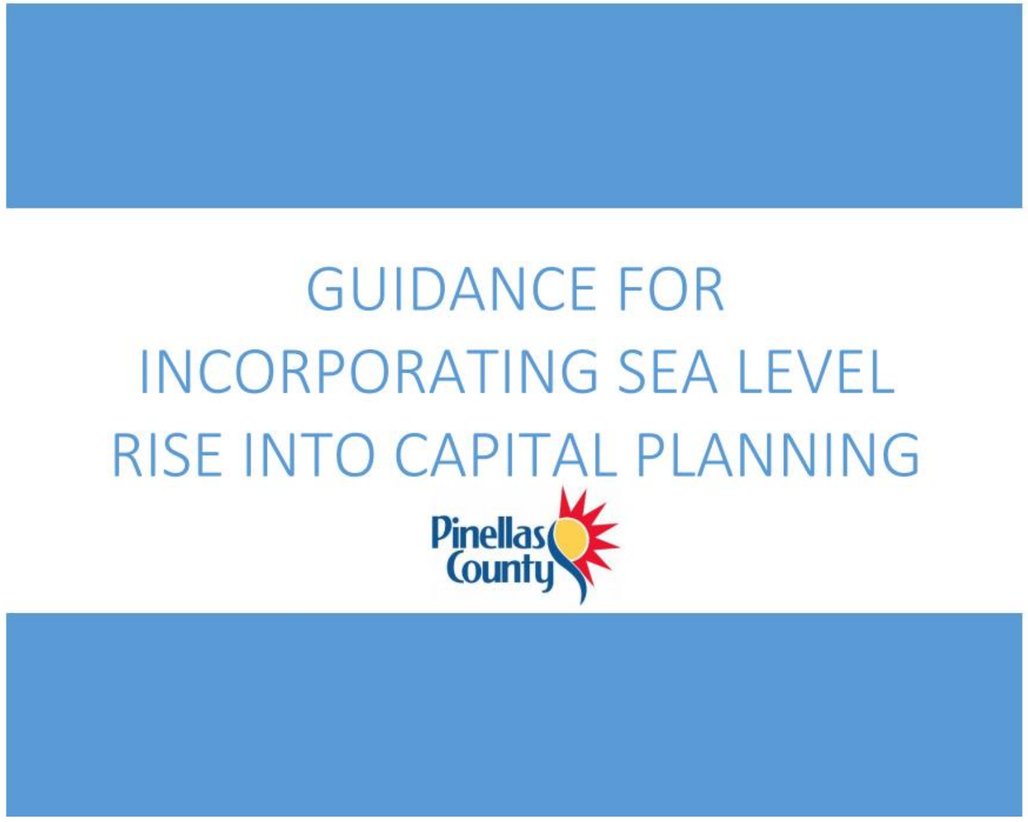
GREENKEYS!
A PLAN TO CREATE A SUSTAINABLE FLORIDA KEYS

MONROE COUNTY
SUSTAINABILITY & CLIMATE CHANGE

HOME | EXECUTIVE SUMMARY | INTRO POLICY OUTREACH | FOCUS AREAS RECOMMENDATIONS | IMPLEMENTATION STRATEGY

Pinellas County

Pinellas County requires a minimum tailwater elevation of 3.0 ft for non-critical infrastructure and 4.0 ft for critical infrastructure. Applicants may propose to utilize alternative tailwater elevations due to site specific constraints but should take into account current and future conditions at the receiving water.



CITY OF SATELLITE BEACH

THE INSTITUTE FOR WATER AND ENVIRONMENTAL RESILIENCE
STETSON UNIVERSITY

Sea Grant Florida

CITY OF SATELLITE BEACH:
POLICY RECOMMENDATIONS FOR RESILIENCY

Thomas Ruppert, Esq.
Erin Deady, AICP, Esq., LEED AP

APRIL 2019

Satellite Beach

- Do not accept infrastr. dedications
- Limit duties on existing infrastr.
- Consider “notice” for permit applicants

Fort Lauderdale

CITY OF FORT LAUDERDALE

All-America City

Memorandum

Memorandum No: 17-016

Date: January 26, 2017

To: Honorable Mayor and Commissioners

From: Lee R. Feldman, ICMA-CM, City Manager

Re: Enforcement of the City's Seawall Ordinance - ULDR Section 47-19.3

As you are aware, the City of Fort Lauderdale adopted amendments to ULDR Section 47-19.3 on June 21, 2016 (CAM #16-0662) to establish construction standards that ensured seawalls and similar structures contributed to coastal resilience and mitigated the effects of tidal flooding and sea level rise. The ordinance included two provisions under which a property owner may receive a code violation:

1. Failing to maintain a seawalls in good repair and setting a timeline of 365 days for completion of repairs if cited; and
2. Requiring owners to prevent tidal waters entering their property from impacting others properties or the public right of way and setting a timeline of 365 days for remedy if cited.

Pensacola

Climate Action Recommendations

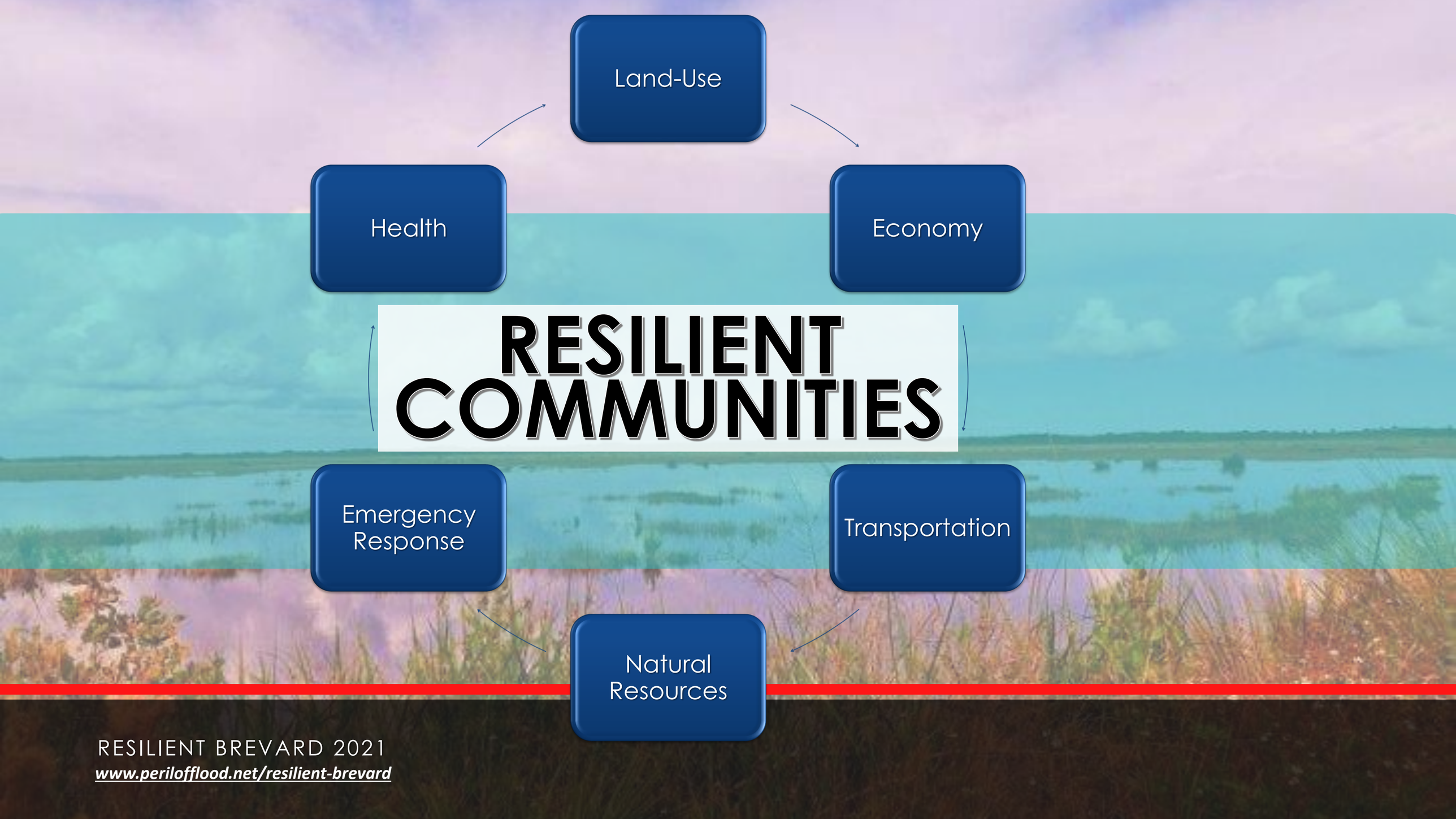
A Blueprint for Addressing Climate Change at the Municipal Level

pensacola news journal

Pensacola awarded $75,000 grant to study impact of sea level rise on city

Jim Little Pensacola News Journal

Published 2:43 p.m. CT Jul. 27, 2020 | **Updated 5:01 p.m. CT Jul. 27, 2020**



RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

PERIL OF FLOOD

- Signed into law in 2015: Section 163.3178(2)(f)1, Florida Statutes
- **Development and redevelopment principles** & strategies, that reduce the flood risk in coastal areas from **high-tide events, storm surge, flash floods, stormwater runoff, & the related impacts of sea-level rise.**
- Best practices
- Site development techniques

FOR MORE INFORMATION ABOUT PERIL OF FLOOD:
www.perilofflood.net/

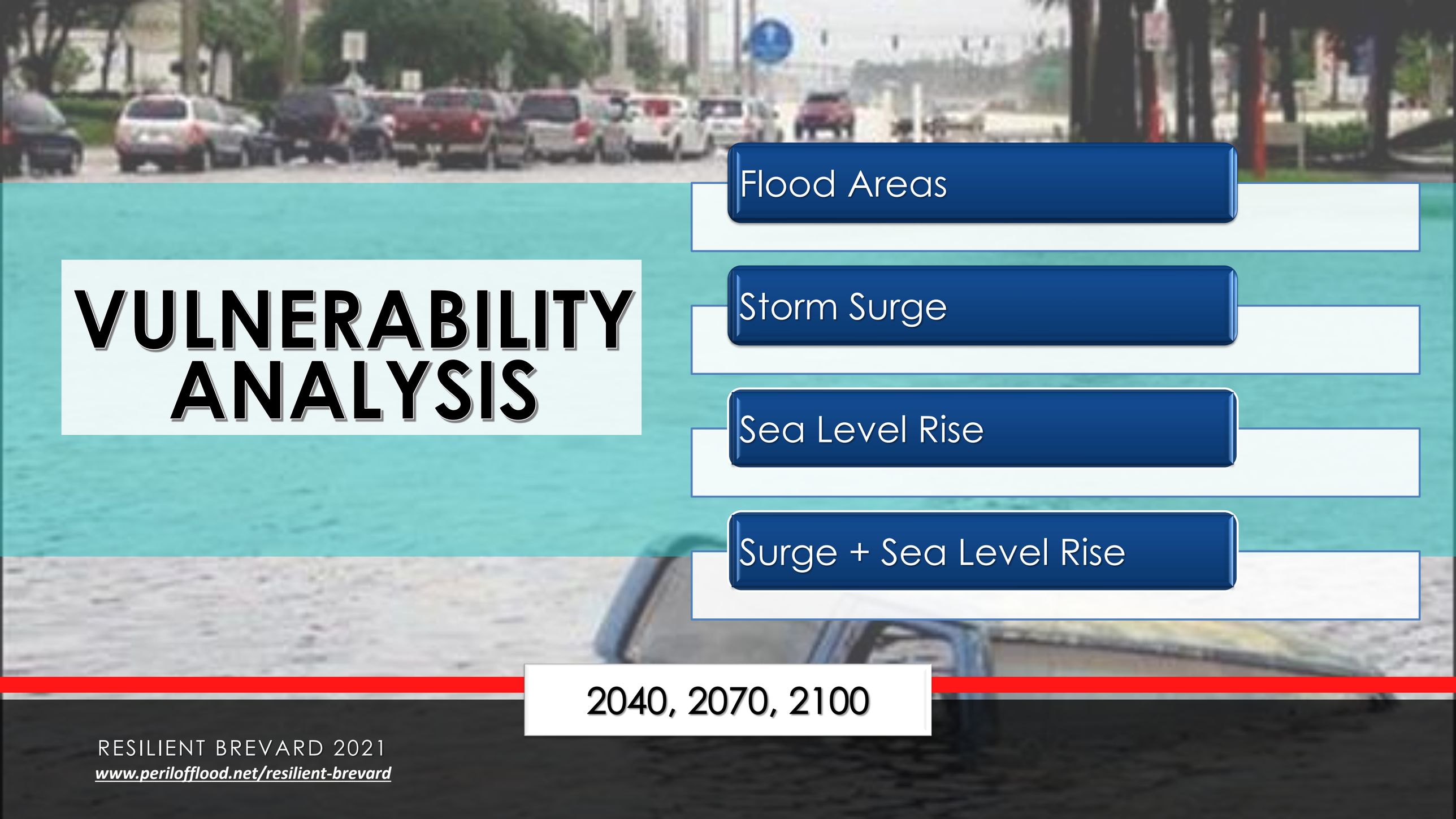
WHAT IT MEANS FOR BREVARD

Opportunity for Brevard County to identify approaches to adapt, avoid & recover from the impacts of natural hazards while also positioning the County to take advantage of potential economic prosperity opportunities.

RESILIENT BREVARD PROJECT TASKS

What Are We Planning For?

Total Water Level Approach



VULNERABILITY ANALYSIS

- Flood Areas
- Storm Surge
- Sea Level Rise
- Surge + Sea Level Rise

2040, 2070, 2100

RESILIENT BREVARD 2021

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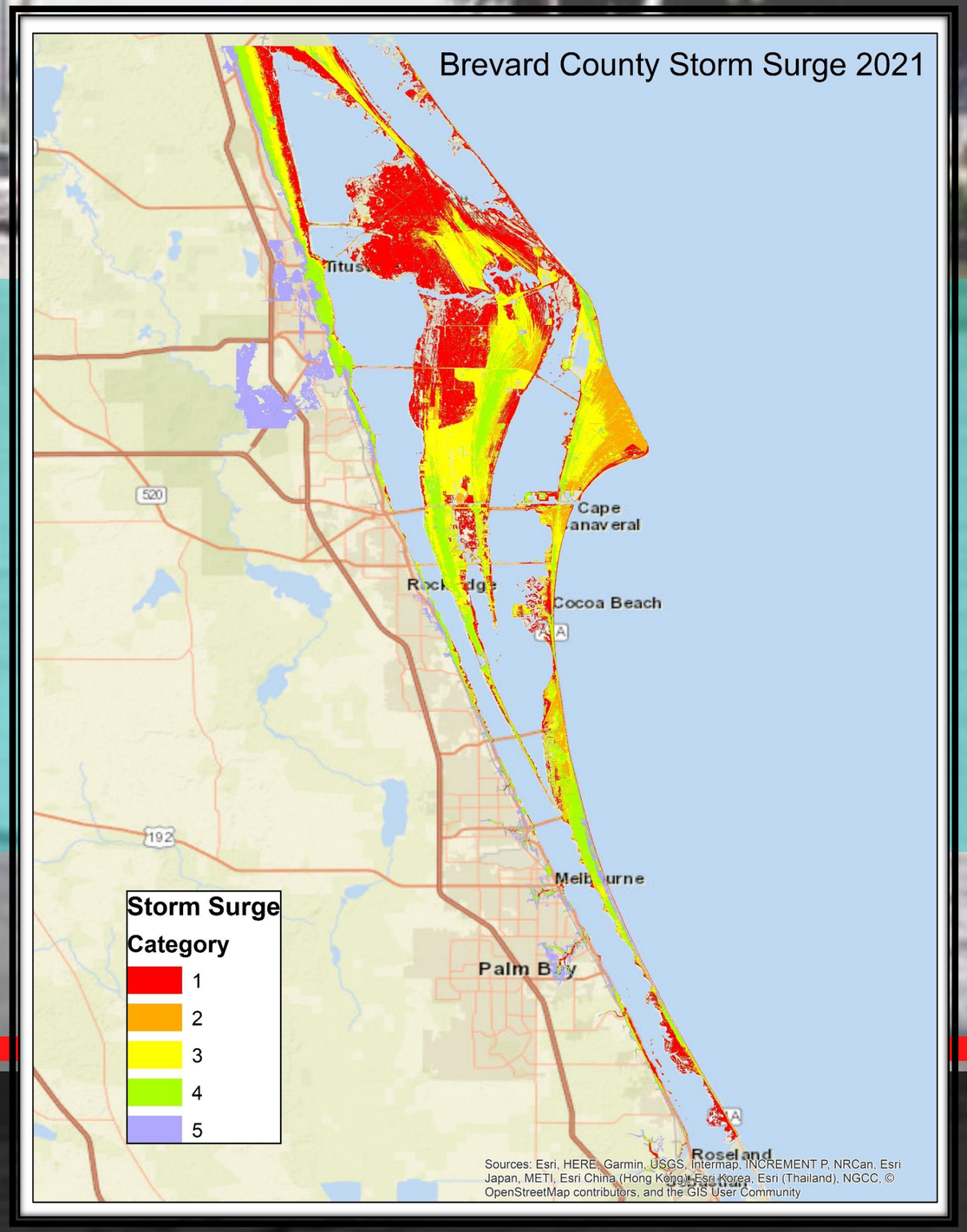
Storm Surge Areas - 2021



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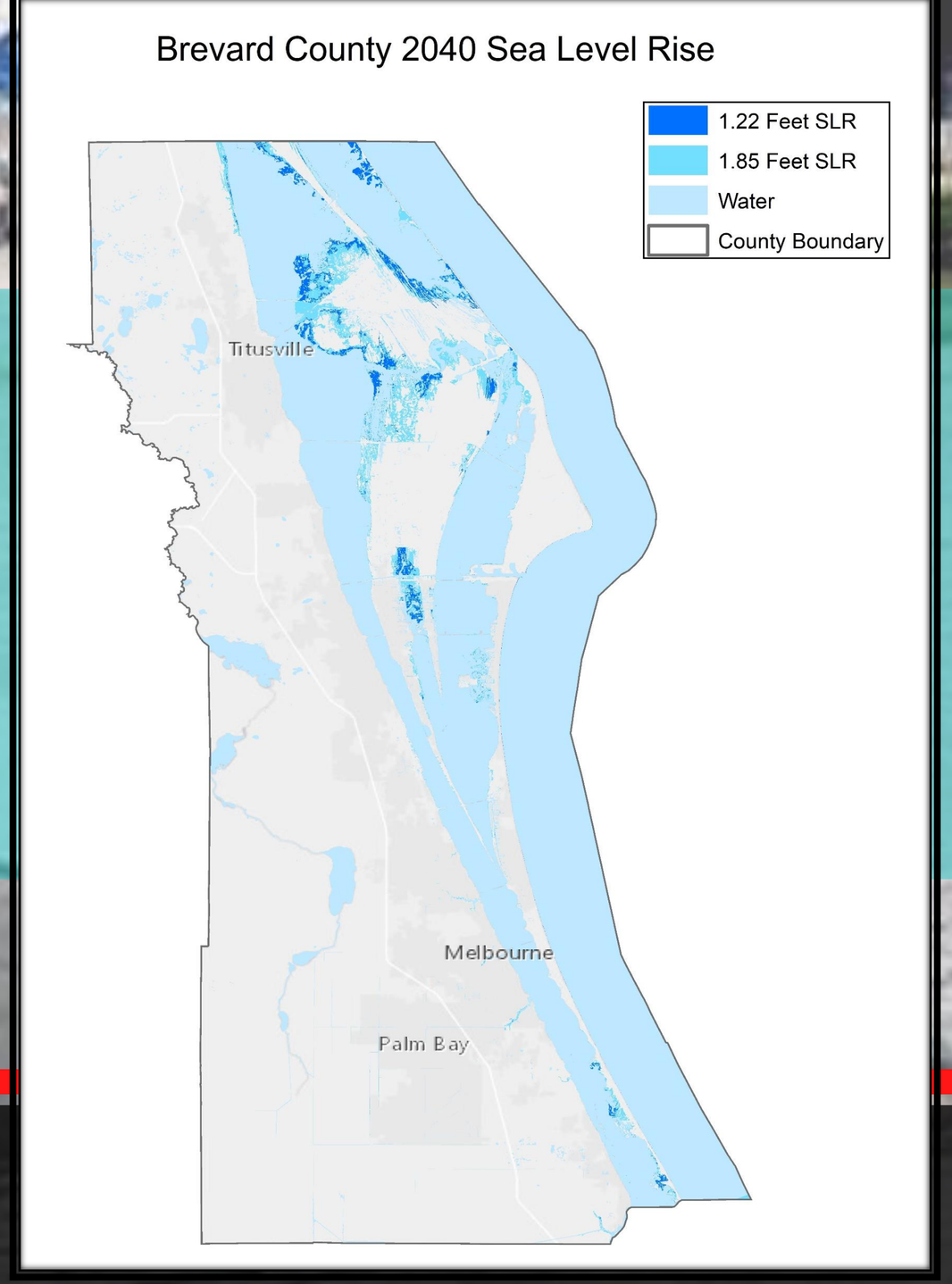
Sea Level Rise 2040



RESILIENT BREVARD 2021

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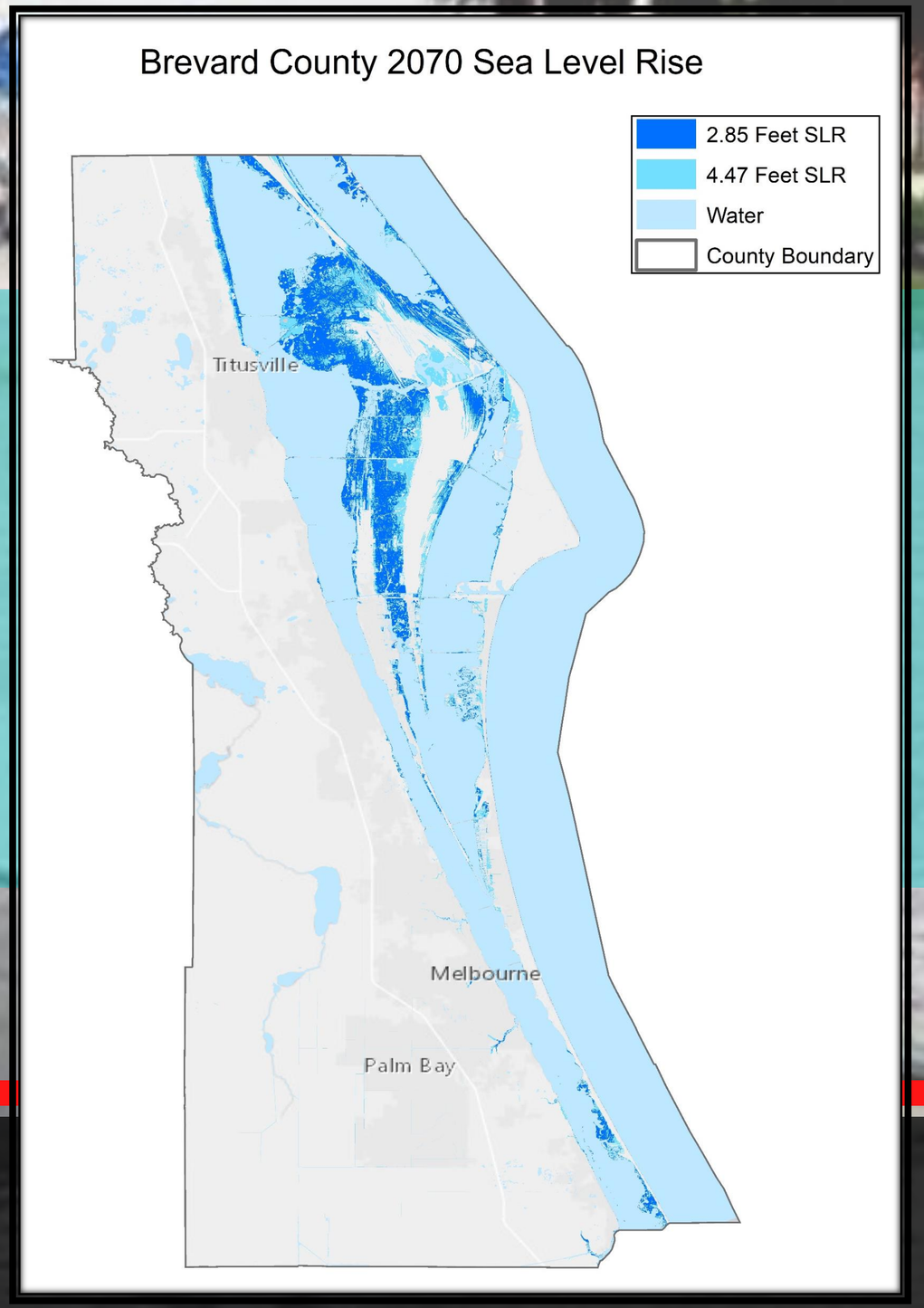
Sea Level Rise 2070



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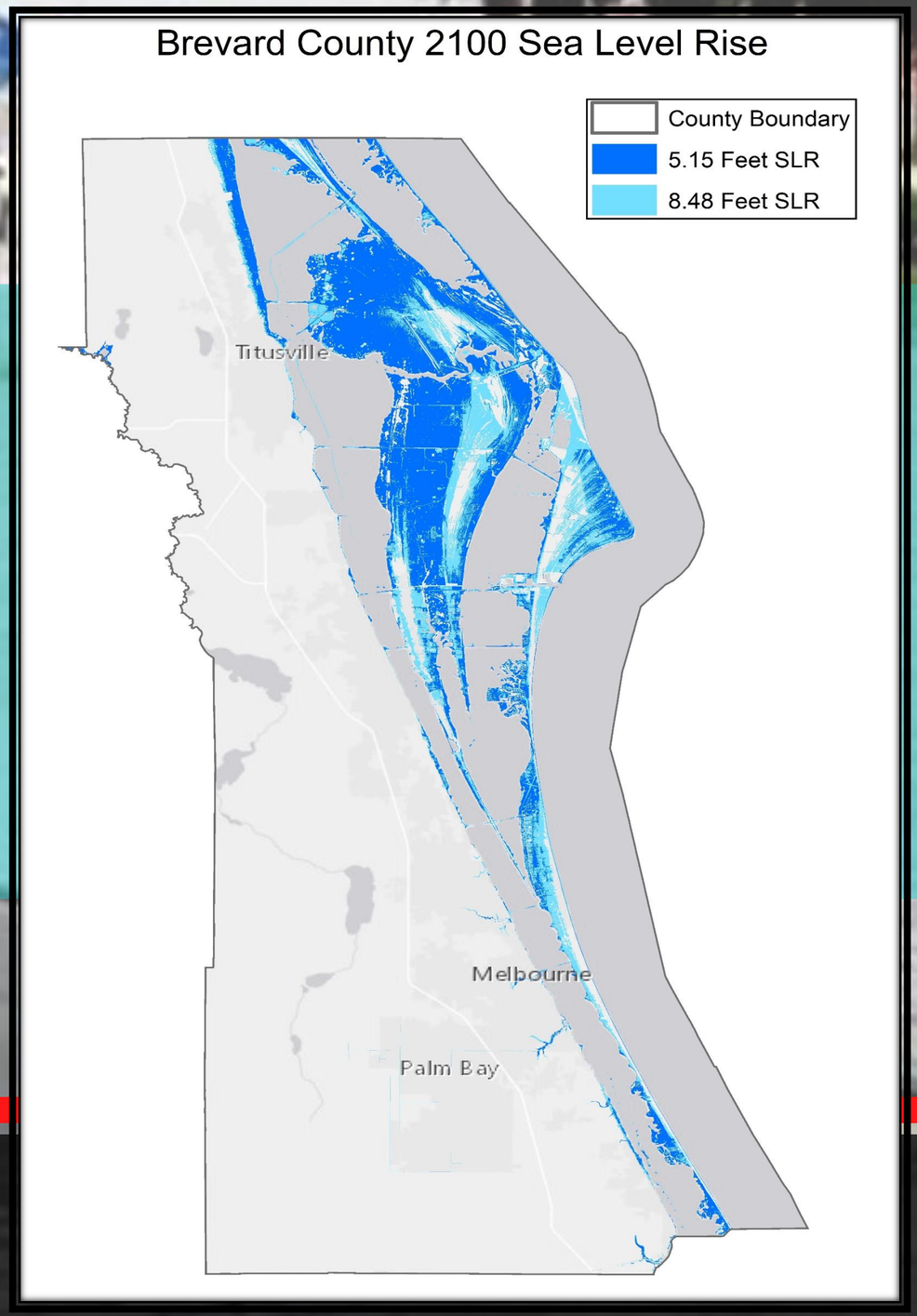
Sea Level Rise 2100



RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

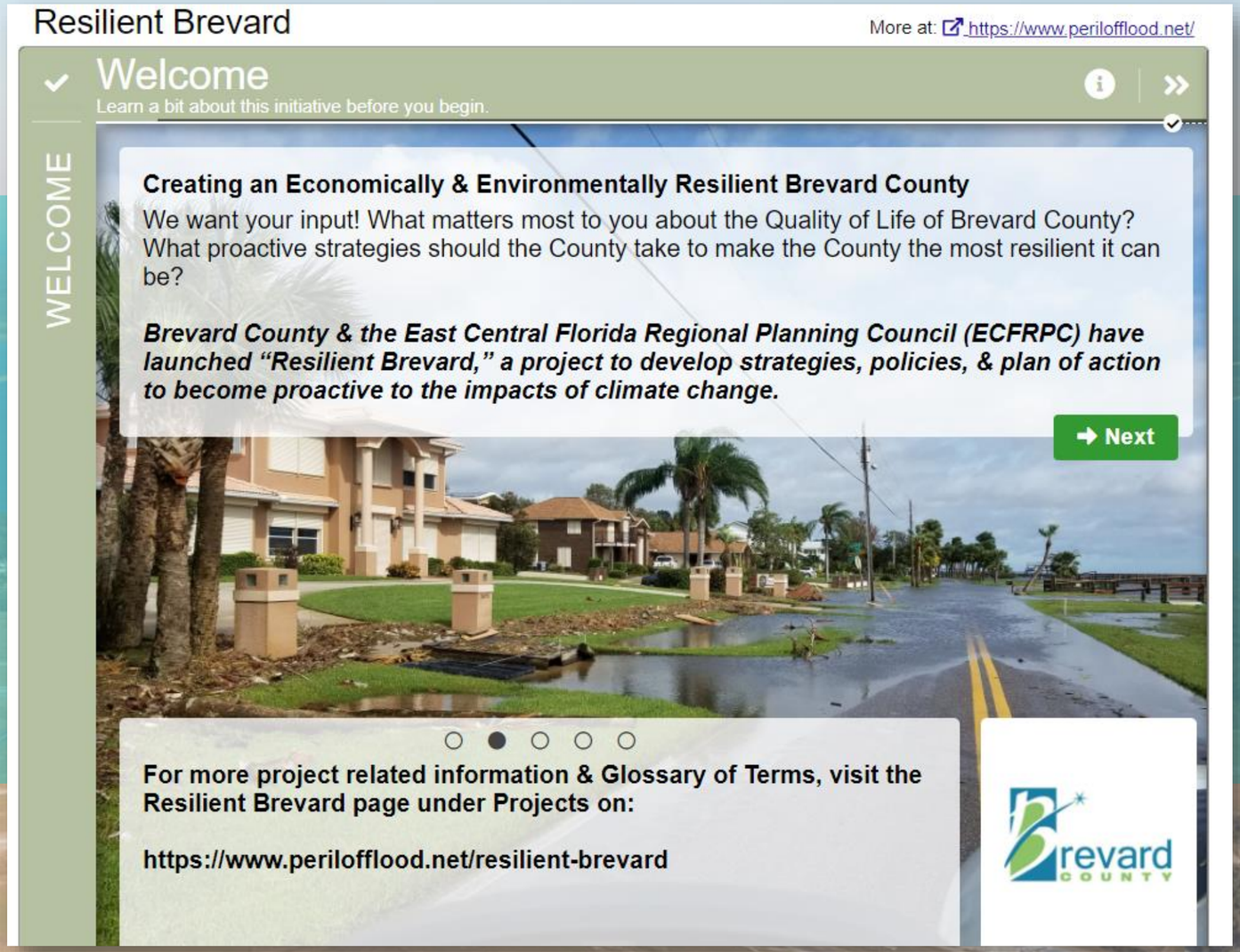
COMMUNITY ENGAGEMENT

- Aware, informed & active community
- Local concerns & preferences are considered
- Solutions can be tailored to the community
- Adjust plans, direct energy & allocate
- Resources to tackle supported strategies

La encuesta está disponible en español en www.perilofflood.net/resilient-brevard.

COMMUNITY SURVEY

WHAT STRATEGIES WILL MAKE BREVARD COUNTY MORE RESILIENT TO THE IMPACTS OF FLOODING & NATURAL HAZARDS?

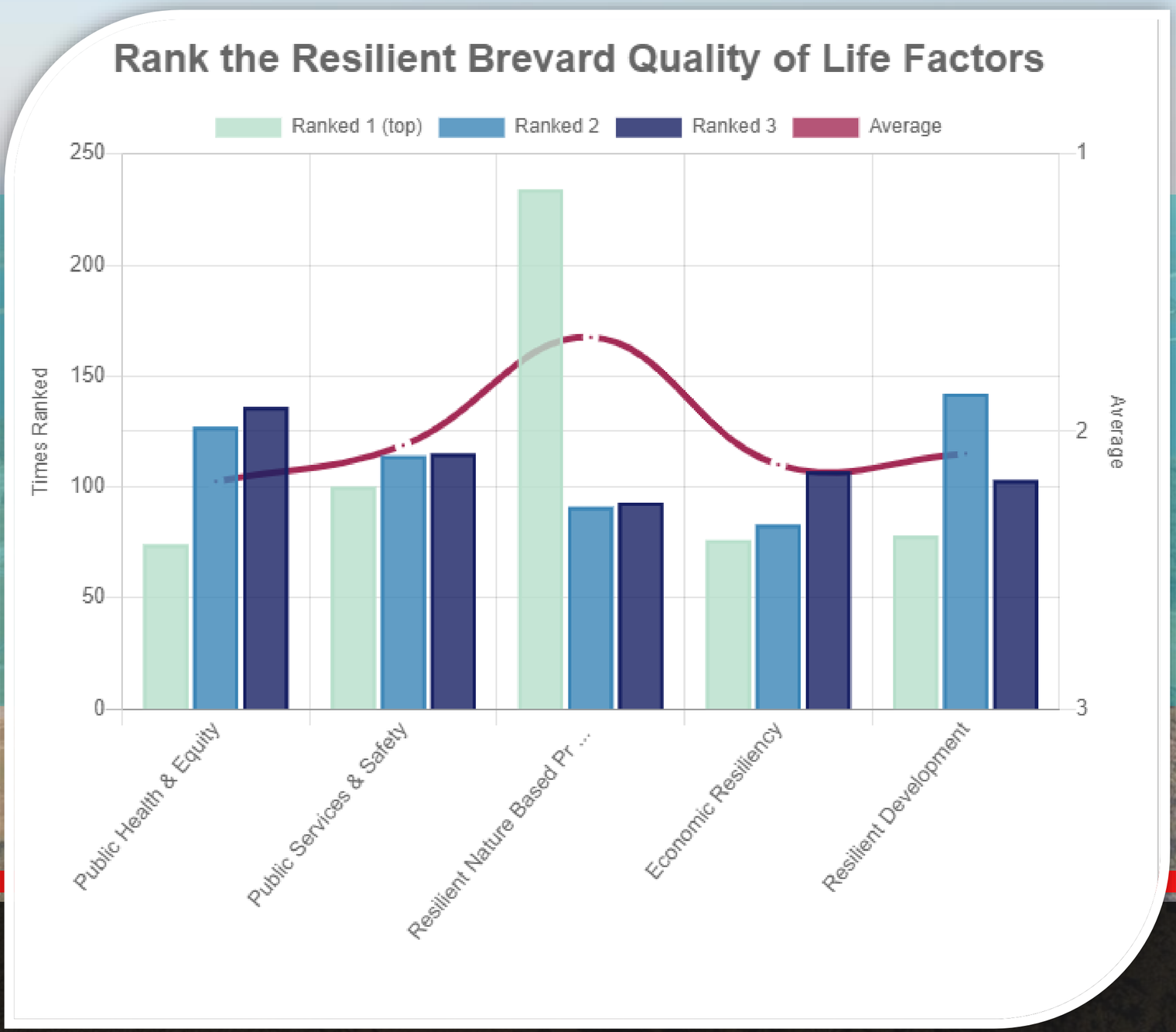


COMMUNITY SURVEY

Community Quality of Life Factors:

- Economic resilience
- Public services & safety
- Resilient development
- Public health and equity
- Resilient nature-base practices

COMMUNITY SURVEY



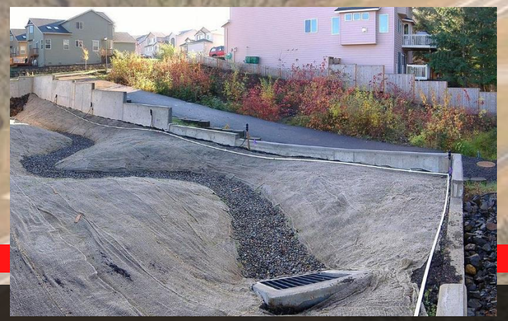
RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

RESILIENT GREEN INFRASTRUCTURE

Nature Based Solutions include:

- **Enhancing Green Space**
- **Protecting & Reestablishing Coastal Dunes**
- **Maximizing Use of Native Vegetation**
- **Implementing bioswales**



RESILIENT BREVARD 2021

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Regional Interconnectedness – Indian River Lagoon Action Plan

Dr. Randall Parkinson

RWParkinson Consulting, Inc.

Planning for Resiliency in Brevard County

- Built Environment
  - Building Codes
  - Planning & Zoning
- Human Environment
  - Public Health & Equity
  - Economy

RWParkinson Consulting, Inc.

Planning for Resiliency in Brevard County

- Built Environment
- Human Environment
- Natural Environment
  - Nature-Based Practices
  - Indian River Lagoon

RWParkinson Consulting, Inc.

Planning for Resiliency in Brevard County

- Built Environment
- Human Environment
- Natural Environment
  - Nature-Based Practices
  - Indian River Lagoon
    - Living Resources
    - Water Quality
    - Habitats

RWParkinson Consulting, Inc.

Planning for Resiliency in Brevard County

- Built Environment
- Human Environment
- Natural Environment
  - Nature-Based Practices
  - Indian River Lagoon
    - Living Resources
    - Water Quality
    - Habitats

→ Vulnerability to Climate Change

RWParkinson Consulting, Inc.

Planning for Resiliency in Brevard County

- Built Environment
- Human Environment
- Natural Environment
  - Nature-Based Practices
  - Indian River Lagoon
    - Living Resources
    - Water Quality
    - Habitats
      - Vulnerability to Climate Change
        - Changing Precipitation Patterns
        - Increasing Storminess
        - Sea-Level Rise

RWParkinson Consulting, Inc.

Planning for Resiliency in Brevard County

- Built Environment
- Human Environment
- Natural Environment
  - Nature-Based Practices
  - Indian River Lagoon

Human Environment

- Living Resources
- Water Quality
- Habitats

Vulnerability to Climate Change

- Changing Precipitation Patterns
- Increasing Storminess
- Sea-Level Rise

Analysis (3 yr study)

RWParkinson Consulting, Inc.

Planning for Resiliency in Brevard County

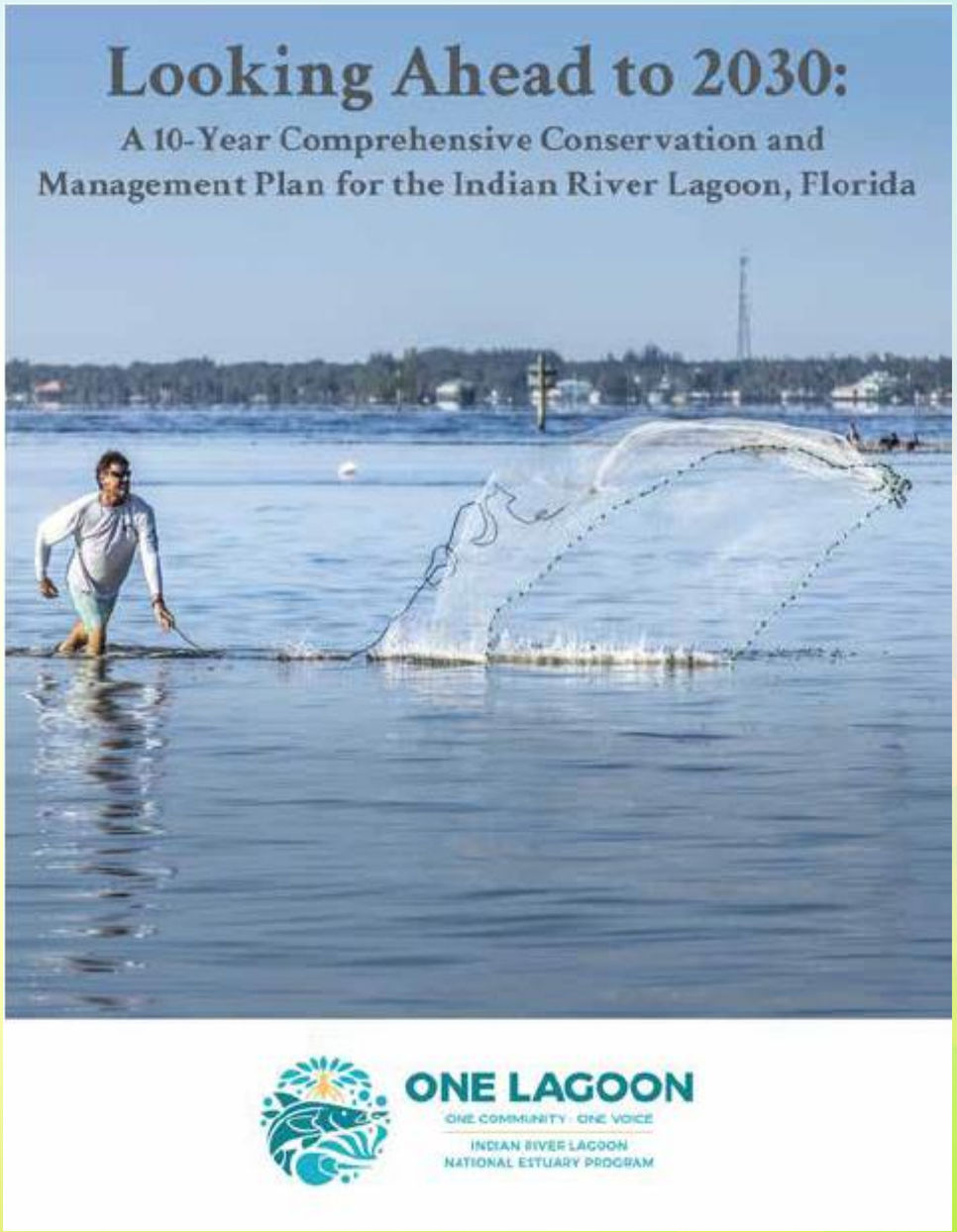
- Built Environment
- Human Environment
- Natural Environment
  - Nature-Based Practices
  - Indian River Lagoon
    - Living Resources
    - Water Quality
    - Habitats

Vulnerability to Climate Change

- Changing Precipitation Patterns
- Increasing Storminess
- Sea-Level Rise

Analysis (3 yr study) → Climate Ready Estuary Action Plan

RWParkinson Consulting, Inc.



RWParkinson Consulting, Inc.

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RWParkinson Consulting, Inc.

RWParkinson Consulting, Inc.

RWParkinson Consulting, Inc.

TECHNICAL REPORT No. 003
February 2021

Indian River Lagoon: Climate Ready Estuary

Understanding risks and taking actions to build estuary and community resilience.

ONE LAGOON
ONE COMMUNITY · ONE VOICE
INDIAN RIVER LAGOON
NATIONAL ESTUARY PROGRAM

RWParkinson Consulting, Inc.

Planning for Resiliency in Brevard County

- Built Environment
- Human Environment
- Natural Environment
  - Nature-Based Practices
  - Indian River Lagoon

RWParkinson Consulting, Inc.

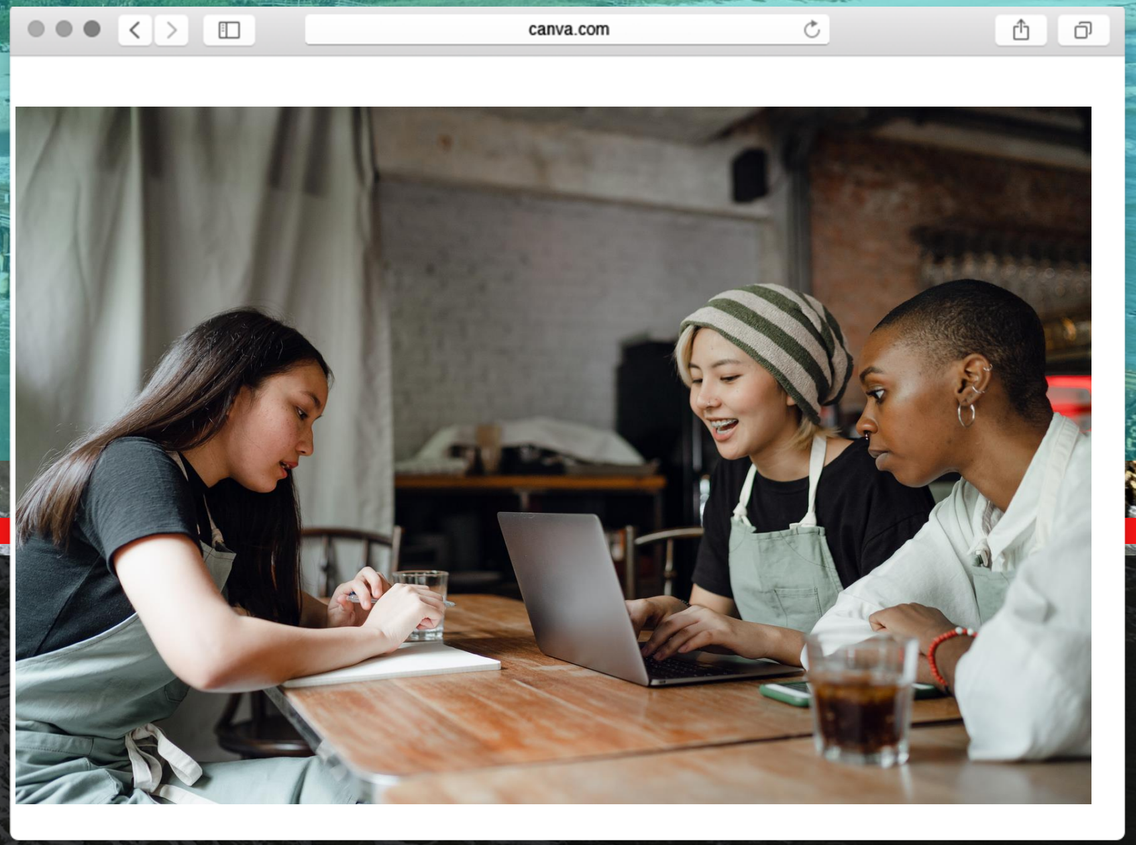
NEXT STEPS

Meeting 2: Late March

STAY UPDATED / STAY INVOLVED

Project updates:

https://www.perilofflood.net/resilient-brevard



Questions & Comments

THANK YOU

Jane Hart - Brevard County Planning and Development
Lori Cox, AICP – East Central Florida Regional Planning Council
resilientbrevard@ecfrpc.org

https://www.perilofflood.net/resilient-brevard

PUBLIC COMMENTARY DELIVERED VIA CHAT FOR COMMUNITY MEETING #1, HELD FEBRUARY 8, 2021

18:10:00 From Frank Golan : I like the green curve!

18:10:38 From Virginia Barker : Wouldn't that be great!

From Tara McCue, ECFRPC : Good evening, if you have any questions, please put them in the chat. We will address as many questions as possible after the
18:15:53 presentation. Thank you.

18:20:12 From Jesse Spencer-Smith : What is meant by "not accepting infra dedications?"

From Addison Mitchell : What is the state of county retention ponds? Are they periodically inspected for unobstructed flow and drainage clearance? Do we have any canals running water from communities into the St. John River? If we do, are they inspected periodically for unobstructed flow? If not, maybe funds
18:21:19 to do that as well as other projects???

18:22:43 From Tara McCue, ECFRPC : Thank you for the questions. We will address them after the presentations.

18:22:45 From Christine Bamberger : Can there be various other environmental practices besides sea walls?

From Thomas Ruppert : "Not accepting infra dedications" refers to the fact that developers often "dedicate" or give the roads or drainage systems in private developments to the local government. When the infrastructure is properly built and not at risk from environmental hazards such as flooding or erosion, this can be good for the community as the community now has access to these roads or drainage systems. However, if the infrastructure is already old and needing improvement, improperly built, or subject to frequent damage from flooding, erosion, or other forces, it can become a very large financial and legal
18:25:33 liability for the local government.

18:26:29 From Ron : Could Brevard prevent new development on property that will be below 2040 sea level?

18:28:22 From Tara McCue, ECFRPC : Thank you for the questions. We will continue to track them and answer at the end of the presentations.

18:30:04 From Ron : Will Brevard County be sued by property owners whose property becomes unusable due to sea rise?

18:32:06 From Mandy Baily : I had a similar question as Ron about private property legal standing (amendment 5) in such a case.

From Christine Bamberger : Will Brevard county invite coalition groups like Marine Resource Council and Indian River Lagoon groups share their knowledge of the area with you? They already have tried and true measures to offer in how to avoid rise of future sea levels. I would feel better if these groups had input
18:32:13 as well.

18:33:45 From Ron : Can Brevard County force FPL to put power lines underground?

From Tara McCue, ECFRPC : Good evening Christine, we are working with Dr. Randy Parkinson who has been working with the IRLC on their plans to help
18:34:27 make sure the direction is complimentary. We will provide much opportunity for input and will reach out to Dr. Soto and her team at the MRC.

18:34:34 From Joseph Montemurno : How is "Coastal Area" defined in state statute shown in prior slide (Would this include some or all of Brevard County)?

18:36:34 From Christine Bamberger : Awesome!

From Karen Black : Can Brevard County adopt stronger wetland protection/buffer zones? It seems that we have not prohibited developers from building in
18:37:16 natural wetlands.

18:38:21 From Ron : Will there be State or Local funds for homeowners to make homes survive sea rise?

18:43:21 From Elaine Trotter : How do you plan to work with cities that are in Brevard and adjacent to unincorporated areas?

18:44:06 From Elaine Trotter : can you repeat that email?

From Sandra Sullivan : Is the coastal impact of stronger hurricanes as important as the flooding? Is storm and rain events the primary reason for flooding as
18:44:52 compounded by higher water level in fall and SLR?

18:46:21 From Tara McCue, ECFRPC : resilientbrevard@ecfrpc.org

PUBLIC COMMENTARY DELIVERED VIA CHAT FOR COMMUNITY MEETING #1, HELD FEBRUARY 8, 2021

From Sandra Sullivan : For clarification on that last question - hurricane and hurricane rain events from statistically more CAT 4 and 5 hurricanes the primary
18:46:51 reason for projected flooding as compounded by higher water level in fall and SLR.
18:46:55 From Christine Bamberger : Yes, I also like the idea Ron posed of preventing new development on property that will be below 2040 sea level!!!
18:47:10 From bruce moia : As economic factors also need to be considered, groups like the Chamber of Commerce and the HBCA should be consulted with.
From Sandra Sullivan : Re comments about Satellite Beach, is it consistent with your advising them that redeveloping the A1A with 100 foot high 22 units per acre buildings and 85 foot buildings on A1A to compensate for flooding. Shouldn't they be doing Low Impact development as priority with statistically higher
18:51:24 number of CAT 4 and 5 hurricanes as documented on resiliency website?.
18:52:42 From Christine Bamberger : If there are homes to be developed in low lying areas to have
18:52:51 From Sandra Sullivan : I am asking if this redevelopment is consistent with plan you are advising for resiliency?
18:53:02 From Christine Bamberger : 'buyer beware" .
18:54:28 From Sandra Sullivan : Will you be talking about Low Impact Development in the next meeting to mitigate stormwater impact?
18:55:16 From Tara McCue, ECFRPC : The presentation will be made available.
18:55:56 From Kimberly Newton : Thank you, Tara,
18:56:25 From Christine Bamberger : That makes me feel better and fabulous.
18:57:28 From Sandra Sullivan : All of the barrier island is on the CHHA.
18:58:53 From Sandra Sullivan : After Irma the St. Johns were under 3 feet of water - a BIG SPONGE - I would think this would be very key.
18:59:04 From Sandra Sullivan : St. John's wetlands
19:00:24 From Karen Black : I agree Sandra, there is a large benefit to keeping wetlands... like 100' to 200' buffer zones.
From Sandra Sullivan : Groundwater on barrier island is 5-7 feet in unincorporated 32937. My pond in fall - during drought overflows from very high water
19:01:40 table level..
From Sandra Sullivan : More than 100' to 200' buffer I would suggest - all of CB Smith park was flooded after rain event associated with Irma. That storm and others illustrate the need to keep those wetlands for stormwater mitigation or I'd suggest there will be massive damage and impact to lives from flooding with
19:04:14 the models in the future.
From Christine Bamberger : I would think public pressure would be the force to ensure to use buffer zones in various areas where it would make sense. It
19:04:16 HAS to be the public to tell the local government what WE WANT, respectfully.
19:05:18 From Christine Bamberger : And the transportation resilience is fabulous.
19:07:00 From Daniel Martoma : How can municipalities which have no natural coastline support other coastal communities develop increased resiliency?
From Frank Skarvelis, CFM : Political suicide: I've advocated "retreat from the shoreline" for 20+ years. There's no political will to support this. Further, with
19:08:13 nearshore areas away from the immediate coat affected, this becomes moot.

19:09:40 From Sandra Sullivan : Yes, more flooding but also coastal damage from those more cat 4/5 hurricanes - so moving density to A1A is also not a solution.
From Sandra Sullivan : Yes, transportation is very important. A study in 1999 by County that there was issues to get everyone off the barrier island in event of fast moving hurricane - so county wide ordinances for barrier island (county and municipalities) might be prudent for stronger and higher frequency of
19:11:38 CAT4/5 storms. https://drive.google.com/file/d/19XTTsnrdUmi9t1AsIAiUIeqc9glS6tvy/view?usp=sharing
From Christine Bamberger : Will there be additional surveys to obtain opinions from the public? It seemed the timeframe of completing the survey was really
19:13:15 brief… I know I could have reached out to many, many more folks to let them also give THEIR thoughts.

PUBLIC COMMENTARY DELIVERED VIA CHAT FOR COMMUNITY MEETING #1, HELD FEBRUARY 8, 2021

From Kimberly Newton : How does the shift to higher density on A1A, to mitigate the property losses lagoon side, affect the infrastructure? per Satellite
19:15:42 Beach

From Sandra Sullivan : The Comprehensive Plan specified because of the 1999 hurricane doc - that no density increases and no moving density on the CHHA. When they did the 100 foot Oceana - DEO said no because of the no moving density on the CHHA. So city removed it from their comp plan. The issue with this is - if State spends 1 Billion over 4 years- shouldn't they strengthen their DEO ability to enforce policy for resiliency? (DEO told me 163 statute was altered
19:15:44 and took away their power)

19:15:55 From Kimberly Newton : Sewer, water, roads?

From Christine Bamberger : Sorry, I clicked on the curser by mistake. A tie on to the low lying lands to have real estate agents to let homeowner know what
19:17:11 kind of info before purchasing.

From Sandra Sullivan : That logic of your answer for Sb doesn't make sense to increase density on A1A because of increased flooding - because
19:17:40 corresponding to flooding is also statistically more Cat 4 and 5 storms according to your resiliency website. More cat 4 and 5 means more coastal damage.

From Sandra Sullivan : The new Vue development in SB - is not yet built. The previous developer plan had large open spaces - (as required by Air Force) to
19:21:39 facilitate natural drainage - low impact develop and lower impact to the lagoon. The Vue by contrast is high impact development with lots of stormwater.

19:22:33 From Frank Skarvelis, CFM : The NFIP continues to move to actuarial rating (more $$) so one may hope this will discourage future coastal development.

19:22:40 From Sandra Sullivan : Will LID (Low impact development) be part of your county strategy?

From Sandra Sullivan : Here is information on LID to minimize the impact to stormwater…. since old stormwater is part of resiliency.
19:25:08 https://drive.google.com/drive/folders/1b8sKKTTZTyvLBalzAPSSM9RXKjEjnY4C?usp=sharing

19:25:42 From Sandra Sullivan : Would Brevard consider ordinances that apply to both county and municipalities?

19:26:40 From Christine Bamberger : Thanks very educational.

19:26:49 From Jesse Spencer-Smith : Thank you so much!

19:26:50 From Sandra Sullivan : Thank you all.

19:26:51 From Kimberly Newton : Thank you, ECFRPC, and everyone from our county and municipal officials

19:26:55 From Elaine Trotter : thanks!

19:27:09 From Mandy Baily : Thank you

19:27:13 From Daniel Martoma : Thank you.

Community Meeting #1 February 8, 2021
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IV. APPENDIX II: PRESENTATIONS FROM COMMUNITY WORKSHOP #2, REGISTRANTS, & CHAT COMMENTARY

RESILIENT BREVARD

YOU CAN HELP BREVARD COUNTY BECOME MORE RESILIENT TO FLOODING & IMPACTS OF NATURAL HAZARDS

COMMUNITY MEETING #2
APRIL 12, 2021
6:00 PM TO 7:30 PM

Brevard County | Florida Department of Environmental Protection | East Central Florida Regional Planning Council est. 1962 | Sea Grant Florida | RWParkinson Consulting, Inc.

www.perilofflood.net/resilient-brevard

HOUSEKEEPING

- This is meeting is in webinar format.
- Put questions & comments in the chat or the Q&A.
- Please keep your lines muted.
- There will a period for comments & questions following presentations.
- This meeting is being recorded.
- The meeting recording & a transcript of questions, comments, & responses will be provided on the project website at:

www.perilofflood.net/resilient-brevard

Lamentamos tener la presentación disponible sólo en inglés en estos momentos. Si prefiere comunicarse en español, por favor, escriba sus preguntas o comentarios co relación al proyecto en el chat de la reunión.

Estos serán incluidos junto con las respectivas respuestas en la página web del proyecto. También puede enviarnos un correo electrónico a resilientbrevard@ecfrpc.org o dejar un mensaje en el número telefónico (407) 245-0300. Un miembro del equipo le responderá en español.

PROJECT OVERVIEW

- Florida Department of Environmental Protection (FDEP) Grant Program
- Project initiated: July 1, 2020
- Project end: April 30, 2021

AGENDA

- Project Overview & Objectives
- Policy Opportunities
- Vulnerability Analysis Findings
- Recommendations
- Strategies for Resiliency
- Feedback
- Next Steps

INTERACTIVE

- Go to www.menti.com on your computer or cell phone browser
- Enter code: 7558 9558

PROJECT OBJECTIVES

- Take a comprehensive look at the social, economic, & functional vulnerabilities from various types of flooding in the county.
- Identify coastal vulnerabilities specific to unincorporated Brevard County.
- Provide recommendations & develop draft policies to reduce flood risk from natural hazards consistent with Peril of Flood statute.

WHAT IS RESILIENCE?

The capacity of individuals, communities, institutions, businesses, and systems within a region to plan, sustain, adapt, recover, improve & grow collaboratively through specific actions and implementation strategies geared to address specific vulnerabilities.

east central florida
REGIONAL RESILIENCY ACTION PLAN

East Central Florida Regional Resiliency Action Plan

https://www.perilofflood.net/ecfresiliency

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

WHAT IT MEANS FOR BREVARD

Opportunity for Brevard County to identify approaches to adapt, avoid & recover from the impacts of natural hazards while also positioning the County to take advantage of potential economic prosperity opportunities.

Good Policy vs. Bad Policy: Costs and Opportunities Addressing Climate Change and Sea-Level Rise

Thomas Ruppert, Esq.
Florida Sea Grant Coastal
Planning Specialist

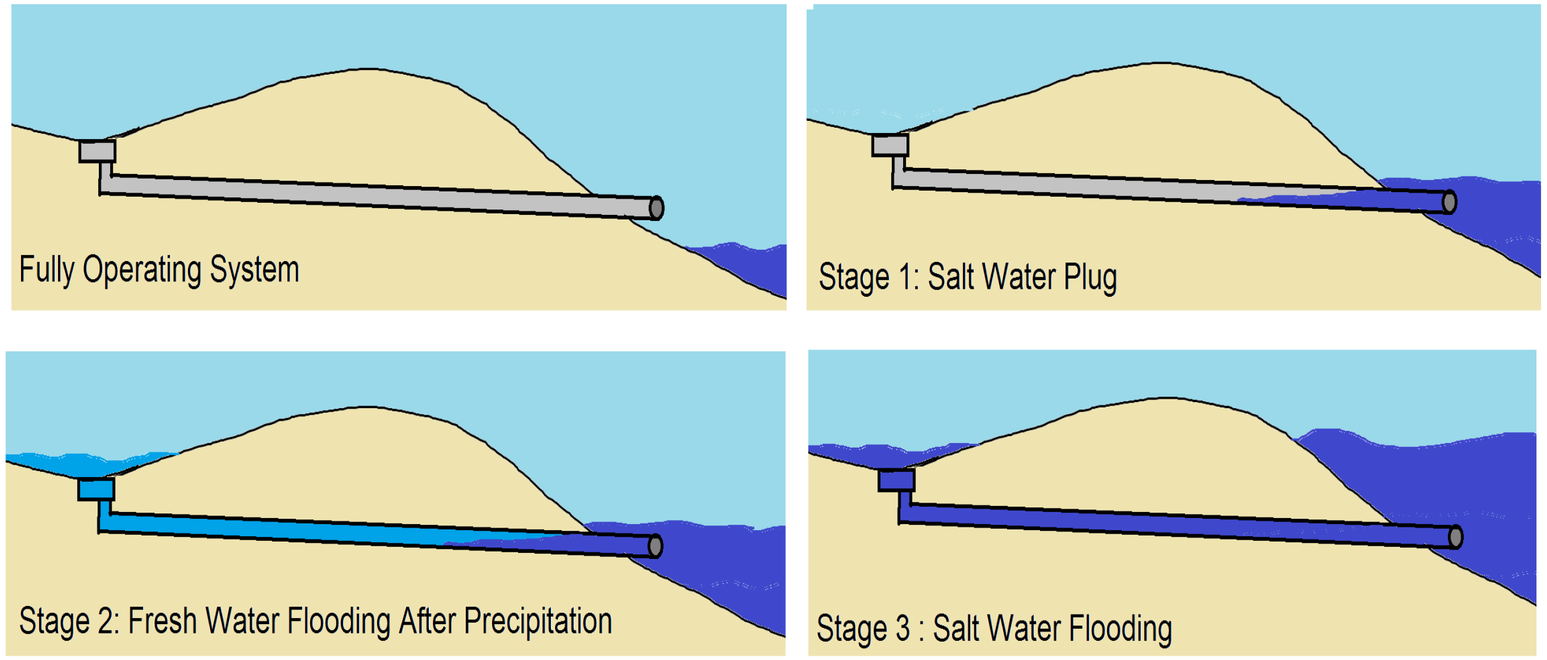
rida Sea Grant College Program

Sea Grant
Florida

The Bad News

- New development or densification in the most hazard-prone areas
- Costs:
  - Higher infrastructure costs (direct and potential legal liability)
  - Risks to human health and safety
  - Risks to property value
  - Insurance & bond rating issues????

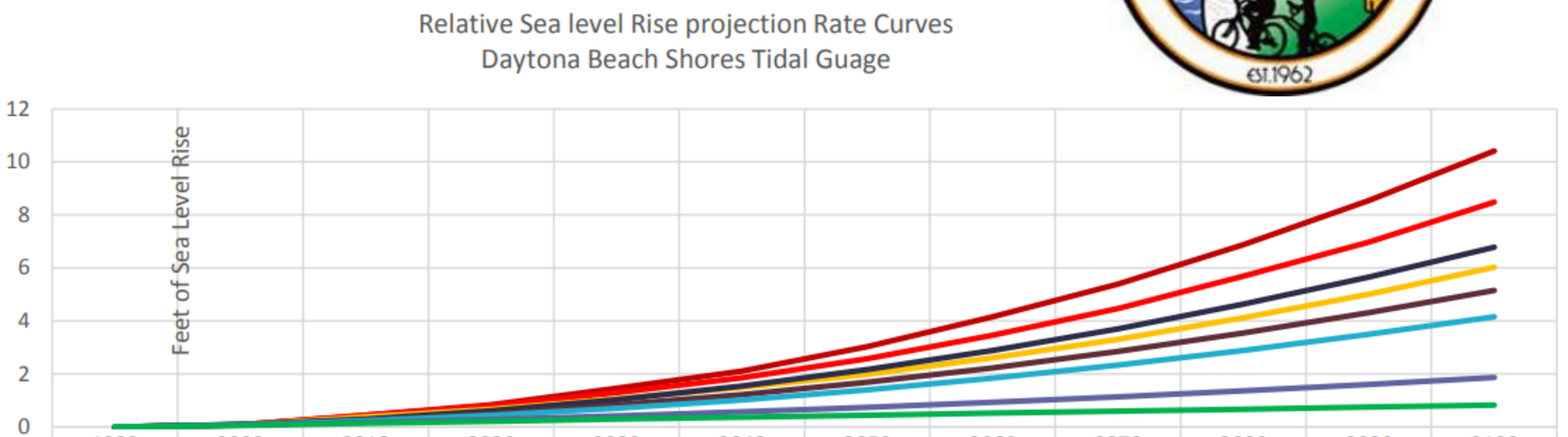
Figure 1: Stages of Stormwater Infrastructure Failure due to Sea Level Rise



Graphic courtesy of Emily Niederman, Stetson University

Sea Grant Florida

The Bad News: SLR



	1992	2000	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
NOAA2017	0	0.08	0.44	0.83	1.46	2.11	3.03	4.15	5.39	6.87	8.54	10.41
NOAA 2017	0	0.08	0.44	0.8	1.29	1.85	2.57	3.46	4.47	5.69	6.97	8.48
NOAA2017	0	0.08	0.38	0.67	1.06	1.49	1.98	2.61	3.3	4.12	5	6.02
NOAA 2012	0	0.09	0.3	0.61	1.03	1.54	2.16	2.88	3.7	4.63	5.65	6.78
USACE 2013	0	0.09	0.26	0.5	0.83	1.22	1.69	2.23	2.85	3.54	4.31	5.15
NOAA 2012	0	0.08	0.23	0.44	0.7	1.02	1.4	1.84	2.33	2.88	3.49	4.16
USACE 2013 Int	0	0.07	0.17	0.28	0.42	0.57	0.74	0.93	1.14	1.36	1.6	1.86
USACE Low	0	0.06	0.14	0.21	0.29	0.37	0.44	0.52	0.59	0.67	0.75	0.82

The Good News

- Building Resilient Infrastructure and Communities (BRIC) from FEMA
  - Superseded “Disaster Recovery Reform Act”
  - Replaced FEMA’s Pre-disaster mit. prog.
  - Funded by 6% set-aside from federal post-disaster funding
  - States and territories w/ major disaster declaration in past 7 years eligible

The Good News

- Proposed federal money for infrastructure
  - Apart from $115 billion for bridge/road/highway repair; $25 billion for airports; and $17 billion for waterways/coastal ports, land ports of entry and ferries. . . .
  - $50 billion proposed for “infrastructure resiliency” to withstand climate-related disasters

The Good News

Gov. DeSantis announces $75m to bolster Florida's resilience to future storms
WTXL
Governor Ron DeSantis announced Wednesday that $75 million has been awarded to 30 communities through the Florida Department of Economic Opportunity's Rebuild Florida

- Funding
  - Increased state funding already happening; DeSantis proposing $1 billion.
  - Legislature passed **SB 1954**

It’s not about good vs. bad: Pragmatic

- Do what you need to now to protect people
- BUT . . . .
  - Start planning for the long-term realities
  - Enough money to continue down the path of armoring/protecting/elevating?
  - How long can you improve infrastructure?
  - Do your past and current development patterns financially support themselves?

It’s not about good vs. bad: Pragmatic

- Have you assessed vulnerability of infrastructure? Under what conditions over what time?
- Do you use the FFRMS?
- Will there come a time that “protection” is throwing good money after bad?
- Do you know where this will happen?
- Do you know when this will happen? If not, when will you try to identify this point?

THE THREE LITTLE PIGS: CLIMATE CHANGE EDITION

RESILIENT BREVARD PROJECT TASKS

PERIL OF FLOOD

FOR MORE INFORMATION ABOUT PERIL OF FLOOD: www.perilofflood.net/

RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

Section 163.3178(2)(f)1, *Florida Statutes*

1. Development & redevelopment principles & strategies that reduce flood risk
2. Best practices for **re**moval of coastal real property from FEMA flood zones
3. Site **development techniques that may reduce losses** and claims made under flood insurance policies
4. Be consistent with, or more stringent than, the **flood-resistant construction requirements** in the Florida Building Code & flood plain regulations
5. Construction activities seaward of the coastal construction control line consistent with Chapter 161, *F.S.*
6. Encourage local governments to participate in the National Flood Insurance Program Community Rating System

Peril of Flood Compliance in Brevard County

Brevard County	
Cape Canaveral	
Cocoa	
Cocoa Beach	
Grant Valkaria	
Indialantic	
Indian Harbor Beach	
Malabar	
Melbourne	
Melbourne Beach	
Palm Bay	
Palm Shores	
Rockledge	

RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

VULNERABILITY ANALYSIS

- Flood Areas
- Storm Surge
- Sea Level Rise
- Surge + Sea Level Rise

2040, 2070, 2100

east central florida REGIONAL RESILIENCY ACTION PLAN

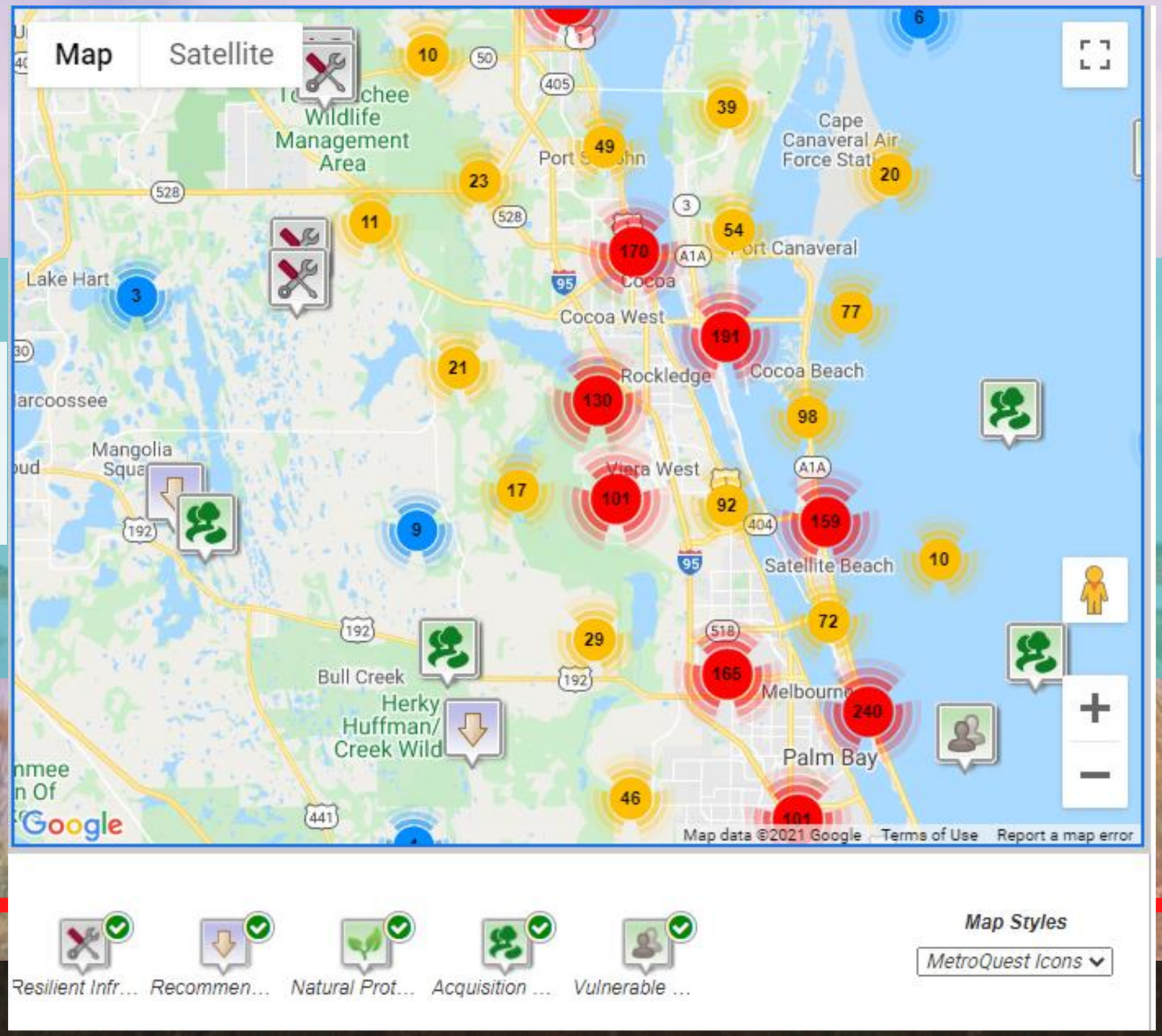
What Are We Planning For?

Total Water Level Approach

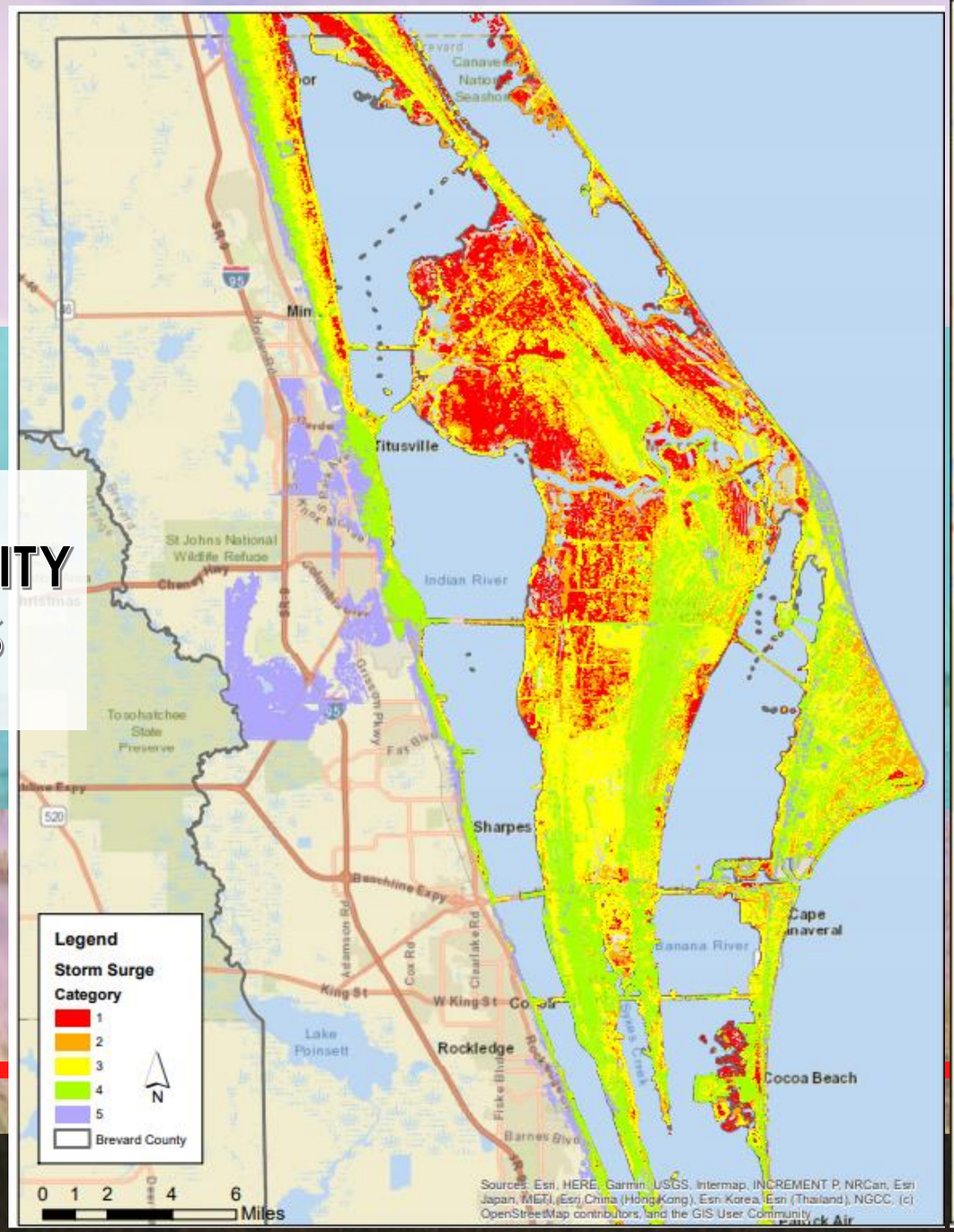
COASTAL HIGH HAZARD AREA

The **coastal high-hazard area** is the **area** below the elevation of the category 1 storm surge line as established by a Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computerized storm surge model.

VULNERABILITY ANALYSIS



VULNERABILITY ANALYSIS



VULNERABILITY ANALYSIS

Hazard	Acres
Category 1 Storm Surge	52,014
Category 2 Storm Surge	69,870
Category 3 Storm Surge	110,735
Category 4 Storm Surge	137,422
Category 5 Storm Surge	155,534
100 Year Flood	392,655
Shallow Coastal Flood	67,142
2040 Sea Level Rise (1.85 feet)	27,344
2070 Sea Level Rise (4.47 feet)	76,720
2100 Sea Level Rise (8.45 feet)	129,199

VULNERABILITY ANALYSIS

Top 5 Land Uses in the 100-Year Floodplain		
FLU	Acres	Percent of Total FLU Category
Public Conservation	131,398	84%
Agriculture	62,153	67%
Res 1	9,500	38%
Res 1:2.5	5580	38%
Res 4	5726	27%

VULNERABILITY ANALYSIS

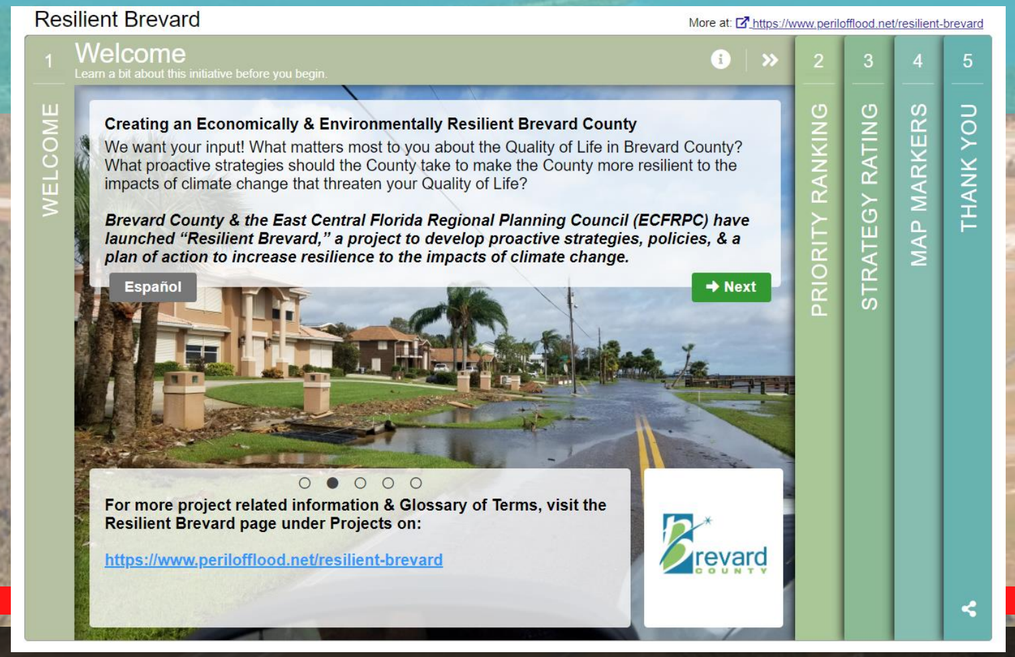
Facility Types	Total Hazards by Facility				
	1	2	3	4	5
ASSISTED LIVING FACILITY	18	88	12		
BOAT RAMP	26	32	36	112	20
DAY CARE	32	136	12	8	
HAZARDOUS MATERIALS FACILITY	78	228	12	32	
HELIPORT/HELIPAD		4	6		
MARINA		4		24	
MOBILE HOME PARK	35	102		32	
POINT OF DISTRIBUTION	4	16	6		
PRIVATE SCHOOL	12	80	6		
PUBLIC SCHOOL	18	84	12		
PUBLIC WATER SUPPLY - PLANT	48	64	42	48	
RELIEF AGENCY		12			
RV PARK	6	36	6	8	
SOLID WASTE FACILITY	16	72	6	8	
Grand Total	**443**	**1650**	**156**	**296**	**20**

*List is condensed to facilities impacted by 3 or more hazards. Total includes all facilities impacted by natural hazards.

RESILIENCY STRATEGIES

- POLICIES
- DESIGN
- RE-EVALUATION

RESILIENCY STRATEGIES



RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

Nature-Based Strategies:

- Adopt growth patterns that support nature
- Enhance Land Use to Protect Surface Water

Public Services & Safety:

- Establish Resilient Utilities
- Natural Stormwater Management

Public Health & Equity:

- Green / Natural Infrastructure
- Phasing Out Septic

Sustainability and Resiliency Opportunities

ATKINS
Member of the SNC-Lavalin Group

Atkins North America, Inc. | April 12, 2021

#inthistogether

Sustainability Moment

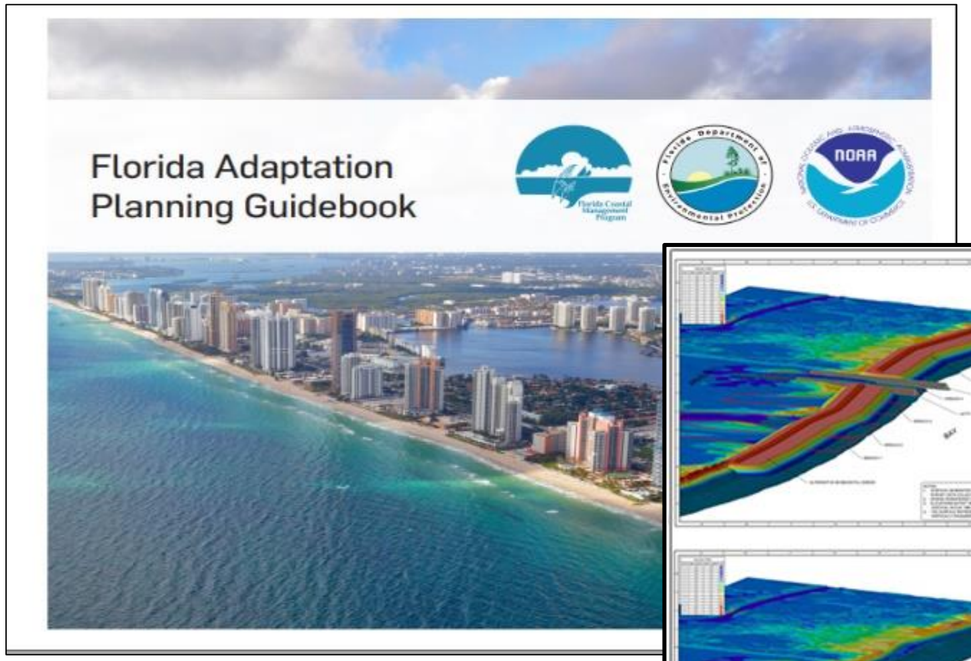
Atmospheric carbon is captured by coastal mangroves, seagrasses and salt marshes at a rate five times faster than tropical forests.

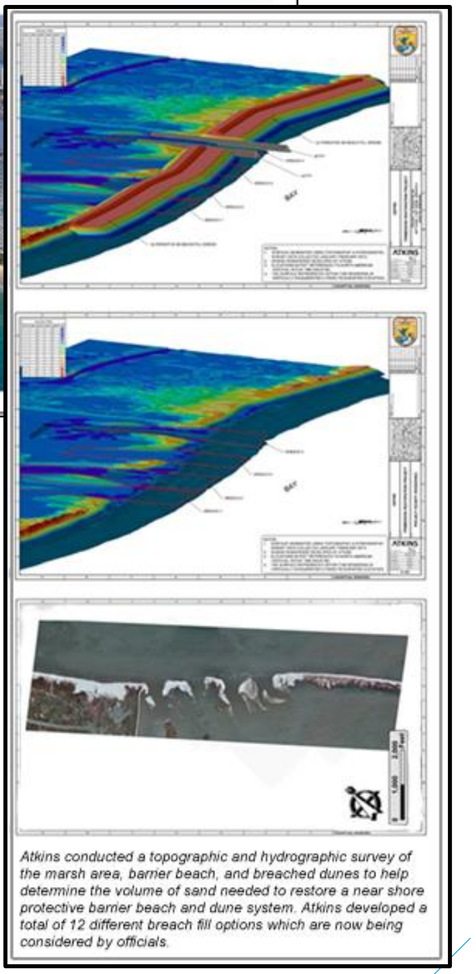
For more details, refer to Smithsonian Institute: https://ocean.si.edu/ocean-life/plants-algae/seagrass-and-seagrass-beds

Our Insights

Climate Adaptation and Resiliency More Than a Trend….Coast to Coast

- Atlanta Regional Commission Vulnerability and Durability Project using City Simulator
- Delaware Prime Hook National Wildlife Refuge coastal resiliency design project
- FEMA Mitigation Decision Support System (MDSS) tool
- State of Florida Adaptation Planning Guidebook
- Boulder County Floodplain Management and Transportation System Resiliency Study and Action Plan with City Simulator
- Texas Department of Transportation (TXDOT) Resiliency Plan
- Mexico Beach Resiliency Redevelopment Plan



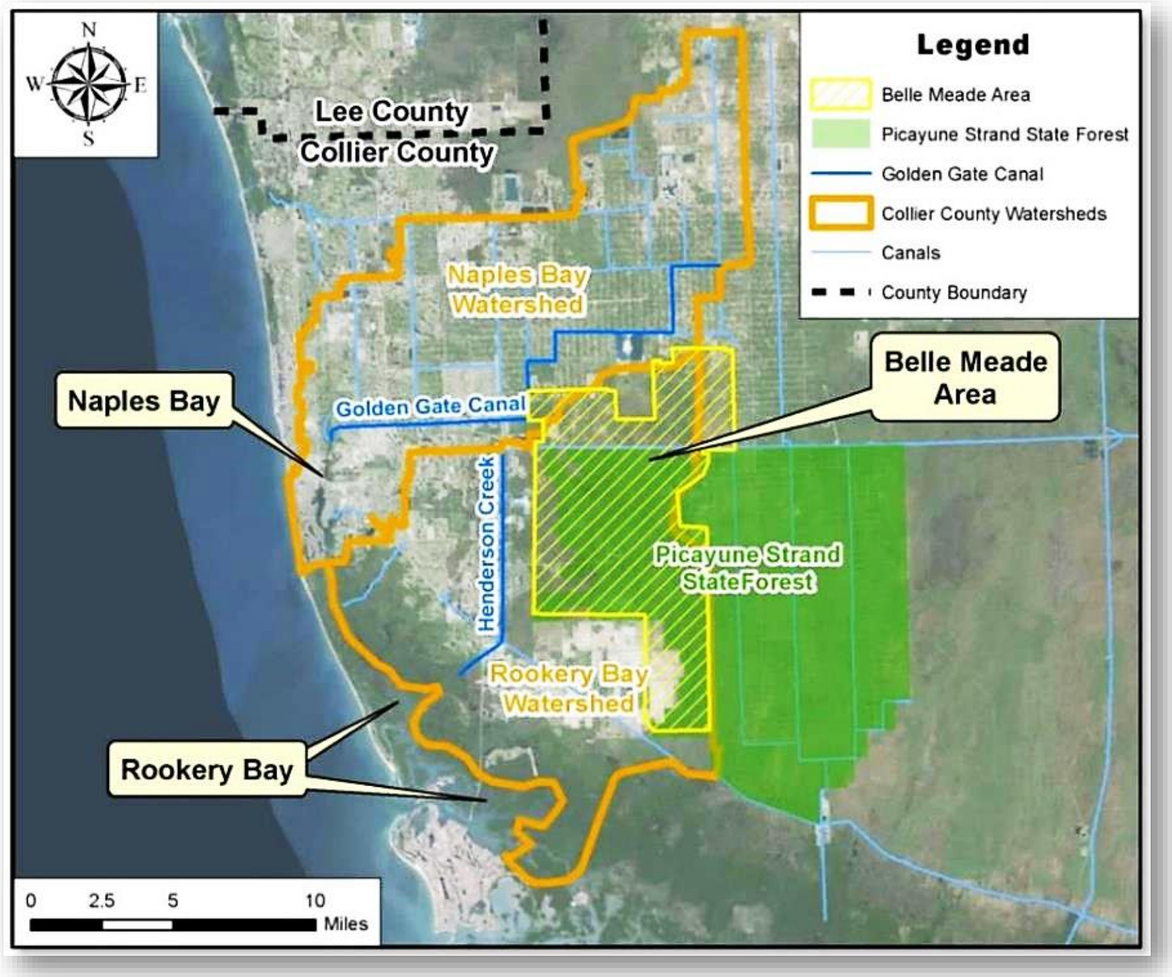


Atkins conducted a topographic and hydrographic survey of the marsh area, barrier beach, and breached dunes to help determine the volume of sand needed to restore a near shore protective barrier beach and dune system. Atkins developed a total of 12 different breach fill options which are now being considered by officials.

Our Insights

Maximize Opportunities Via Stakeholder Partnerships

- FEMA / NOAA
- USACE
- US FWC
- FL State DEP, SWMDs, DOT, FWC, etc.
- Misc. Municipalities
- Private Sector / Industries



Conceptual Design Highlights

Naples Bay

- Water quality improvement
- Salinity issues from excessive freshwater
- Rehydrating the watershed
- Restoring hydrology to historical flows

Rookery Bay

- Proposed diversion improves flow deficits that were created by Golden Gate Canal

Resiliency in Florida – Progress

Peril of Flood & Associated Comp Plan Insights
Planning Solutions

- Assessment of zoning changes **(Adaptation Action Areas or similar overlay districts)**
- Evaluating resilience and sustainability together
- **Land Development Codes**
  - Stronger requirements in vulnerable areas
  - Adapting codes to allow for higher standards
    - *ie, change in approach to max building heights to accommodate higher freeboard standards*
- **Green Infrastructure Guidance**
- Social Equity/Environmental Justice
- Adjusting CIP approaches for full life-cycle costs including additional funds needed for **operations and maintenance, disposal of assets**, etc
- Implications to emergency management/evacuation for coastal communities (Post-Disaster Redevelopment Plans, pre-positioning for grants, LMS, CRS, etc)
- Broader visioning activities to assess potential future scenarios and help make it real for residents

Resiliency in Florida – Progress

Peril of Flood & Associated Comp Plan Insights
Physical Solutions

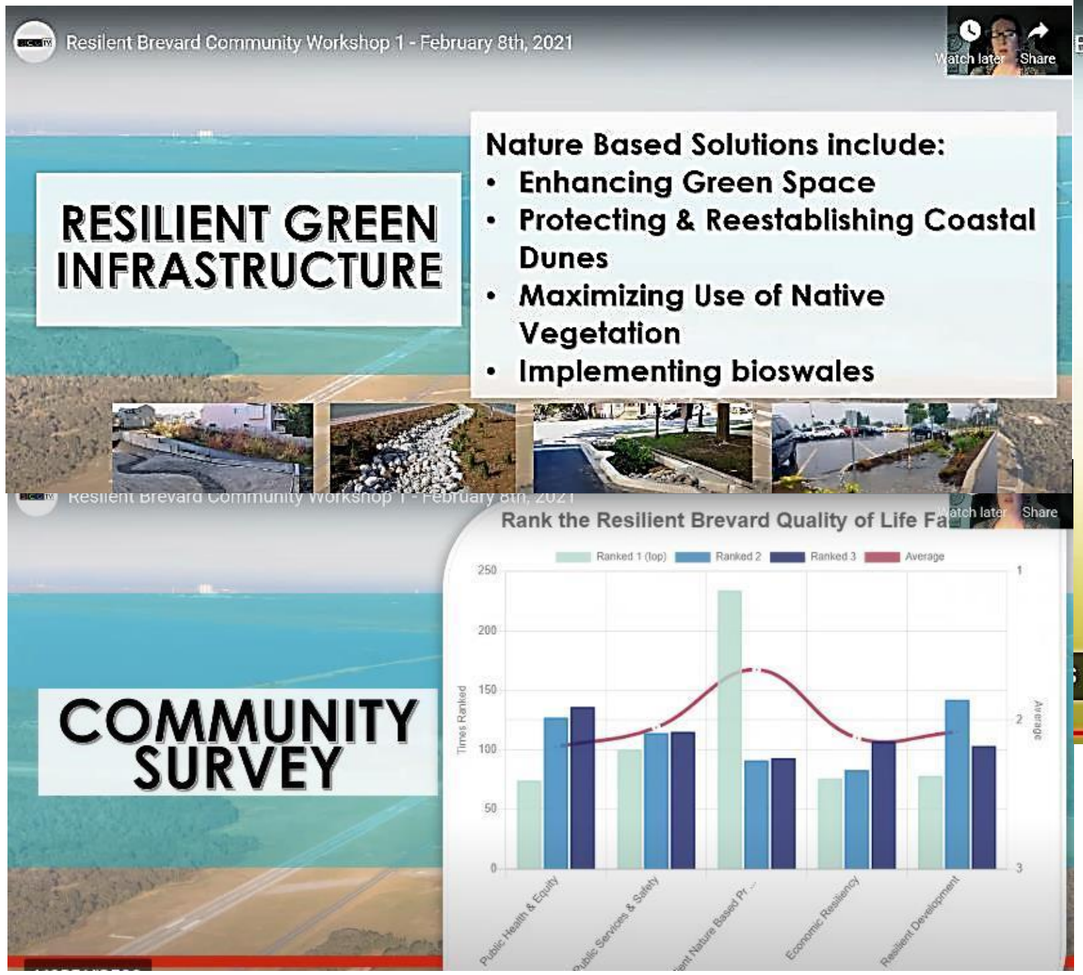
- Evaluating coastal barriers
  (seawalls, mangroves, wave attenuation structures)
- Protecting/promoting critical ecosystems –
  (sea grass/oyster beds, wetlands, rookeries, mangroves)
- Incorporating SLR* forecasts into new infrastructure design
  (flood control structures, transportation, water/wastewater)
- Green Infrastructure/LID**
  (localized / natural stormwater mgmt. solutions)

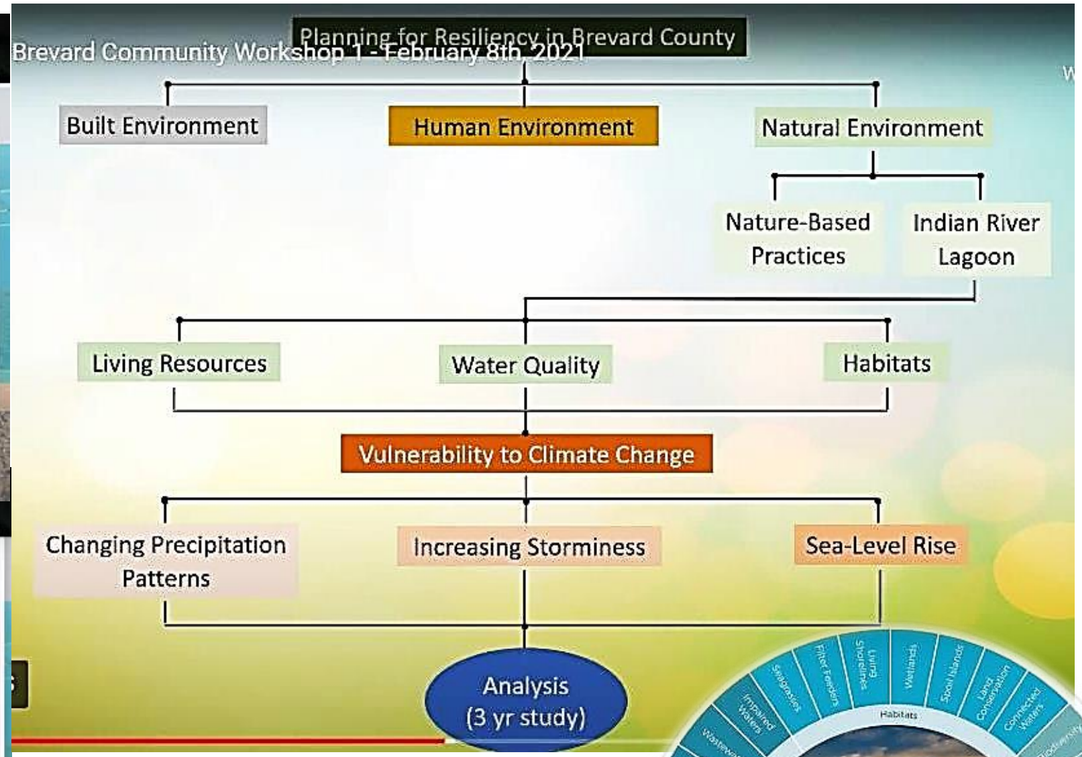
* Sea Level Rise

** Low Impact Development

Resiliency in Florida – Brevard Community Focus

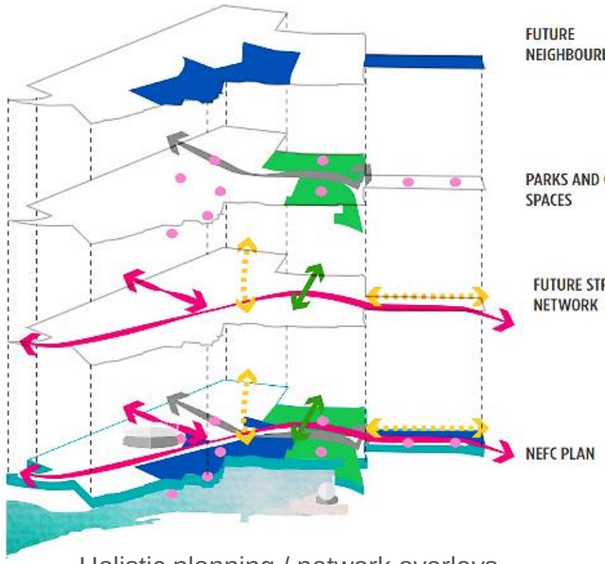
Nature Based Solutions & Sustainable Development Practices





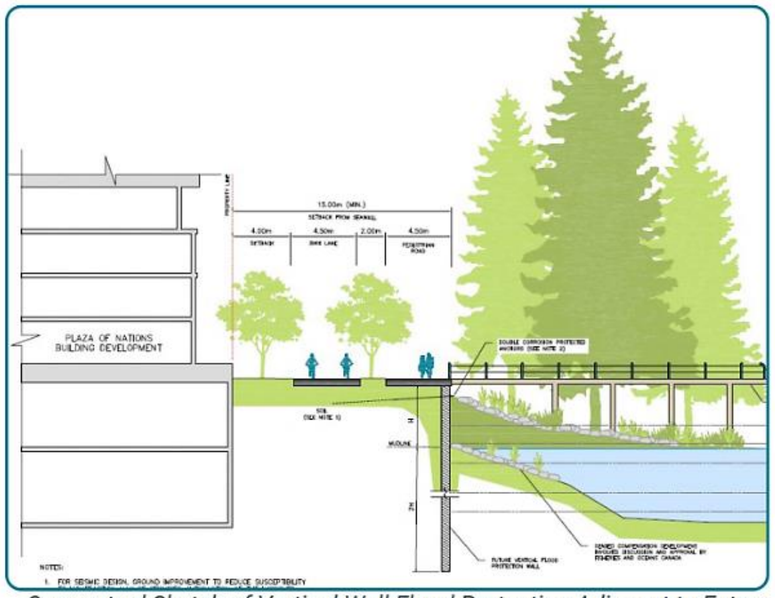
Global - Resilience Project Trends – Partnering with Nature

Vancouver B.C. - Northeast False Creek Master Plan



Holistic planning / network overlays

Graphic / Visual reminders of SLR



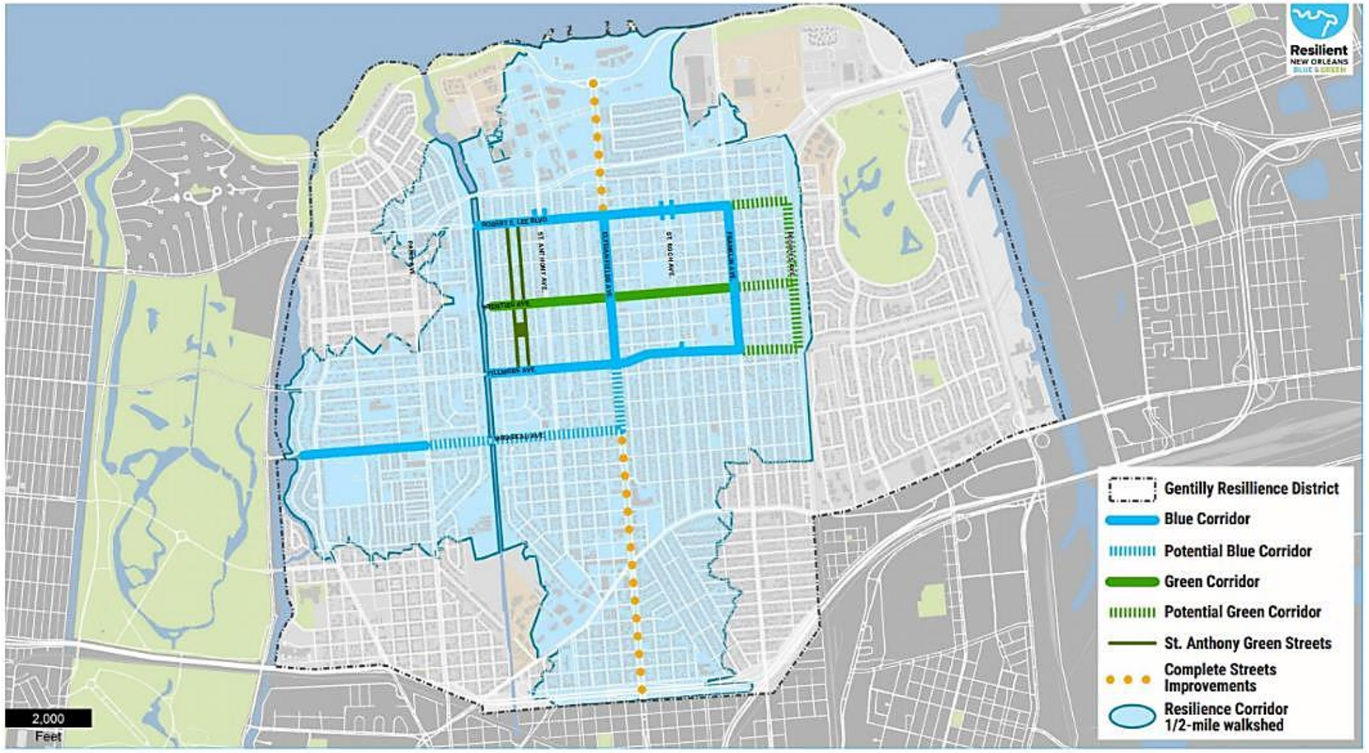
Conceptual Sketch of Vertical Wall Flood Protection Adjacent to Future NEFC Development

- SNC-Lavalin led master planning & coastal/marine/eco-science technical expertise.
- Catalyst project – driving City policy, by-law and code updates.
- Prohibits (new) building critical infrastructure below Flood Construction Level.
- SLR & earthquake seismic sea walls / earthen berm provisions.
- SLR adapted ‘sloping hillside’ waterside park(s) with upland berm ‘natural sea wall’.
- Biodiverse habitat flood / park features

For more details, refer to: The future of Northeast False Creek | City of Vancouver/

USA - Resilience Project Trends

‘Ground Zero’ Touchstone - New Orleans, Post-Katrina – includes ‘Blue’ sustainable/resilient solutions

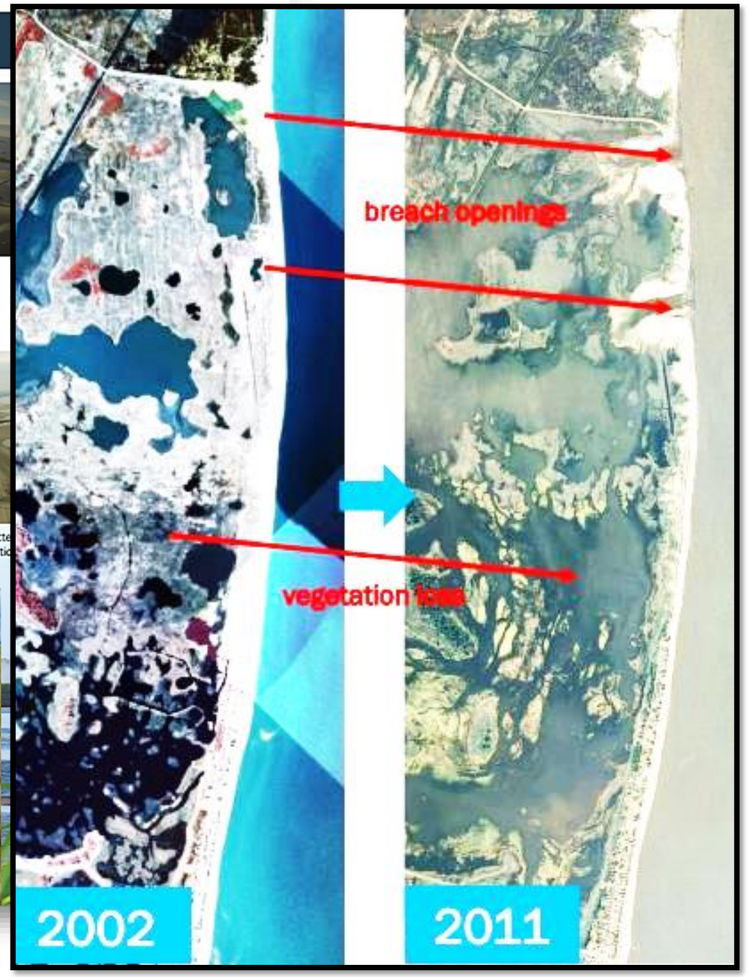


The Blue & Green Corridors Project focuses on Robert E. Lee Blvd., Prentiss Ave., Filmore Ave., Mirabeau Ave., Elysian Fields Ave., Franklin Ave., and Peoples Ave.

How a Blue Corridor could look along the Elysian Fields neural ground at Prentiss Avenue

USA - Resilience Project Trends – Partnering with Nature

Milton, DE - Prime Hook NWR Marsh Restoration



- Repeated storm event salt intrusion degraded the artificially engineered fresh-water habitat.
- Project restored natural ecology (brackish estuary habitat) for coastal storm protection, recreation, and ecological benefits.
- Technology-Science marriage key driver of successful decision-making process.
- Detailed Delft3D hydrodynamic model developed to understand the physical hydrological processes and guide natural ‘biomimicry’ in restoration design process.

U.S. FISH & WILDLIFE SERVICE

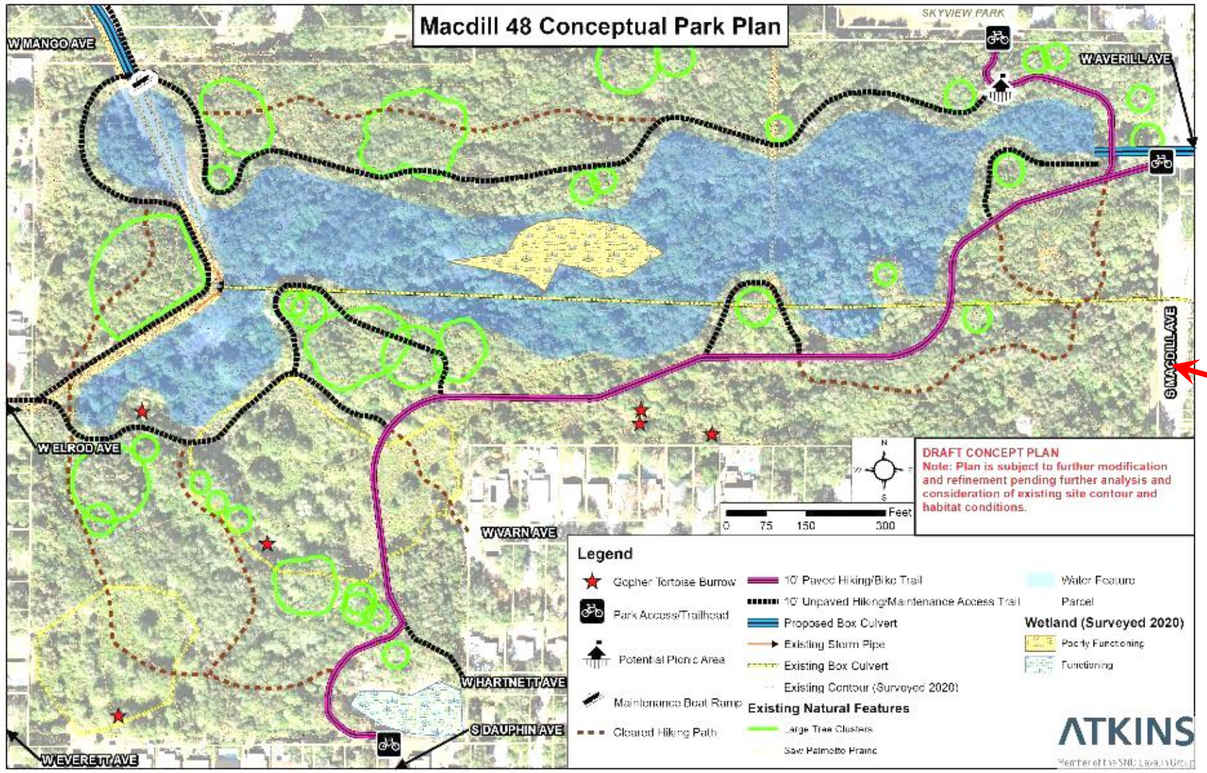
WODA Environmental Excellence Award 2016

asbpa Best Restored Beach 2017

For more details, refer to: https://e360.yale.edu/features/the-science-and-art-of-restoring-a-damaged-wetland

Florida - Resilience Project Trends – Partnering with Nature

Tampa Bay Lower Watershed – Tampa's "MacDill 48" Park - Wetland / Estuary Park solutions



Atkins EcoScience / Stormwater drainage & Native Landscape, Site design (boardwalks) SMEs

Lower Watershed Drainage Basin

- Design-Build Project (ongoing as of 4/2021) - part of sea level rise (SLR) adaptation initiatives.
- SWFWMD co-funding enabled fallow site restoration project to mobilize.
- Enhanced Park / passive recreation setting for community.
- Significant reduction of nuisance flooding including critical evacuation routes. (surrounding boroughs).
- Reduced discharge of nutrients & pollutants into Hillsborough Bay**
- Restored / Enhanced habitat diversity**

** fulfills part of City agreement w/FCT to rehydrate the (previously over-drained / depleted) wetland ecosystem, restore onsite habitat diversity and provide a high-level of water quality treatment (thereby improve downstream Hillsborough Bay water quality)

For more details, refer to: https://lpstormwater.com/project-information/

Florida - Resilience Project Trends – Grassroots Collaborative Planning

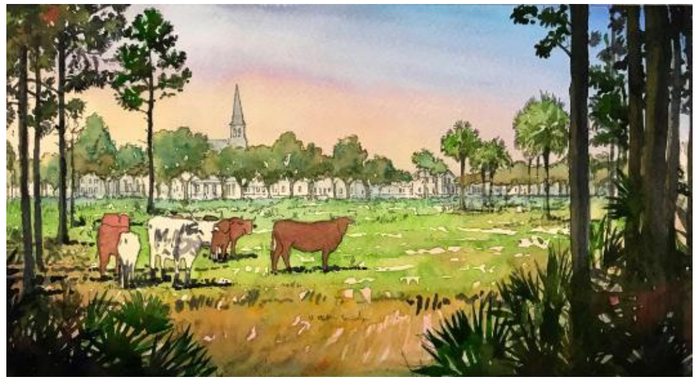
What I'm Hearing From Our Community: An Update From Knight Kiplinger

July 1, 2017

Two months ago, on May 5, I announced an unusual planning process for our family's large tract of land in western Palm City, a place called Pineland Prairie.

In full-page newspaper ads, I asked the citizens of Martin County to visit this Web site, read about my vision for this land, and tell me their top priorities for our county's future and their ideas on how this land could help meet these goals.

The community response has been gratifying, and, as promised, many of the ideas are now being applied to our preliminary planning of this project.



For more details, refer to: https://pinelandprairie.com/comments-from-citizens

Resilient ‘Connectivity’ solutions

Holistic Future Proofing – Community master plan – multi-purpose networks

Florida panther makes 800-mile trek in 5 months

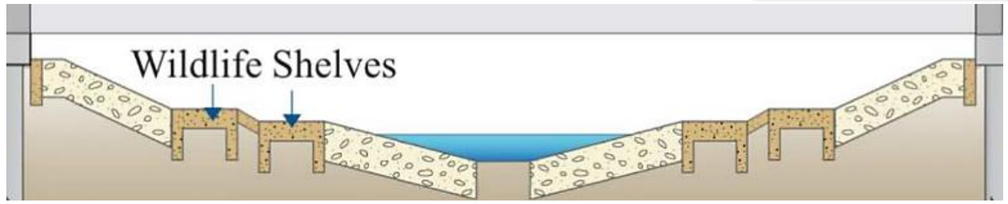
Posted at 7:32 AM, Nov 30, 2015 and last updated 7:32 AM, Nov 30, 2015

PORT ST. LUCIE, Fla. (AP) - Wildlife officials have tracked a prowling

Large Mammal ‘Eco-Pass’ culvert (France)

Winter Park, FL – Chain of Lakes small scale recreation use canal

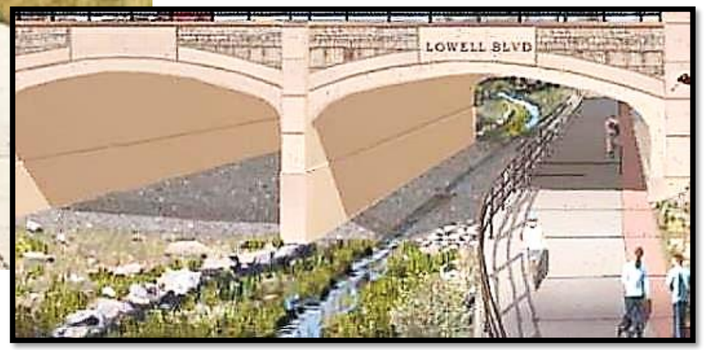
Multi-faceted – Flood control / Wildlife / Pedestrian pathway



Florida DOT D1 / Atkins Collaboration – ‘resilience’ Ecopass highway solution – recently adopted ‘standard detail’

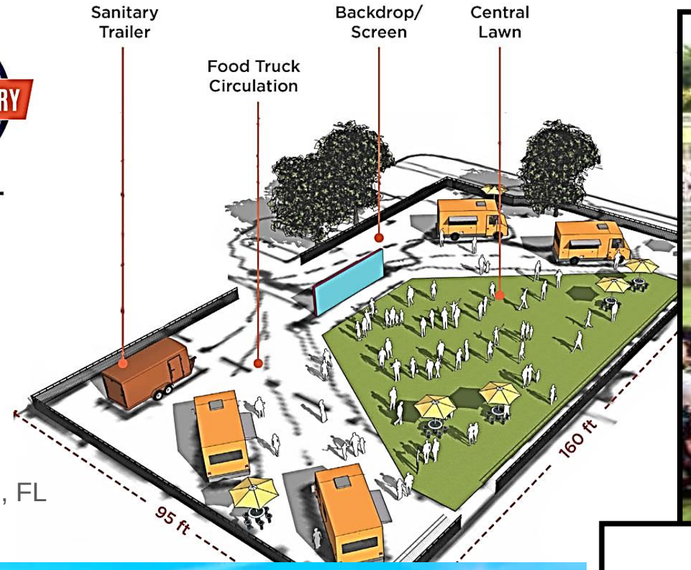
Smart Growth / Resilience connectors for:

- Watershed balance
- People
- Wildlife



Resilient ‘Flex-Use’ solutions

Private Development & Community Open Space



Gainesville, FL

“Celebration Park” Food Truck Venue – Naples, FL

Seaside, FL Amphitheatre (top and bottom images) – also provides ‘severe event’ water storage (storm surge and/or rainfall)

Cocoa, FL – regional retrofit potential?

Opportunity for Innovation

- ‘Severe’ storm water storage parks
- Minimize built infrastructure / impervious surface
- Use of mobile elements that can be evacuated/relocated (food trucks, etc.)

Community / Campus Master Plan – Low Impact Development (LID)

Harmony, FL – 70% of Harmony's 11,000 acres are lakes, conservation areas and green space.

Key Site Features / Strategies

- Reduced Impervious surface area – e.g., narrower roads (also help slow traffic speeds), smaller house/hardscape footprints, use of pervious pavers/crushed shell drives, etc.
- 'De-centralized' stormwater features - Numerous 'rain-scape' features to infiltrate (or capture/reuse) rainfall close to its source.

Key Benefits / Opportunities

- Safeguarding water quality, local aquifer recharge hydrology
- Community aesthetics, integrated landscape & habitat
- Reduced infrastructure system costs
- Reduced potable water / irrigation demand
- Supports compliance with numerous codes, regulatory criteria

Community / Campus Master Plan – Low Impact Development (LID)

‘Rainscaping’ & Land Use ‘Clustering’ to maximize benefits

Shared play field / open space bioswale

Crushed shell / pervious ‘paving’ and landscape cover

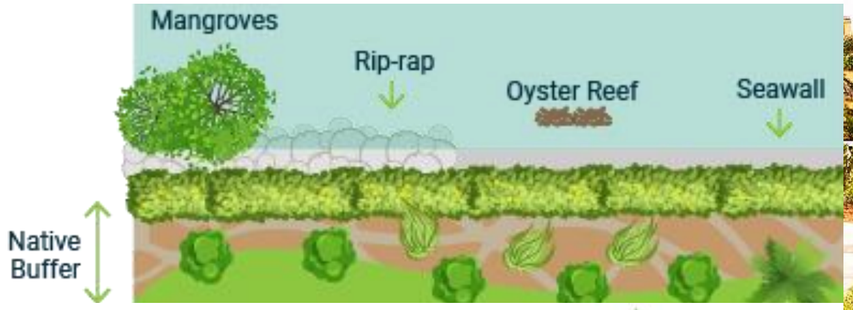
‘Pocket Neighborhood’ concept

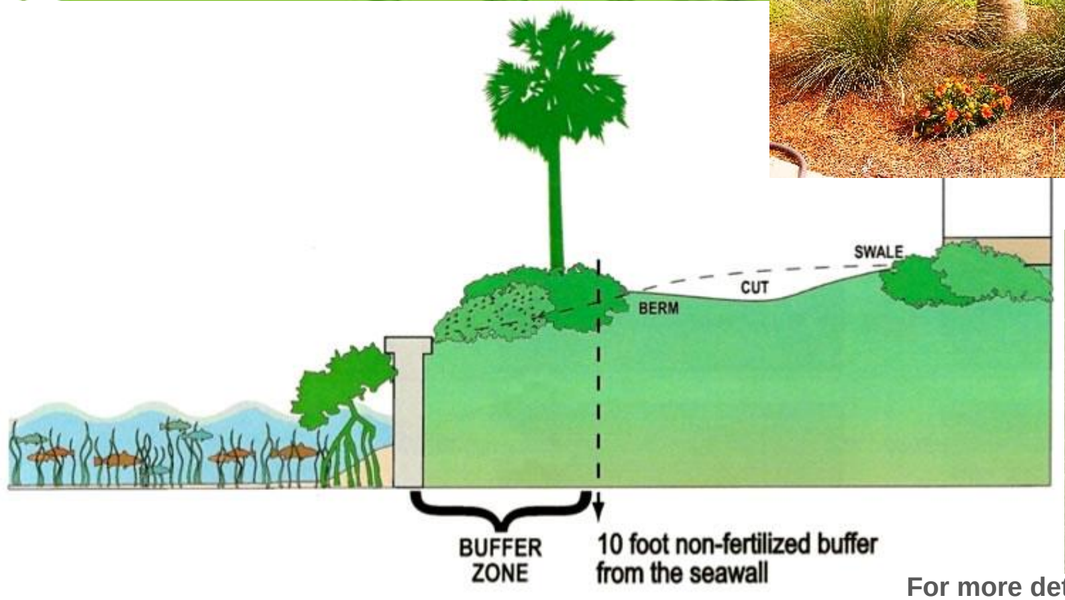
Native soils / leaf mulch landscape ‘bioretention’

Feature rain garden / bioswale for high-profile locations

Waterfront conditions– Low Impact Development (LID)

ALL Water-Front Buffer Zones (Protecting Ecosystem Water Quality)



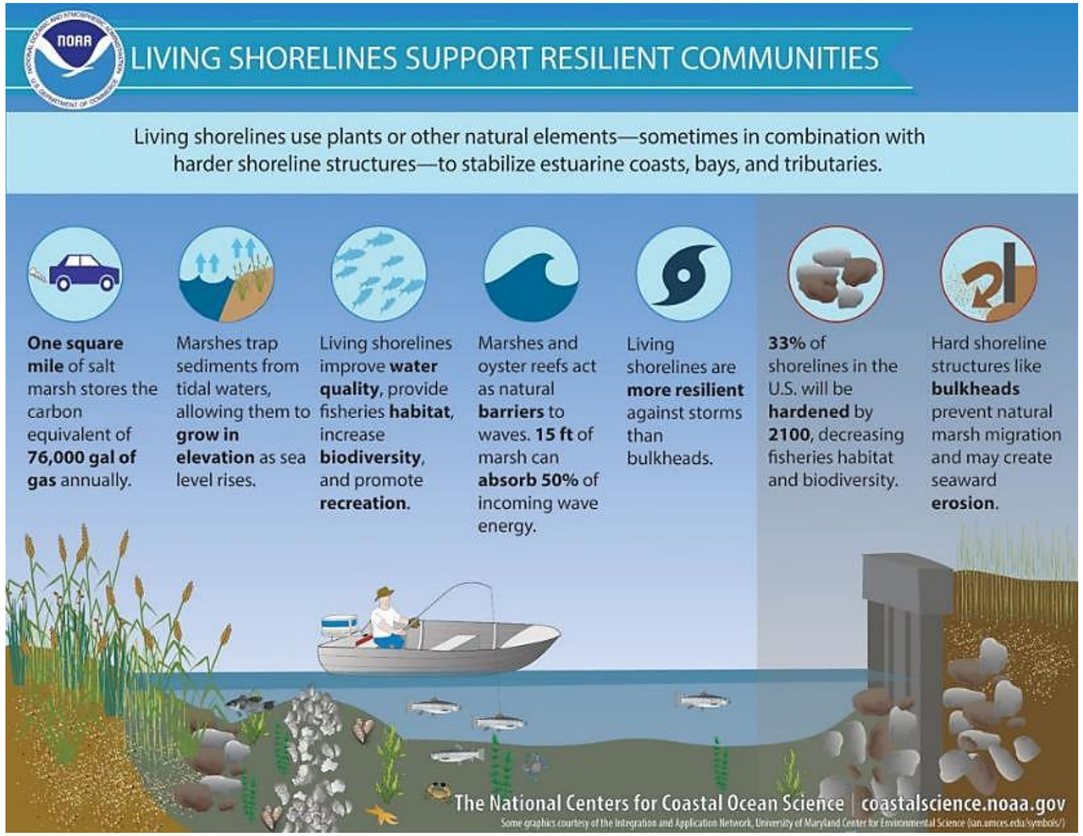


- Provide low-maintenance buffer zone least 15ft** (25ft+ at IRL/Indian River) from the water body.
- No grass clippings, pesticides, fertilizer, or irrigation water should be applied in this zone.
- Buffer with low-maintenance plants to filter stormwater and prevent erosion.
- Plant Florida-Friendly / Preserve existing native shoreline plants.

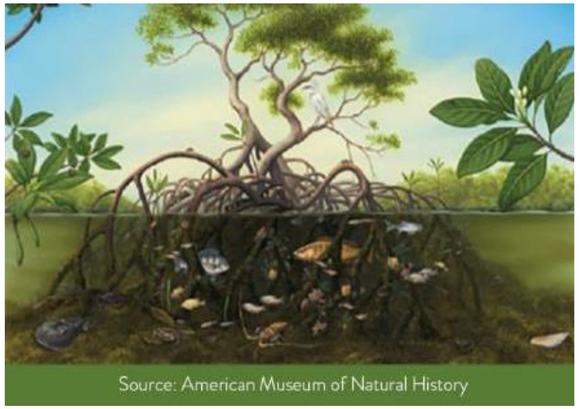
For more details, refer to: https://keepbrevardbeautiful.org/our-programs/lagoon-friendly-lawns/certified-lawn-care-contractors

Brevard County – Resilient ‘Coastal’ solutions

Holistic Future Proofing & Habitat / Eco-tourism health – Estuaries/ marshes & living shorelines



For more details, refer to: https://www.habitatblueprint.noaa.gov



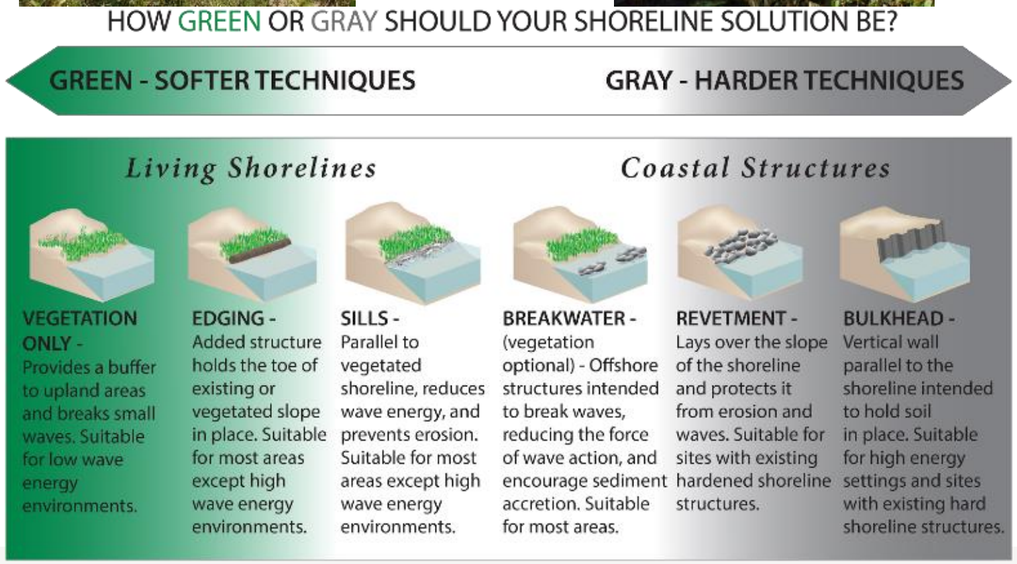
- Estuaries & Salt Marshes:
  - Reduce storm surge by reducing wave intensity and height and by slowing the flow of water as it travels across the marsh.
  - Store floodwaters & provide water quality benefits, contributing toward greater ecosystem health / resilience.
  - Provide critical habitat for manatees / overall biodiversity.
- Oysters, Coral Reefs, Mangroves:
  - Break offshore waves, reducing wave energy & slowing inland water transfer.
  - Provide critical habitat for marine ecosystem biodiversity.

Brevard County – Resilient ‘Coastal’ solutions

Holistic Future Proofing & Habitat / Eco-tourism health – “redeemed” sea walls

Redeemed seawall at FWC’s Mosquito Lagoon Marine Enhancement Center Shoreline Demonstration Area New Smyrna Beach, FL
(coquina planter, oyster bag planter, and rip-rap with native plants)

Redeemed seawall feature
Tidal Inlet of Hillsborough River, Tampa FL



Brevard County Douglas Park Living Shoreline Demonstration site
oyster seawall revetments and breakwaters

- As of 02/24/2021, Florida Manatee deaths >358 - 3x higher than 1st Qtr 2020 or 2019.
- Critical IRL habitat under threat due to algae blooms, fish kills, poor water quality, and dwindling seagrass.
- ½ cent SOIRL* tax funded projects
  - Dredging removal of pollutants (“muck”) to reduce algae blooms and fish kills & aid sea grass establishment / successful living shoreline restoration.
  - Living Shore / Oyster/Clam/Mangrove restorations
  - Septic to Sewer conversion

For more details, refer to: https://restoreourshores.org/

* Save Our Indian River Lagoon

Brevard County – Resilient property solutions

Holistic Future Proofing – Community master plan – multi-faceted solutions – Development codes

Brevard COUNTY
Natural Resources Management

- City/County collaboration to identify shared community scale infrastructure ‘guiding principles’ and associated resilience / sustainability values and priorities.
- Advance community adoption of Best Practices
  - Reduce harmful Algae Bloom / non-point source Waterway nutrification (fertilizers, animal waste, etc.)
  - Reduce localized ‘nuisance’ flooding potential (long-term preventative)
  - Conserve current potable water utility infrastructure resources

For more details, refer to: https://restoreourshores.org/
https://savetheirl.org/education/low-impact-development/
https://befloridiannow.org/homeowner-toolkit/

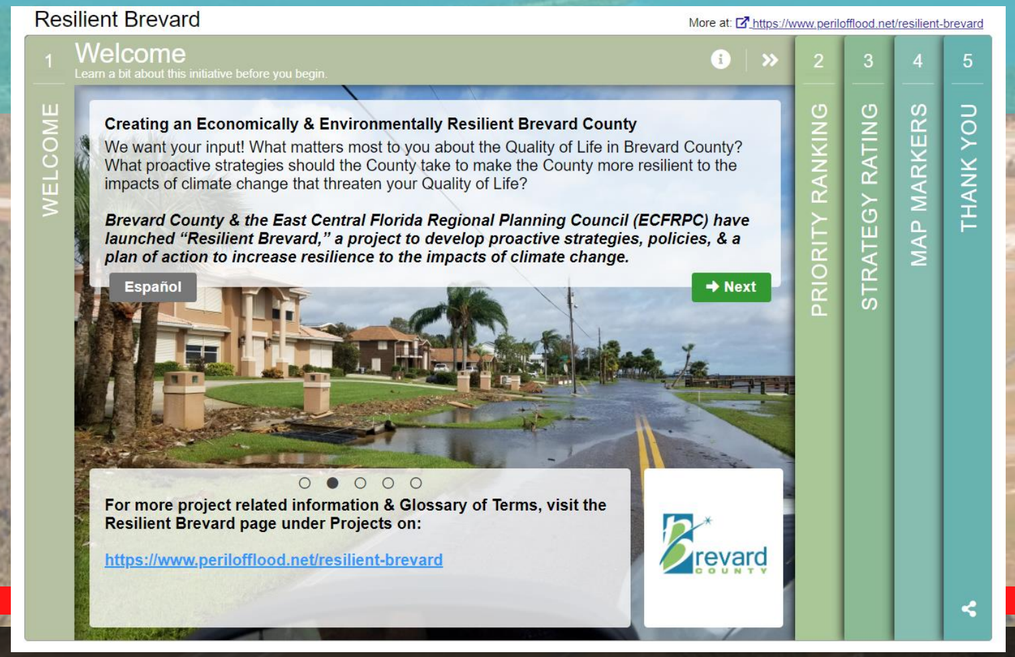
Thank you!

Brevard County – Embracing a resilient future

Climate Adaptation and Resiliency Recap & Resources

- Engineering Net Zero - https://www.engineeringnetzero.com/sectors-services/
- Atkins Built + Beyond Podcast - https://builtandbeyond.buzzsprout.com/ (Climate, Resilience, etc.)
- LID strategy videos - https://soils.ifas.ufl.edu/extension/videos/low-impact-development/
- Brevard Resources - https://keepbrevardbeautiful.org/get-educated/sustainability
- IRL Resources - https://www.brevardfl.gov/SaveOurLagoon/Home

RESILIENCY STRATEGIES



RESILIENT BREVARD 2021
www.perilofflood.net/resilient-brevard

Nature-Based Strategies:

- Adaptation Action Areas

Public Services & Safety:

- Evaluate Buffers for water quality protection and protection from flooding.
- Evaluate Relocating Utilities Outside of the CHHA.

Public Health & Equity:

- Develop Green / Nature-Based Infrastructure Plan
- Identify Funding Mechanisms for Funding Nature-Based Infrastructure Implementation and Maintenance

Questions & Comments

Mentimeter

RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

THANK YOU

Jane Hart - Brevard County Planning and Development
Lori Cox, AICP – East Central Florida Regional Planning Council
Thomas Ruppert, Florida Sea Grant
Joanna Switzer, Atkins
resilientbrevard@ecfrpc.org

https://www.perilofflood.net/resilient-brevard

PUBLIC COMMENTARY DELIVERED VIA CHAT FOR COMMUNITY MEETING #2, HELD APRIL 12, 2021

0:16:21	Tara McCue, AICP, ECFRPC:	Everyone in that needs to be in?
0:18:42	Bach McClure:	I'm here if you need me. - Bach
0:19:11	Tara McCue, AICP, ECFRPC:	thank you! if your phone is muted, I can change you to "allow to talk"
0:22:44	Tara McCue, AICP, ECFRPC:	join us at menti.com enter code:7558 9558
0:23:09	Tara McCue, AICP, ECFRPC:	join us at menti.com enter code 7558 9558
0:29:07	Kristina Jackson:	I think I'm not seeing the stuff hes talking about
0:32:36	Kristina Jackson:	With sea rise how much will the IRL rise, will it be equal with sea rise?
0:33:14	Randall Parkinson:	IRL SLR will be the same as global sea level rise
0:39:55	Sandra Sullivan:	It is interesting that the flood map was basically the same in 1988 in this ECFRPB document evaluating hurricane evacuation off the barrier island. https://drive.google.com/file/d/19XTTsnrdUmi9t1AsIAiUIeqc9glS6tvy/view?usp=sharing
0:40:21	Kristina Jackson:	It's ok, we've all been there, I was heard yelling at my son in Zoom yesterday
0:41:00	Daniel Martoma:	Great cartoon!
0:41:52	Randall Parkinson:	Sandra, can you clarify your concern please
0:43:48	Lee Ann Mccullough-Wham:	Is the CCCL the 1986 or 1981 line?
0:44:48	Tara McCue, AICP, ECFRPC:	Darcie, i don't know the date...we just use the latest one that we get the file from the state. Has there been an update since 1986?
0:47:49	Sandra Sullivan:	So in other words most of the area impacted is one the floodplain.
0:50:23	Sandra Sullivan:	Nature based: the most important is protecting the flood plain and wetlands in Florida - to support this please look at the scientific research: https://scholar.google.com/scholar?hl=en&as_sdt=0%2C10&q=sea+level+rise+%2B+wetlands&btnG=
0:50:36	Randall Parkinson:	Sandra, different areas will be impacted by different types of flooding. Floodplains are vulnerable to both heavy rainfall events and storm surge. Coastal areas will be impacted significantly by storm surge. Both will be impacted by SLR.
0:53:22	Darcie McGee:	Lee Ann, checking on the cccl definition. may take a minute. it's a definition that is pages long. great question
0:53:50	Lee Ann Mccullough-Wham:	ok thank you
0:55:16	Tara McCue, AICP, ECFRPC:	Here is a good link for the CCCL guidance. https://floridadep.gov/sites/default/files/Homeowner%27s%20Guide%20to%20the%20CCCL%20Program%206_2012%20%28002%29_0.pdf
0:55:53	Randall Parkinson:	Year 2017
0:57:01	Sandra Sullivan:	Thank you! Land Dev Codes needs to protect wetlands as most important for resiliency as shown by scientific research - remember Irma - wetlands under 3-4 feet of water :): https://scholar.google.com/scholar?hl=en&as_sdt=0%2C10&q=sea+level+rise+%2B+wetlands&btnG=
0:57:12	Lee Ann Mccullough-Wham:	perfect
0:57:17	Lee Ann Mccullough-Wham:	thanks
1:19:55	Sandra Sullivan:	Wow, excellent presentation.
1:22:14	Tara McCue, AICP, ECFRPC:	menti.com
1:22:28	Tara McCue, AICP, ECFRPC:	Code 7558 9558
1:25:34	Sandra Sullivan:	I am writing one now
1:26:17	Sandra Sullivan:	In the last meeting, Mr. Rupport was sayng about developing A1A corrodor Satellite Beach -however FEMA map shows A1A a flood zone as well.
1:26:31	Sandra Sullivan:	How does he justifiy that?
1:27:41	Sandra Sullivan:	What are you looking at for building code changes on the barrier island?
1:29:18	Bach McClure:	They're asking about killing vegetation and then it discharging.
1:29:47	Sandra Sullivan:	What plans do you think you will have for the SR404 which has a difficiency for evacuation - given the projection for more Cat4/5 hurricanes due to rise in water temp.

1:34:14	Thomas Ruppert:	This is Thomas Ruppert. As to the question from Sandra regarding A1A. If you view the FEMA flood maps for Satellite Beach at https://msc.fema.gov/portal/search?AddressQuery=satellite%20Beach%2C%20florida#searchresultsanchor, you will see that A1A is NOT in the Special Flood Hazard Area (1% annual chance). In fact, A1A is also outside the 0.2% annual chance flood, sometimes referred to as the "500 year flood plain."
1:34:57	Tara McCue, AICP, ECFRPC:	Regarding SR 405, the Space Coast TPO is working on a resilience transportation plan. They will be looking at roadway transportation resilience including evacuation routes.
1:35:41	Darcie McGee:	veg swales only got a few votes
1:38:01	Sandra Sullivan:	Yes it is in flood map for FEMA see this post with pix off FEMA: https://www.facebook.com/groups/WavesAction32937/permalink/2777818762548657/
1:38:50	Sandra Sullivan:	Shows A1A flooded same as the west side.
1:40:13	Sandra Sullivan:	Mr. Rupport did you consider the evacuation deficiency in the above report and in TPO docs for the 404 causeway when you proposed more density on the barrier island?
1:43:13	Sandra Sullivan:	That is the link I used to generate the flooding map. Did you see FEMA recently updated it so maybe you haven't seen since those updates.
1:43:55	Thomas Ruppert:	It is not correct that the maps show the same flooding at A1A as on the west side. The maps on the Facebook page are not the detailed enough to see properly. "Firmettes" available on FEMA's website at the link I provided are. When you bring up Satellite Beach, click on the "Print Map/FIRMette" and you will see that the SFHA does not reach A1A. And look carefully at the legend: the orange/brown coloration is the 500-year floodplain, not the Special Flood Hazard Area. This is in direct contrast to all of the 100-year floodplain (i.e. Special Flood Hazard Areas) which are all on the west side of Satellite Beach.
1:45:54	Sandra Sullivan:	I wish I could paste the image here - the same flooding on the west is on the A1A area. I could use an image if I could
1:46:01	Daniel Martoma:	Thank you.
1:46:27	Sandra Sullivan:	Thank you Lori.

Community Meeting #2 April 12, 2021
REGISTRANT LIST

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V. APPENDIX III: INFOMERCIAL SLIDES & TALKING POINTS

RESILIENT BREVARD

YOU CAN HELP BREVARD COUNTY BECOME MORE RESILIENT TO FLOODING & IMPACTS OF NATURAL HAZARDS

SCAN WITH PHONE CAMERA TO TAKE COMMUNITY SURVEY

Brevard County

Florida Department of Environmental Protection

East Central Florida Regional Planning Council est.1962

Sea Grant Florida

RWParkinson Consulting, Inc.

www.perilofflood.net/resilient-brevard

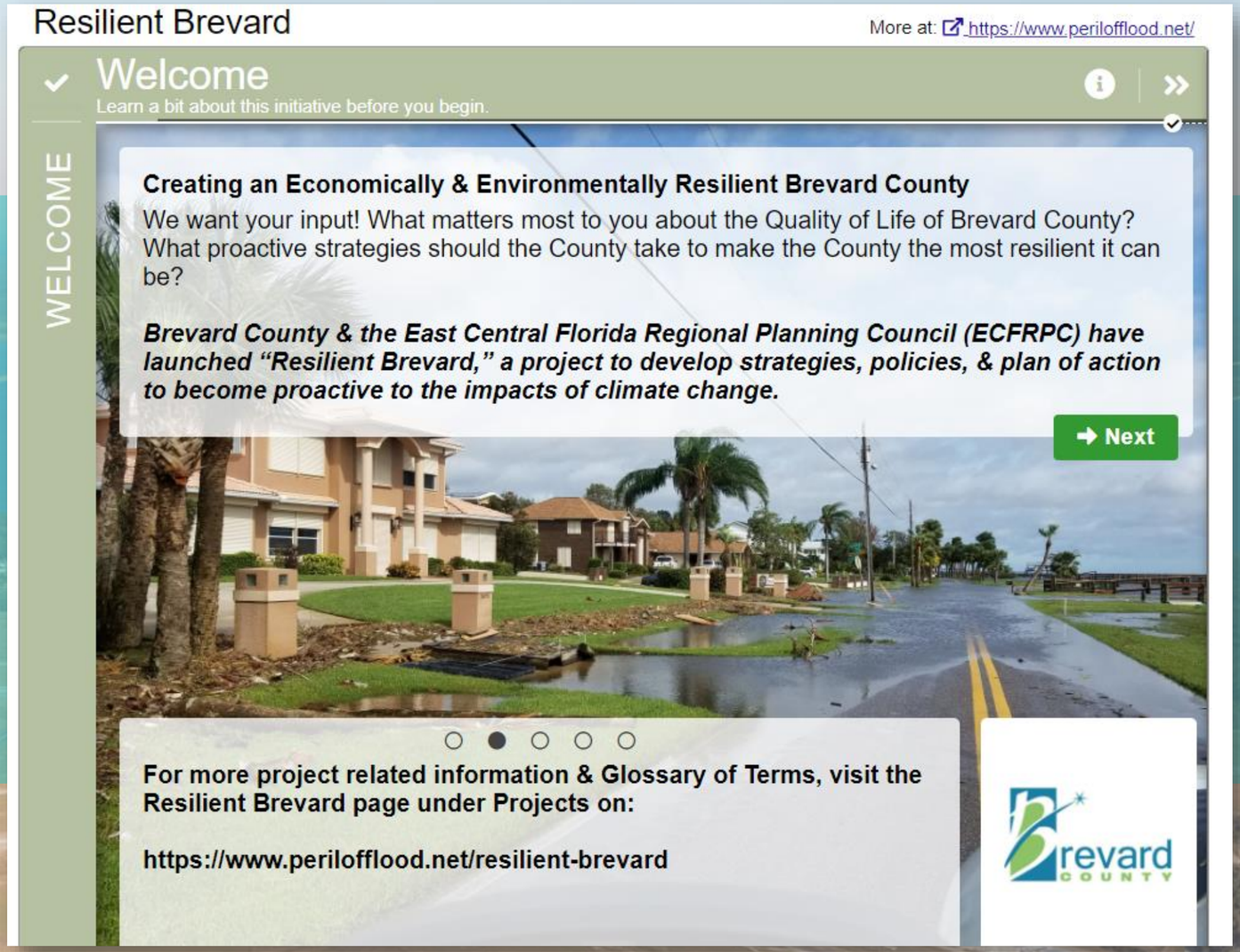
PROJECT PURPOSE

- Identify vulnerabilities
- Provide data & recommendations for future decision-making
- Develop strategies to minimize & mitigate the impacts of flooding & natural hazards

La encuesta está disponible en español en www.perilofflood.net/resilient-brevard.

COMMUNITY SURVEY

WHAT STRATEGIES WILL MAKE BREVARD COUNTY MORE RESILIENT TO THE IMPACTS OF FLOODING & NATURAL HAZARDS?



COMMUNITY SURVEY

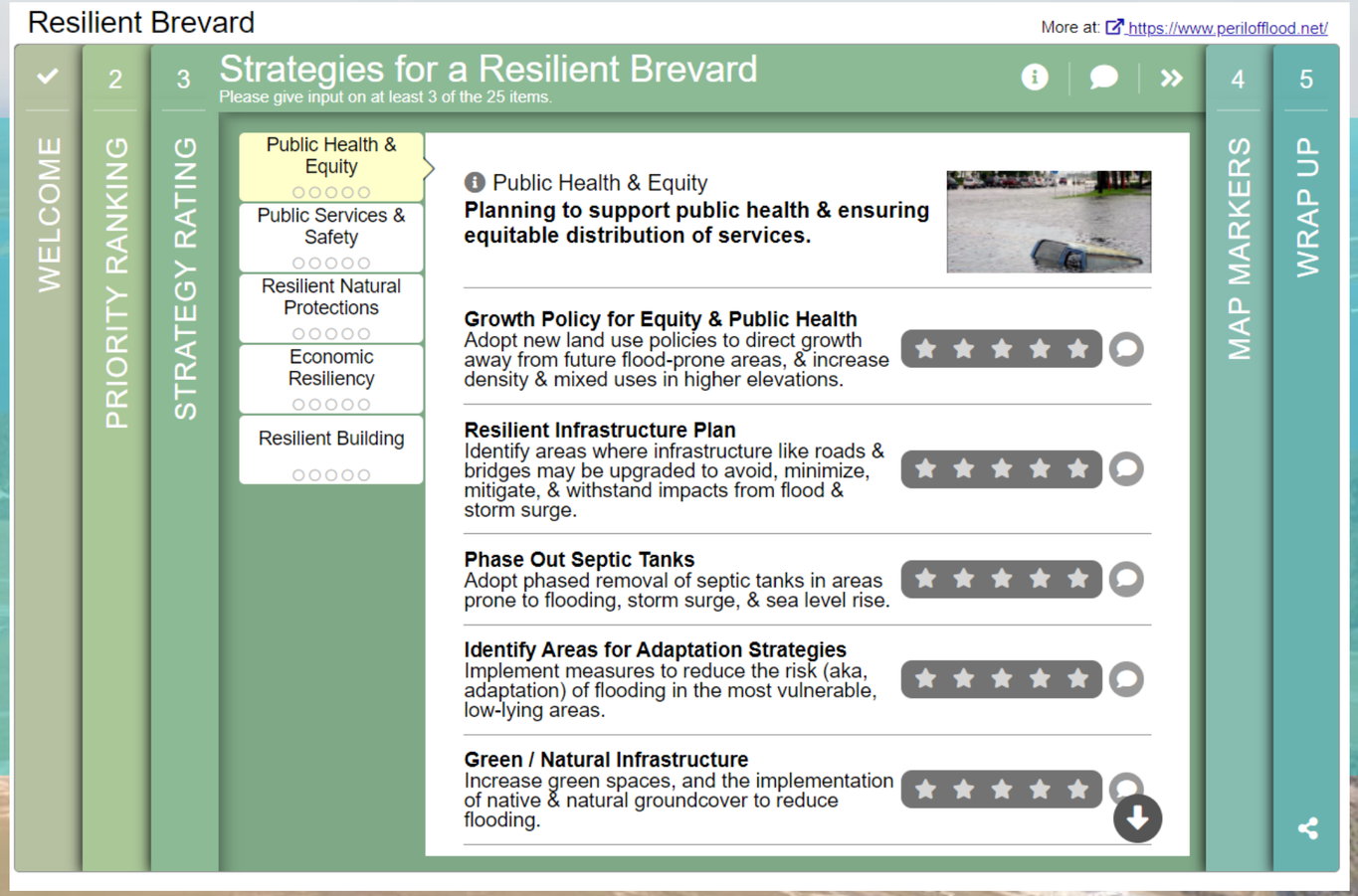
WHAT STRATEGIES WILL MAKE BREVARD COUNTY MORE RESILIENT TO THE IMPACTS OF FLOODING & NATURAL HAZARDS?

RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

COMMUNITY SURVEY

WHAT STRATEGIES WILL MAKE BREVARD COUNTY MORE RESILIENT TO THE IMPACTS OF FLOODING & NATURAL HAZARDS?

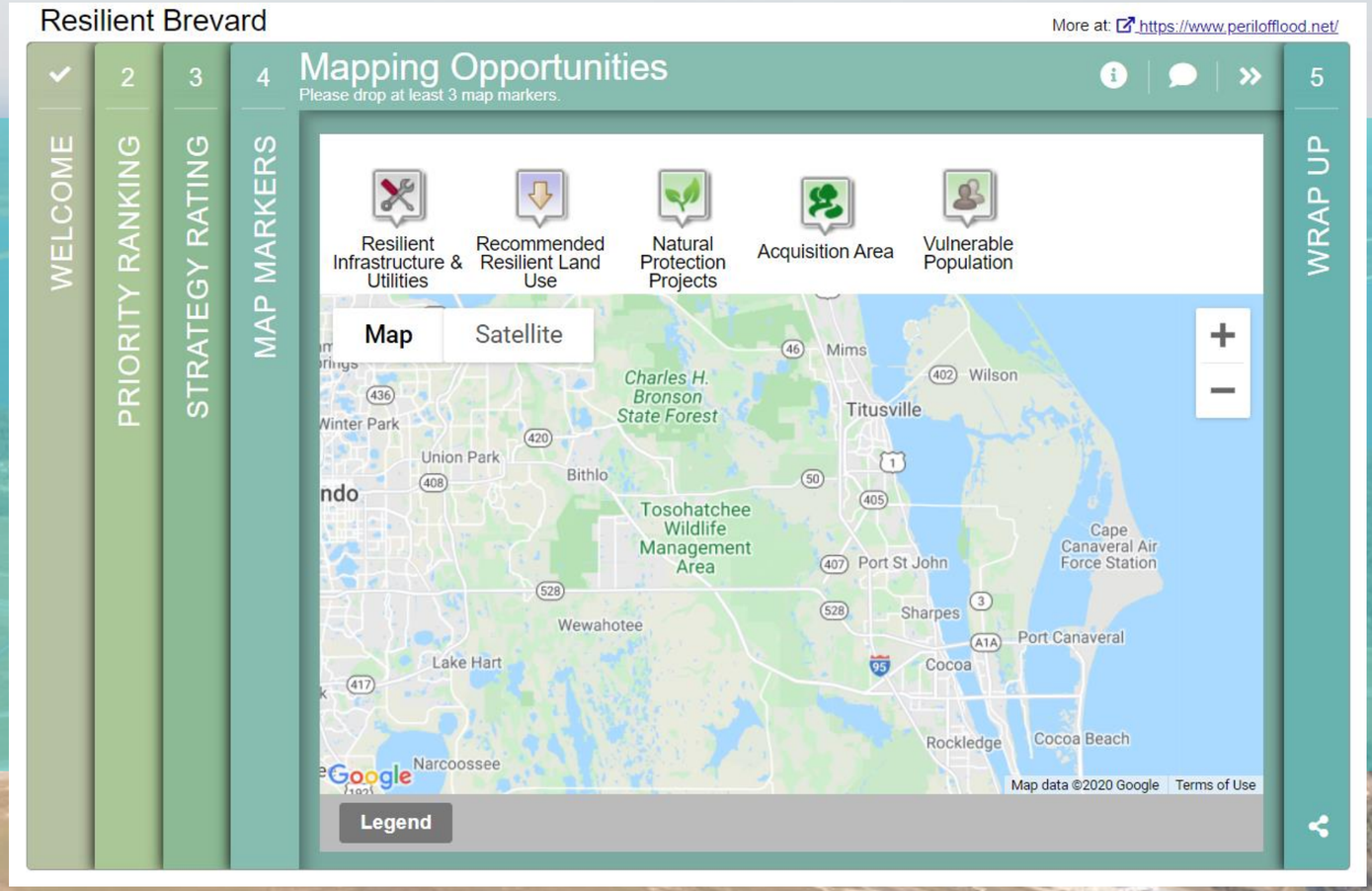


RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

COMMUNITY SURVEY

WHAT STRATEGIES WILL MAKE BREVARD COUNTY MORE RESILIENT TO THE IMPACTS OF FLOODING & NATURAL HAZARDS?



RESILIENT BREVARD 2021

www.perilofflood.net/resilient-brevard

ADAPTATION

Adjusting natural or human systems to lessen harm.

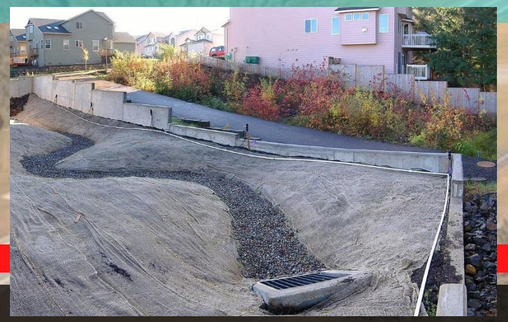
PRIORITY ACTION AREAS

Areas identified for adaptation strategies to:

- Avoid or minimize risks
- Focus fiscal resources
- Support vulnerable populations

GREEN INFRASTRUCTURE

Design features using natural systems to protect urban development from natural hazards such as inland flooding, stormwater pollution, & storm surge. For example: green space, coastal dunes, native vegetation, & bioswales



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RESILIENT DEVELOPMENT

Designing development to adapt, mitigate, or withstand the impacts of environmental hazards such as flooding, tropical storms, hurricanes, & storm surge.

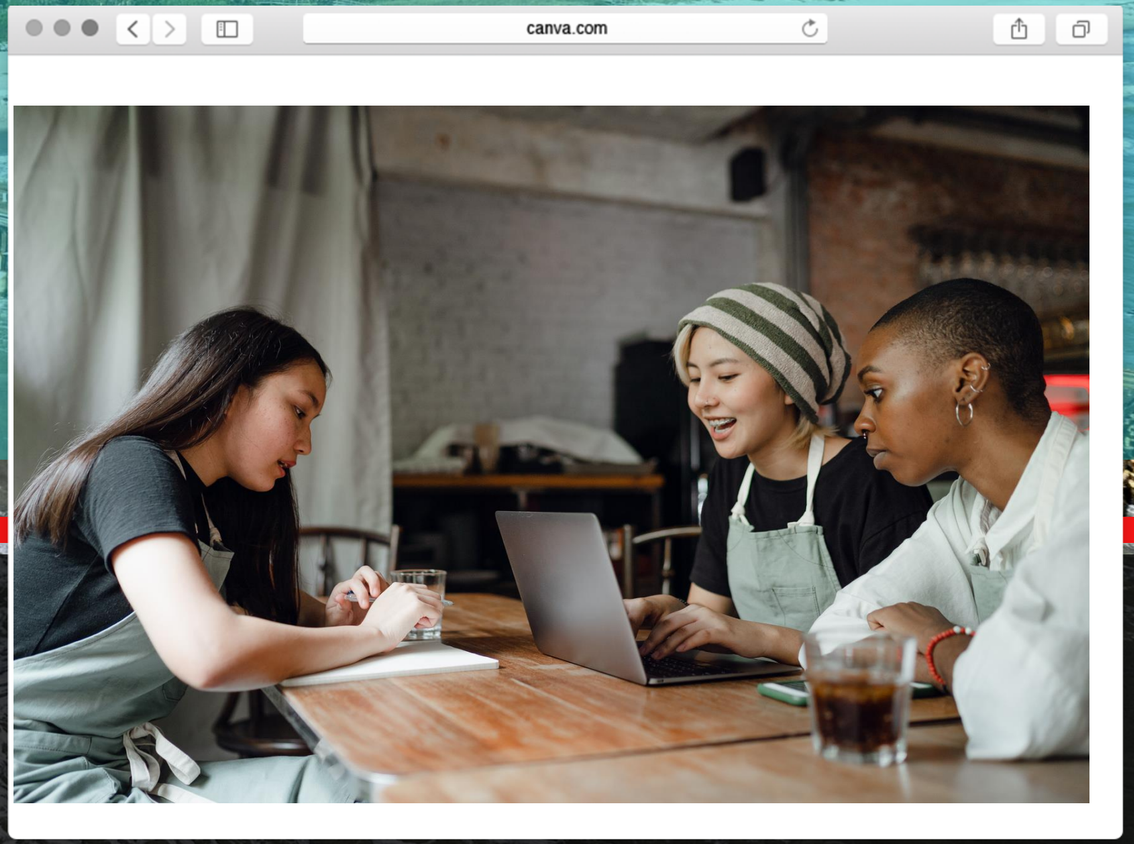
VULNERABILITY ANALYSIS

WHAT?
WHO?
WHEN?

VIRTUAL PUBLIC MEETINGS

Meeting 1: Preliminary Findings
Meeting 2: Project Conclusions

Project updates:
https://www.perilofflood.net/resilient-brevard



STAY UPDATED / STAY INVOLVED

RESILIENT BREVARD 2021
www.perilofflood.net/resilient-brevard


THANK YOU
PROJECT UPDATES:
https://www.periloffflood.net/resilient-brevard
brevard COUNTY
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
East Central Florida Regional Planning Council
est 1962
Sea Grant Florida
RWParkinson Consulting, Inc.

Hi, I'm Jane Hart from Brevard County Planning & Development. I invite you to participate in "Resilient Brevard," a project to fortify and protect Brevard County from the perils of flooding that our community faces today and into the future.

As a coastal community of nearly 600,000 people, we are quite familiar with tropical storm-related flooding and coastal erosion. With these events, we also experience secondary impacts including

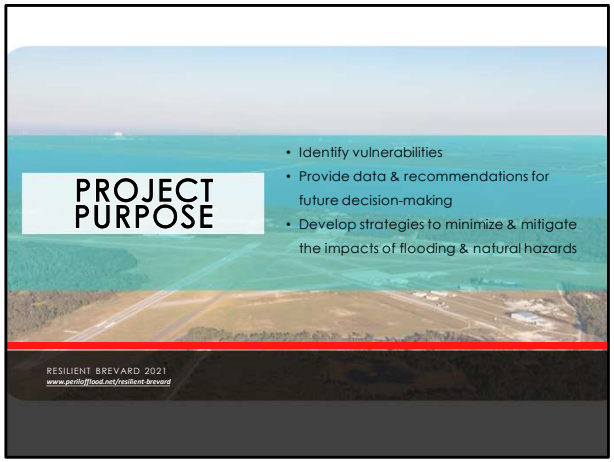
environmental damage, and interruptions in the delivery of public services like power, water, sewer, and emergency services.

With hundreds of miles of shoreline, as flooding and surge impacts become more common, more severe and last longer, Brevard County faces increasing risks to critical facilities, community assets, local/regional economies, and the health/welfare of residents, businesses, and visitors.
To prepare for the projected increase in storm impacts, Brevard County is launching "Resilient Brevard" to take a comprehensive look at social, economic, and functional vulnerabilities from various types of flooding. "Resilient Brevard," will work with you, the community, to develop proactive strategies, policies, and a plan of action to increase our resilience to flooding.

To launch "Resilient Brevard," the County has partnered with the East Central Florida Regional Planning Council, through a grant by the Florida Department of Environmental Protection, and further support from Florida Sea Grant and RW Parkinson Consulting.
With your input, the County will develop strategies to mitigate,

adapt, and/or retreat from impacts, and policies to guide the decision-making process for future development, infrastructure projects, and programs. Please scan the code on the screen or go to www.perilofflood.net/resilient-brevard to take an online survey.

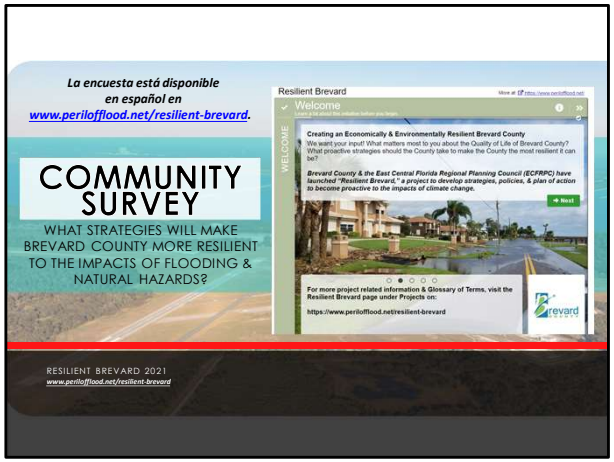
The survey will capture what factors you find most important to the quality of life you enjoy in Brevard County. You will learn in subsequent slides how to provide your feedback. The survey should take about 15 minutes of your time.



Hi, I'm Lori Cox with the East Central Florida Regional Planning Council. We're supporting the County to conduct the Resilient Brevard project.

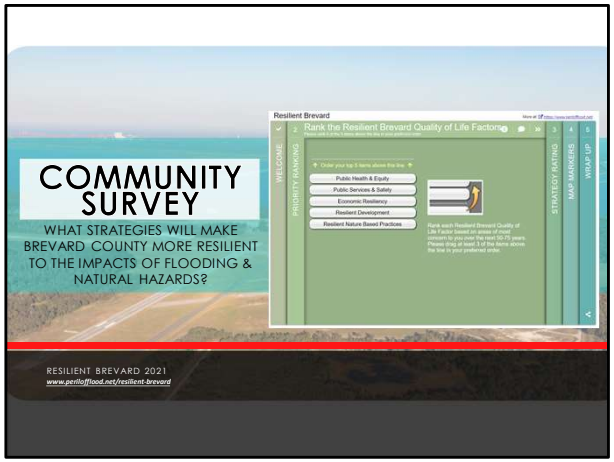
Coastal areas are especially vulnerable to the impacts of natural hazards as they are likely to experience increased flooding and storm surge due to extreme weather events, including tropical storms, and rain-induced flooding.

The purpose of this project is to support Brevard County to become more resilient to natural hazards by identifying vulnerabilities, providing data and recommendations to support future decision-making, and developing some draft strategies to minimize and mitigate impacts from known threats such as coastal and inland flooding.



As part of this study, Brevard County invites you to participate in an online community survey. This survey seeks to identify community-supported STRATEGIES that WILL MAKE BREVARD COUNTY MORE RESILIENT TO THE IMPACTS OF NATURAL HAZARDS. The survey is currently open and will be open until January 22nd.

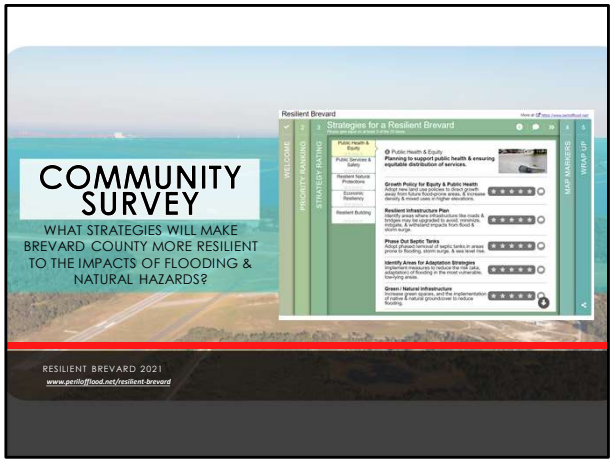
You can find the survey in English and Spanish at: www.perilofflood.net/resilient-Brevard



The Resilient Brevard Community Survey provides the option to rank factors that support quality of life.

Those factors are:
1. Public Health & Equity
2. Public Services & Safety
3. Economic Resiliency
4. Resilient Development
5. Resilient Nature Based Practices

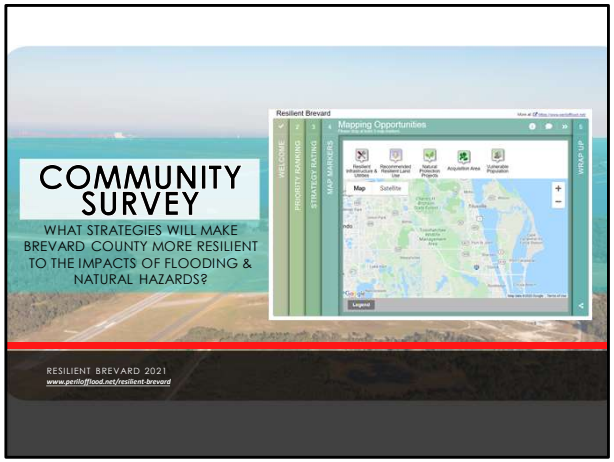
Once participants rank their top 3 out of the 5 quality of life areas provided in the survey, they will then be able to provide feedback on a collection of potential strategies to support to those Quality of Life Factors.



Based on the choices you made on the previous screen, the Quality of Life Factors, you'll then provide feedback on strategies to support each of those factors.

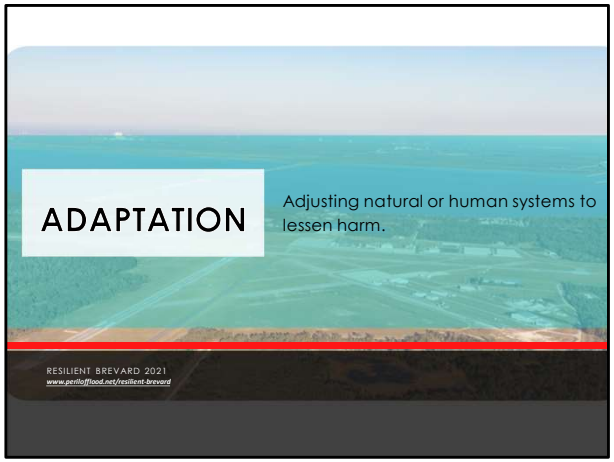
Brevard County is proactively developing strategies to avoid, minimize, and mitigate the impacts of natural hazards.

The Community Survey provides participants the opportunity to rank potential strategies to preserve and protect our community – strategies like green or nature-based improvements, fortifying critical facilities, and implementing land use policies to shift development out of high-hazard areas. Then, you'll have the opportunity to show us exactly where you'd like to see strategies implemented by marking priority locations on an interactive map. The survey should take about 15 minutes of your time.



For more information, the Community Survey also provides the opportunity for respondents to provide feedback through a mapping tool where respondents can drop a pin where they'd like to see a particular strategy implemented.

Just drag and drop a pin on the map and then you'll be shown some corresponding strategies to avoid, minimize, and mitigate the impacts of climate change - including flooding and coastal erosion.



On the project site, you'll find a glossary of terms you might find in the survey and the study.

Some of the terms you'll see in the Community Survey include Adaptation….


PRIORITY
ACTION AREAS
Areas identified for adaptation strategies to:
• Avoid or minimize risks
• Focus fiscal resources
• Support vulnerable populations
RESILIENT BREVARD 2021
www.perilsofflood.net/resilient-brevard


GREEN
INFRASTRUCTURE
Design features using natural systems to protect urban development from natural hazards such as inland flooding, stormwater pollution, & storm surge. For example: green space, coastal dunes, native vegetation, & bioswales
RESILIENT BREVARD 2021
www.perilofflood.net/resilient-brevard


RESILIENT DEVELOPMENT
Designing development to adapt, mitigate, or withstand the impacts of environmental hazards such as flooding, tropical storms, hurricanes, & storm surge.
RESILIENT BREVARD 2021
www.perilsofflood.net/resilient-brevard

Utilizing the results of the Community Survey, the project team will conduct a more detailed Vulnerability Analysis. The VA looks at high tide, storm surge, flash floods, and stormwater runoff.

The analysis will determine WHAT and WHO is located within high risk areas today and in the future, and WHEN impacts are projected to occur.

The outcome of the vulnerability analysis and the comments and feedback from the Community Survey to develop strategies and draft land-use policies to guide development to low-risk areas.

This outcomes of this study will be presented to the Board of County Commissioners in future public hearings as Brevard County updates its comprehensive plan.

Following the online Community Survey, two virtual public meetings will be provided.

To protect the health & safety of our community, these meetings will be held virtually.

This will give you the opportunity to continue to stay connected to the project and to stay involved.

Stay tuned to the project page for future updates and meeting announcements.

You can see the URL on the slide or scan the QR code to be taken directly there.

Thank you for your time.

We appreciate your input on the Community Survey and look forward seeing you at the future virtual meetings.

If you need assistance taking the survey or need additional information, please email the project team at: resilientbrevard@ecfrpc.org or call the East Central Florida Regional Planning Council at (407) 245-2300.

We thank you for taking time to help Brevard County find the most appropriate ways to avoid and overcome the perils of flooding.

I. APPENDIX IV: COMMUNITY SURVEY RESPONDENT COMMENTARY

File contains all data collected as of March-1-2021 23:00:00-UTC. All data reported in UTC. Click the Refresh button in Data Center to download the latest dataset.

VisitID	VisitTime	SiteVisited	Platform	Set	Item	Comment	Negative	Neutral	Positive
135558	29-12-2020 13:56:09	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	This is 10 stars to me. We have got to stop thepollution into our waters	4%	11%	85%
135594	29-12-2020 15:20:37	az2z2x	mobile	Resilient Nature Based Practices	Conservation Lands	Overdevelopment will accelerate the impact of climate change and destroy our greatest assets - the lagoon and beaches	81%	18%	1%
135594	29-12-2020 15:21:22	az2z2x	mobile	Resilient Nature Based Practices	Land Use to Protect Surface Water	Tourists don't want to see dead dolphins andmanatees washing ashore. Improving the lagoon is a must	50%	2%	48%
135594	29-12-2020 15:22:01	az2z2x	mobile	Public Health & Equity	Phase Out Septic Tanks	This will have a huge impact on lagoon health and better tourism	2%	2%	96%
135594	29-12-2020 15:23:14	az2z2x	mobile	Economic Resiliency	Development Standards for Resiliency	This will preserve the spaces that drive tourism and economy	1%	81%	18%
135628	29-12-2020 16:33:21	az2z2x	mobile	Resilient Nature Based Practices	Beach Quality & Quantity	Stormwater systems need improvement to not be designed to dump directly into the rivers. Example: merritt island	85%	2%	13%
135714	29-12-2020 18:16:02	az2z2x	mobile	Public Services & Safety	Efficient Use of Taxpayer Dollars	Taxpayer dollars should be used to invest in resilient infrastructure in high-risk areas for current residents and businesses, but investment may be limited based on a matching criterion or other economic savings.	81%	10%	9%
135785	29-12-2020 19:24:11	az2z2x	web	Resilient Nature Based Practices	Resilient Natural Practices & Protections	We should educate homeowners on creating rain gardens and natural retention areas in their yards and discourage grass-based landscapes that use water, pesticides and fertilizer. We should study what is being done in NC (https://www.nccoast.org/project/nbss/) and other coastal states.	97%	3%	0%
135785	29-12-2020 19:25:20	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	We put way too much money into constant beach restoration instead of understanding how to better work with the ocean!	88%	3%	9%
135785	29-12-2020 19:27:00	az2z2x	web	Resilient Nature Based Practices	Land Use to Protect Surface Water	Create natural parks and other walk and bikeways with natural landscapes and projects that emphasize good land management practices.	0%	34%	66%
135785	29-12-2020 19:28:37	az2z2x	web	Resilient Nature Based Practices	Conservation Lands	Protect the natural wetland areas, work with the Everglades restoration and St Johns management projects. Stop the use of biosolids on all farms and other properties in Brevard.	1%	95%	4%
135785	29-12-2020 19:30:38	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	What about Eau Gallie? That entire area could be revitalized but it seems to always be in some sort of a quagmire!	1%	99%	0%
135785	29-12-2020 19:31:55	az2z2x	web	Resilient Development	Incentives to Exceed Design Requirements	Why not just change the design requirements?	23%	74%	3%
135785	29-12-2020 19:32:55	az2z2x	web	Public Health & Equity	Phase Out Septic Tanks	And quit allowing any new construction with septic!	29%	70%	1%
135855	29-12-2020 20:46:49	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	I think you should provide some education aboutwhat these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks	50%	1%	49%
135855	29-12-2020 20:46:56	az2z2x	web	Resilient Nature Based Practices	Resilient Natural Practices & Protections	I think you should provide some education aboutwhat these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks	50%	1%	49%
135855	29-12-2020 20:47:03	az2z2x	web	Public Health & Equity	Beach Quality & Quantity	I think you should provide some education aboutwhat these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks	50%	1%	49%
135855	29-12-2020 20:47:09	az2z2x	web	Resilient Nature Based Practices	Land Use to Protect Surface Water	I think you should provide some education aboutwhat these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks	50%	1%	49%
135855	29-12-2020 20:47:17	az2z2x	web	Resilient Nature Based Practices	Conservation Lands	I think you should provide some education aboutwhat these mean and how they differ. I am aware environmentally but still has some trouble really understanding what the options/tradeoffs mean. Thanks	50%	1%	49%
136062	30-12-2020 13:03:40	az2z2x	mobile	Economic Resiliency	Purchase Greenspace	If purchase occurs within Brevard	0%	100%	0%
136062	30-12-2020 13:06:23	az2z2x	mobile	Resilient Nature Based Practices	Conservation Lands	If they are acquired within Brevard	0%	100%	0%
136073	30-12-2020 13:33:02	az2z2x	mobile	Resilient Development	Incentives to Exceed Design Requirements	Forget incentives, REQUIRE it!	2%	94%	4%
136084	30-12-2020 14:34:21	az2z2x	web	Public Health & Equity	Green / Natural Infrastructure	Green infrastructure reduces temperature and heat illness risks while reducing AC costs by 20%. Trees sequester cO2 and have been proven to reducecrime and increase property values. Give us more accesible parks in Cocoa, Titusville, Cape Canaveral.	89%	11%	0%
136084	30-12-2020 14:47:10	az2z2x	web	Public Health & Equity	Growth Policy for Equity & Public Health	Give us an electric railway to Orlando airport.Do not continue to allow large gray infrastructure to be built in vulnerable areas along intracoastal and the beaches. Concrete increases runoff and increases pollutants. Put green roofs on the CapeCanaveral parking garages and terminals. Plant trees and close impermeable car only pavements in Melbourne, Cocoa, and Titusville to encourage planting, cooler temperatures, lower energy costs on cooling buildings.	91%	8%	1%
136084	30-12-2020 14:54:48	az2z2x	web	Public Health & Equity	Resilient Infrastructure Plan	Provide and develop greenways and/or complete streets along transportation corridors to Jax, and Miami.Limit development along Banana River and Indian River. Install sewer systems for the county. Replace above ground utilities with underground to allow planting of trees. Develop School gardens for their community neighbors.	1%	91%	8%
136084	30-12-2020 15:06:32	az2z2x	web	Public Health & Equity	Phase Out Septic Tanks	Yes, inspections were overturned in 2010. Tenyears later we reap lower h20 quality and brown algal blooms. New development should not be incurring with Septic tanks.	72%	23%	5%
136084	30-12-2020 17:16:06	az2z2x	web	Public Health & Equity	Identify Areas for Adaptation Strategies	Children are the most vulnerable to heat, pollutant, flood stress exposures to mold and waterborne pathogens. African American populations are morelikely to receive late or no health care or be in communities vulnerable and without disaster insurance to adverse economic impacts of algal blooms, drought, flood, and mental health impacts of heatstresses. Identify with maps areas with low income and youth populations and change behaviors in these vectors.	100%	0%	0%
136216	30-12-2020 19:45:16	az2z2x	web	Economic Resiliency	Development Standards for Resiliency	And require best natural shoreline practices toreduce erosion and flooding.	0%	1%	99%
136216	30-12-2020 19:47:13	az2z2x	web	Public Services & Safety	Natural Stormwater Management	Make Green Stormwater practices mandatory for the health and protection of people and the Economy.	3%	24%	73%
136216	30-12-2020 19:49:13	az2z2x	web	Public Services & Safety	Resilient Utilities	Use on-site power options like solar for areaswhere storms can disconnect areas from the main grid.	1%	93%	6%
136216	30-12-2020 20:37:10	az2z2x	web	Public Health & Equity	Identify Areas for Adaptation Strategies	Identify flood risk areas that need to be purchased and turned into natural states that protect from erosion and flooding. Relocate buildings in flood risk areas.	99%	0%	1%
136261	30-12-2020 21:49:44	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	Protecting upland habitat is also important. We can't all live high and dry unless we also protect those areas for endangered species such as Scrub Jays and Gopher Tortoises.	25%	4%	71%
136261	30-12-2020 21:51:51	az2z2x	web	Resilient Nature Based Practices	Conservation Lands	Conservation is important but it needs to include green corridors and a variety of land types and ecosystems, such as wetlands and uplands, fresh and brackish waterways, etc.	8%	20%	72%
136275	30-12-2020 22:32:25	az2z2x	mobile	Economic Resiliency	Focus on Economic Centers	No, these are not mutually exclusive - to approach it in such a fashion is naive. The County needs to focus on growth and of both residential development and economic centers to support resiliency of each.	51%	15%	34%
136275	30-12-2020 22:33:40	az2z2x	mobile	Economic Resiliency	Mobility for Resiliency	Yes, but this will necessitate embracing and incentivizing higher density development for mobility to truly be efficient, sustainable and resilient.	0%	4%	96%
136275	30-12-2020 22:35:19	az2z2x	mobile	Economic Resiliency	Purchase Greenspace	Viera has been a model of this approach with the significant environmental set asides in perpetuity with a dedicated funding source for ongoing maintenance.	1%	94%	5%
136275	30-12-2020 22:36:18	az2z2x	mobile	Economic Resiliency	Development Standards for Resiliency	There are other approaches that should be explored that do not sacrifice the ability to development such lands in a responsible a s resilient manner.	91%	8%	1%
136275	30-12-2020 22:37:18	az2z2x	mobile	Economic Resiliency	Focus Public Infrastructure Investments	This is a laudable strategy but is should be accompanied by incentives in places already designated for future development.	21%	63%	16%
136275	30-12-2020 22:39:00	az2z2x	mobile	Resilient Development	Determine What Will Flood	There can be more comprehensive approaches thatentail stormwater systems that extend outside a specific property's boundary but adequately manage drainage within an overall basin.	1%	97%	2%
136275	30-12-2020 22:39:54	az2z2x	mobile	Resilient Development	Stricter Standards for Higher Risk Areas	Too general - what types of standards? They cannot be so overly burdensome if risks can be mitigated successfully.	73%	22%	5%
136275	30-12-2020 22:40:37	az2z2x	mobile	Resilient Development	Design features for flood protection	Need to flesh out what other examples would beconsidered.	24%	68%	8%
136275	30-12-2020 22:40:57	az2z2x	mobile	Resilient Development	Incentives to Exceed Design Requirements	Yes, incentives are the key	0%	99%	1%
136275	30-12-2020 22:41:54	az2z2x	mobile	Resilient Development	Direct Growth Pattern	Sounds good but the devil is in the details asinevitably there may unintended consequences.	99%	1%	0%
136275	30-12-2020 22:42:43	az2z2x	mobile	Public Services & Safety	Resilient Transportation Infrastructure	Not sure what is intended by "elevate" - could be entirely cost prohibitive.	15%	84%	1%
136275	30-12-2020 22:43:18	az2z2x	mobile	Public Services & Safety	Efficient Use of Taxpayer Dollars	Careful not to have this be a blanket policy asthere are always necessary exceptions	6%	78%	16%
136275	30-12-2020 22:43:37	az2z2x	mobile	Public Services & Safety	Natural Stormwater Management	Yes, but inventive based.	1%	89%	10%
136275	30-12-2020 22:44:37	az2z2x	mobile	Public Services & Safety	Improve Mobility Through Transit	There needs to be a paradigm shift to promote and incentivize higher densities for mobility through transit to be improved and efficient.	1%	1%	98%
136275	30-12-2020 22:44:51	az2z2x	mobile	Public Services & Safety	Resilient Utilities	Essential	2%	14%	84%
136608	1-1-2021 21:09:03	az2z2x	web	Resilient Development	Determine What Will Flood	Require? You mean, order me to build a dike? Ithis seems like a foolish statement, it is no more so than this question. What kinds of properties,and what kinds of requirements?	100%	0%	0%
136608	1-1-2021 21:10:55	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	Sounds good in theory, but how much stricter should these standards be? Will they be economically feasible? Can they be enforced "gracefully," orwould you like to throw government weight around?	26%	68%	6%
136608	1-1-2021 21:11:48	az2z2x	web	Resilient Development	Design features for flood protection	Sorry, i'm not up for government "requiring"more of anything. Especially not a Socialist government.	77%	21%	2%
136608	1-1-2021 21:13:34	az2z2x	web	Resilient Development	Incentives to Exceed Design Requirements	Sounds great. But would these "incentives" bepositive or negative (i.e., punitive)? Are you attempting to fool us?	66%	1%	33%
137062	4-1-2021 17:00:38	az2z2x	mobile	Public Services & Safety	Efficient Use of Taxpayer Dollars	If new & upgraded infrastructure in high-risk areas are NEEDED and there are no other funds available, then wouldn't taxpayer dollers NEED to be used?	100%	0%	0%
137061	4-1-2021 17:02:16	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	This needs more elaboration. Elevated areas also have significant importance for wildlife and water quality such as Scrub Habitat. I wouldn't agreewith further development on these highly endangered areas. Redevelopment is the way of the future sustainability. Using land that has already been developed on will ensure natural lands are kept protected for humans to enjoy, and wildlife to have a place to live.	43%	21%	36%
137061	4-1-2021 17:04:32	az2z2x	web	Public Services & Safety	Resilient Transportation Infrastructure	Create more bridges over historic and current wetlands that are cut off by current roads to allow water to flow.	2%	96%	2%
137061	4-1-2021 17:05:08	az2z2x	web	Public Services & Safety	Efficient Use of Taxpayer Dollars	This should be elaborated more.	5%	91%	4%
137061	4-1-2021 17:07:10	az2z2x	web	Public Health & Equity	Growth Policy for Equity & Public Health	Protect wetlands and flood areas by creating buffers. Add buffers to the development permitting process.	1%	93%	6%
137061	4-1-2021 17:14:52	az2z2x	web	Public Health & Equity	Identify Areas for Adaptation Strategies	What sort of measures. This needs to be elaborated.	5%	93%	2%
137162	4-1-2021 19:31:34	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	I support this when critically endangered upland habitat (Florida scrub) are protected. Avoiding wetland habitat and disturbing natural hydrologicpatterns is important to increase resiliency.	54%	9%	37%
137162	4-1-2021 19:34:19	az2z2x	web	Public Health & Equity	Growth Policy for Equity & Public Health	Again, only create higher density areas in moreelevated areas when critically endangered upland habitat (Florida scrub) is protected. Redevelopment of areas in high elevation that are already disturbed should be targeted for future development for high density.	95%	4%	1%
137162	4-1-2021 19:37:35	az2z2x	web	Public Health & Equity	Resilient Infrastructure Plan	I agree in terms of failed septic tanks adjacent to surface water (Atlantic ocean, Indian River and St. Johns), however, no new development shouldbe allowed in these areas. Structures grandfathered in should be included in a strict permitting system that mitigates any replacement or new development with the addition of buffers and native vegetation.	100%	0%	0%
137162	4-1-2021 19:42:54	az2z2x	web	Resilient Development	Determine What Will Flood	Capturing 100% may be difficult. One way or another the captured water will infiltrate or runoff to some watershed. Implementation of rain gardenswould put less pressure on residents to capture 100% of rain and allow for the slow infiltration ofstorm water runoff from overwhelming infrastructure. A mix of rain barrels, rain gardens, adoption of native vegetation replacing sod, and strict irrigation usage will greatly enhance the water quality of Brevard County.	98%	1%	1%
138145	6-1-2021 12:56:30	az2z2x	web	Public Health & Equity	Identify Areas for Adaptation Strategies	At some point low lying areas will not continueto benefit from measures to reduce flooding. Dollars spent to maintain something that sea level rise will continue to encroach is not sustainable.	98%	2%	0%
138145	6-1-2021 12:58:53	az2z2x	web	Public Health & Equity	Green / Natural Infrastructure	The current Best Managment Practices that business owners should be following are not monitored. There is no benefit for the business owner. Create tax incentives or some other means to reward the business or homeowner. City, county and stateregulations should all be equal in expectations.	35%	7%	58%
138145	6-1-2021 13:02:56	az2z2x	web	Resilient Development	Determine What Will Flood	In a perfect world this would a benefit to ourwaterways and natural springs. I think city, county and state infrastructure should be instituting this now. Money spent on beach re nourishment is an example of a continuous battle to stop sea level rise while causing damage to our natural environment. Money should be spent on relocation incentives.	50%	0%	50%
138145	6-1-2021 13:03:38	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	A flood area should not be developed.	8%	91%	1%
138145	6-1-2021 13:05:40	az2z2x	web	Resilient Development	Direct Growth Pattern	Does this mean land that is natural is rezonedto development. At some point growth needs to slow until infrastructure has caught up to meet current demands. Our natural water source is in danger.	53%	15%	32%
142142	11-1-2021 16:33:38	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	We need to get out of these areas. The fact that Titusville is focusing CRA dollars on the downtown is not logical. It is a a very vulnerable area. The benefits to this area does not out weigh the risks.	85%	13%	2%
142142	11-1-2021 16:34:49	az2z2x	web	Resilient Development	Incentives to Exceed Design Requirements	We have moved past the point of incenting versus requiring.	2%	98%	0%
142142	11-1-2021 16:35:28	az2z2x	web	Resilient Development	Design features for flood protection	We have to stop building in these vulnerable areas.	96%	4%	0%
145109	18-1-2021 20:13:47	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	I don't know what this means.	5%	94%	1%
145118	18-1-2021 20:34:07	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	Not sure what is meant by this: discharging onto the beach, or cleaning up after any inadvertant discharges?	5%	94%	1%
147285	20-1-2021 17:25:01	az2z2x	web	Public Health & Equity	Identify Areas for Adaptation Strategies	Over the last 25+ years nearby development hasdestroyed my family homestead property by flooding it with drain off - what was once a beautiful hardwood hammock is now a nasty swamp.	99%	0%	1%
147410	20-1-2021 19:17:33	az2z2x	web	Public Health & Equity	Green / Natural Infrastructure	Good luck, in the beaches it appears that everyinch of developable land is developed or under construction.	0%	0%	100%
147410	20-1-2021 19:19:17	az2z2x	web	Public Health & Equity	Resilient Infrastructure Plan	Demand that beach condos install sea walls a yard higher than their base land, then cover the walls with green dunes.	1%	98%	1%
147410	20-1-2021 19:22:10	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	This is too little too late. Satellite &ch isfull of houses built sub-code. The cost of upgrades would not fly with voters. Except for those of us on A1A most the beaches west even 1 block are in flood zones.	95%	5%	0%
147566	20-1-2021 20:45:43	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	Density should NOT be increased. We already have too many people living in too little space for the available resources.	3%	96%	1%
147566	20-1-2021 20:47:54	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	So...are we currently discharging wastewater tothe beaches? If this is happening it needs to stop immediately...'same with drainage. How is this possibly happening???	2%	96%	2%
147566	20-1-2021 20:49:38	az2z2x	web	Public Health & Equity	Growth Policy for Equity & Public Health	There should be no increase in density anywhere. We have too many people living here already.	2%	93%	5%
147566	20-1-2021 20:54:49	az2z2x	web	Public Health & Equity	Identify Areas for Adaptation Strategies	So...what strategies will work? Build levees along the Indian River? Raise the elevation of homes to 20' above sea level?	1%	96%	3%
147566	20-1-2021 20:57:42	az2z2x	web	Public Services & Safety	Efficient Use of Taxpayer Dollars	Phasing out septic systems with well-functioning sewer and waste treatment systems (that do not impact our beaches, rivers, or drinking wells) should be a priority.	99%	0%	1%
147679	20-1-2021 21:44:52	az2z2x	web	Economic Resiliency	Focus Public Infrastructure Investments	This is not a feasible proposal. Eliminating public investment to non-flooding areas will place additional lives and properties at risk and will limit responses in emergency situations.	71%	28%	1%
147937	21-1-2021 02:40:04	az2z2x	web	Resilient Nature Based Practices	Resilient Natural Practices & Protections	Canals and Ditches need to be kept deep and cleaned out... this provides drainage to allow water to leave the areas quickly and keeps water from building up in areas. It also provides a habitat for the animals and places for the public to enjoy the waterways in our areas.	1%	2%	97%
147937	21-1-2021 02:50:25	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	Deep and clean waterways allow our natural wetland life to flourish, a place for their young to develop, a place for the natural predators to keep the wildlife cleansed of damaged, aged and diseased creatures to keep a healthy environment. Plants should be in the areas to keep erosion down, to give cover for the animals in the aeras, to give shade to the people in those areas but must be kept manicured to prevent a hazard during excessive windstorm also. The community should pay the costs.	92%	7%	1%
147937	21-1-2021 03:06:23	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	More drainage thru the barrier islands must bedesigned to allow in and out flow, that keeps fresh water and fresh food for the creatures all around the area. It keeps " fresh " water to be circulated and reduces the growth of dangerous insects like mosquitoes as the tides pull and push to keep vegetation exercised. Closer access ways to beachesmust be designed to take advantage of those access points, reducing manual labor and the clutter ofwalkways over dunes allowing easier disabled access	30%	7%	63%
147937	21-1-2021 03:16:40	az2z2x	web	Resilient Nature Based Practices	Land Use to Protect Surface Water	Housing plots should be broken up more and growth areas kept between housing units and apartments. These are natural barriers and also help slow air and water flow during storms. These also reduce community stress by isolating the areas. Vegetation actually helps collect surface water during rains and as the morning dew covers the vegetation. giving it pathways to return and slowly drains the water down the stems.	64%	7%	29%
147937	21-1-2021 03:21:34	az2z2x	web	Resilient Nature Based Practices	Conservation Lands	This is a loss to the areas... yes, some placeshould be reserved for pure natural habits that can not be managed effectively but that also makesfor wasted areas devoid of much life or useful vegetation and reduces the wildlife and makes for serious fire hazards because of buildup.	100%	0%	0%
148109	21-1-2021 14:55:09	az2z2x	web	Resilient Development	Determine What Will Flood	In principle this is great. In practice it's very difficult because of a high cost to outcome ratio. Where source water quality protection is the objective it can justify the cost. For quantity/runoff mitigation it should be considered on a priority basis rather than as a set of universal requirements applying to all areas.	37%	10%	53%
148109	21-1-2021 14:57:12	az2z2x	web	Resilient Development	Design features for flood protection	Increasing capacity to move volume downstream create and amplifies quantity management issues in downstream areas. This would need to be done selectively and cautiously.	1%	98%	1%
148214	21-1-2021 16:35:01	az2z2x	web	Resilient Nature Based Practices	Conservation Lands	This is the most inportant way to be resilient!	0%	2%	98%
148214	21-1-2021 16:36:06	az2z2x	web	Resilient Nature Based Practices	Resilient Natural Practices & Protections	There are so much good research on this LID, tree tracts et.c.	0%	0%	100%
148214	21-1-2021 16:37:39	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	Reusing urban areas in need of redevlopment isalready developed is VERY inportant to sucessful resilience	1%	2%	97%
148214	21-1-2021 16:38:39	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	Again, redevelop urban ares- they ARE high and dry	1%	98%	1%
148223	21-1-2021 16:40:08	az2z2x	mobile	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	We need to STOP building in the county, period.Our leaders have rapes this county ans state to their own benefit for far to long. Enough!	95%	0%	5%
148214	21-1-2021 16:40:45	az2z2x	web	Resilient Development	Direct Growth Pattern	We need more redevelopment , not new development!	76%	19%	5%
148214	21-1-2021 16:42:02	az2z2x	web	Public Health & Equity	Growth Policy for Equity & Public Health	Do not develope MORE land reuse the already safe elevations!	16%	3%	81%
148431	21-1-2021 19:12:09	az2z2x	web	Public Health & Equity	Identify Areas for Adaptation Strategies	Flooding needs to happen periodically so low lying areas and flood plains should not be developed. Fighting nature is expensive!	99%	1%	0%
148431	21-1-2021 19:15:14	az2z2x	web	Resilient Development	Determine What Will Flood	I disagree with this because I don't think it'san achievable goal. It assumes we can predict the future and create perfect infrastructure. Realistically, we can do neither.	47%	3%	50%
148431	21-1-2021 19:16:31	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	Again, we cannot realistically achieve these goals. Restricting development will be less costly in the long run.	100%	0%	0%
148431	21-1-2021 19:17:26	az2z2x	web	Resilient Development	Design features for flood protection	Maybe. Still think it's wiser to not have development there in the first place.	15%	7%	78%
148431	21-1-2021 19:18:16	az2z2x	web	Resilient Development	Incentives to Exceed Design Requirements	Incentives are good, but prohibitions will alsobe necessary.	2%	0%	98%
148558	21-1-2021 19:51:20	az2z2x	mobile	Resilient Development	Determine What Will Flood	We need less land developement and more areas for the water to go that are left natural	1%	93%	6%
148558	21-1-2021 19:52:09	az2z2x	mobile	Resilient Development	Stricter Standards for Higher Risk Areas	These areas should not be developed	11%	88%	1%
154523	22-1-2021 14:30:43	az2z2x	web	Resilient Nature Based Practices	Conservation Lands	This topic often falls by the wayside in Countydiscussions. But we have much evidence that conserved lands, EEL lands, etc., are buffering our county from ravages of climate change. It's a nondramatic but hugely important choice.	80%	19%	1%
154523	22-1-2021 14:33:20	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	Not a whole lot of "elevated" areas are beingdeveloped, west of US 1, along the RR tracks, etc., especially heading north of Palm Shores. Can the County incentivize development there?	12%	84%	4%
154777	22-1-2021 15:23:57	az2z2x	web	Economic Resiliency	Focus on Economic Centers	Anything other than development is good. Density increases should have stricter guidelines. It is too easy to increase density on parcels and thushave High impact development in Brevard County	1%	1%	98%
154777	22-1-2021 15:25:46	az2z2x	web	Economic Resiliency	Development Standards for Resiliency	Gotta have figures how this will save money.	0%	1%	99%
156333	22-1-2021 19:05:05	az2z2x	web	Economic Resiliency	Development Standards for Resiliency	I agree with this concept; however, how much ofour shoreline is currently undeveloped?	1%	98%	1%
156481	22-1-2021 19:23:55	az2z2x	web	Resilient Nature Based Practices	Resilient Natural Practices & Protections	Mandate LID	1%	98%	1%
156481	22-1-2021 19:25:22	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	Mandate AWT as a minimum standard. Move WWTPs off vulnerable barrier island. Covert al OSDS to centralized sewer	89%	9%	2%
156481	22-1-2021 19:27:24	az2z2x	web	Economic Resiliency	Focus on Economic Centers	Integrate economic centers with community centers through mixed use zoning with a vision for walkable, livable and sustainable	0%	98%	2%
156481	22-1-2021 19:28:08	az2z2x	web	Economic Resiliency	Focus Public Infrastructure Investments	Community growth vision should focus on conservation - clusters - corridors and countryside	1%	93%	6%
156481	22-1-2021 19:31:48	az2z2x	web	Public Health & Equity	Resilient Infrastructure Plan	statewide standards for resiliency to sea levelrise and storm surge are needed, especially at FDOT	2%	86%	12%
157091	22-1-2021 23:02:29	az2z2x	web	Public Services & Safety	Resilient Transportation Infrastructure	Due to projected sea level rise, any roads thatwill be at or below water level within 30 years should be ignored.	99%	1%	0%
157091	22-1-2021 23:12:42	az2z2x	web	Resilient Development	Determine What Will Flood	I think this would be lost in any court challenge. Currently, we require that any development create no additional runoff. It would nice to find away for the county to fix problems that were created by previous developers who did create additional runoff that damaged surrounding homeowners. Perhaps, some kind of impact fee paid by developers.	99%	0%	1%
157353	23-1-2021 00:00:10	az2z2x	mobile	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	New home buildings need adequate plumbing withbest new practices.	1%	38%	61%
157353	23-1-2021 00:06:29	az2z2x	mobile	Resilient Development	Determine What Will Flood	Sounds unrealistic. Easier to have best practices on new construction	50%	0%	50%
157353	23-1-2021 00:10:28	az2z2x	mobile	Public Health & Equity	Phase Out Septic Tanks	Easier to require on new construction. Owners may accept if at no cost to them.May have exceptions where City or County water unavailable or impractical.	49%	2%	49%
157353	23-1-2021 00:13:48	az2z2x	mobile	Public Health & Equity	Green / Natural Infrastructure	Is there any guidance for lawn maintenance andless harmful fertilizers for individuals or HOAs over 55 communities using professional lawn care services?	66%	14%	20%
157353	23-1-2021 00:24:00	az2z2x	mobile	Resilient Nature Based Practices	Land Use to Protect Surface Water	Titusville sewer overflow. Who pays for improvements on aging or inadequate sewage treatment in Brevard County? Potential new trash dump on 192 should have best practices, population will need and development will be around it. Dump in Palm Bay with biosolids should be checked out and publicize report to reassure public if no problems.	62%	3%	35%
158434	23-1-2021 18:28:05	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	I'm not sure 'hardening' is a long term solution. Hard armored structures buy you time and are costly to install and maintain. If you need to planfor SLR impacting the structure... we probably shouldn't be building there.	100%	0%	0%
159205	24-1-2021 19:18:12	az2z2x	web	Public Services & Safety	Resilient Utilities	Water and wastewater	2%	93%	5%
159205	24-1-2021 19:20:01	az2z2x	web	Resilient Development	Determine What Will Flood	Include regulations on volume and rate of runoff from areas upstream of flood prone areas	4%	96%	0%
160013	25-1-2021 19:17:20	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	Already develope above 100yr flood which will not be enough in the future	94%	6%	0%
160013	25-1-2021 19:19:44	az2z2x	web	Economic Resiliency	Development Standards for Resiliency	Flooding is dependent on elevation not distance	97%	3%	0%
160085	25-1-2021 19:48:37	az2z2x	web	Public Health & Equity	Growth Policy for Equity & Public Health	Also policies that direct less growth and support more green areas no matter of the elevation.	11%	32%	57%
160085	25-1-2021 19:49:38	az2z2x	web	Public Health & Equity	Resilient Infrastructure Plan	Going to have to let some of it flood...too much development in low areas...and headlands for the St. Johns already	49%	47%	4%
160085	25-1-2021 19:51:31	az2z2x	web	Public Health & Equity	Phase Out Septic Tanks	We have been beating this dead horse for too long. No more septic tanks...and remove those that exist NOW....been paying the sales tax and don't see a return on my investment as a citizen or business owner.	94%	5%	1%
160085	25-1-2021 19:52:45	az2z2x	web	Public Health & Equity	Identify Areas for Adaptation Strategies	These areas have been identified for decades but we just continue to bring in fill and elevate causing once reasonable land to flood. Too much development.	64%	18%	18%
160085	25-1-2021 19:55:17	az2z2x	web	Resilient Development	Determine What Will Flood	We already know where it floods. And water does flow..to capture when mother nature drops 32 or more of rain during a hurricane it is going to have to go somewhere....Stop the over development	6%	93%	1%
160085	25-1-2021 19:56:49	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	The standards are already strict for development but only the big corporations can afford to do development.	20%	78%	2%
160085	25-1-2021 19:57:51	az2z2x	web	Resilient Development	Direct Growth Pattern	How about no development in high risk area....	100%	0%	0%
160085	25-1-2021 19:58:34	az2z2x	web	Resilient Development	Incentives to Exceed Design Requirements	Money solves everything when it comes to commercial development in this county	2%	9%	89%
160085	25-1-2021 19:59:45	az2z2x	web	Resilient Development	Design features for flood protection	We are in coastal Florida...sea level is rising...we are way behind the curve that the Netherlands have implemented...	1%	97%	2%
160424	25-1-2021 22:28:02	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	Without a doubt, the highest priority must be assigned to cleaning our lagoon and river. Septic tanks MUST be replaced by a county sewage system asoon as possible. The more difficult issue is reducing the amount of fecal matter being deposited by its inhabitants.	79%	13%	8%
160704	26-1-2021 06:34:26	az2z2x	mobile	Resilient Nature Based Practices	Land Use to Protect Surface Water	Clean drinking water for the entire county should be a number #1 priority.	0%	5%	95%
161680	26-1-2021 20:25:37	az2z2x	web	Public Services & Safety	Natural Stormwater Management	Personally i have flooding issues at the back of my property where the county put in a ditch for drainage. It does not move the water along, not properly constructed....	100%	0%	0%
162712	27-1-2021 14:28:42	az2z2x	web	Public Services & Safety	Efficient Use of Taxpayer Dollars	The title and description do not seem to go together - of course, taxpayer dollars will need to be spent and, of course, they should be spent efficiently - not wastefully. And spending them in high risk areas seems to be what we're talking about -reducing the risks.	100%	0%	0%
163738	28-1-2021 13:16:49	az2z2x	mobile	Public Health & Equity	Growth Policy for Equity & Public Health	This needs to begin with education of Brevard's elected officials, city managers and support staff, that SLR is happening and as a community we muust not only face this, but stop development at it's going, especially on the barrier island.	27%	14%	59%
163738	28-1-2021 13:18:48	az2z2x	mobile	Public Health & Equity	Resilient Infrastructure Plan	Again, basic education of what this concept isand that it is reality, as development speeds along, especially on the barrier island. This survey and glossary are great tools to help advance this.	27%	7%	66%

163738	28-1-2021 13:32:18	az2z2x	mobile	Public Health & Equity	Phase Out Septic Tanks	Brevard knows the septic tanks have to go. First step is stopping permitting for additional tanks to be installed. This has to be addressed at state level and has imo some of the worst strategies to date, because everyone thinks 'someone' else should be paying for the transition to sewer. Within the past few weeks I learned of a private business person, owns a mobile home park on the lagoon, all but Begging for help because she's spenther last 10's of thousands of dollars to upgrade…	79%	20%	1%
163738	28-1-2021 13:33:59	az2z2x	mobile	Public Health & Equity	Green / Natural Infrastructure	Development has to be managed. Green area isour strongest link. And definitely needs measures if extended procreation.	1%	95%	4%
163738	28-1-2021 13:36:21	az2z2x	mobile	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	Any development on the barrier island is 100% the wrong decision. To move everyone that affords the lifestyle of the barrier islands onto the mainland is going to be a treacherous few decades ahead…	99%	1%	0%
163738	28-1-2021 13:37:40	az2z2x	mobile	Resilient Nature Based Practices	Beach Quality & Quantity	Education. Our policy makers are so behind in the knowledge to make the obvious only sustainability decisions to act and require fees and fines forviolations…	97%	3%	0%
163738	28-1-2021 13:40:20	az2z2x	mobile	Resilient Nature Based Practices	Land Use to Protect Surface Water	Lake Washington and our poisoned drinking water, specifically the 2019 issues with Chloramine, because of the amount of glysophate used along thisand surrounding areas is evidence enough this is life and death urgency already…	100%	0%	0%
163738	28-1-2021 13:44:46	az2z2x	mobile	Resilient Nature Based Practices	Conservation Lands	More commonly called in Brevard, Future Development areas.	3%	91%	6%
163738	28-1-2021 13:46:41	az2z2x	mobile	Public Services & Safety	Efficient Use of Taxpayer Dollars	Maintenance for existing use and current residents, planned with the reality of minimal decades of use even possible in these most vulnerable areas.	95%	4%	1%
163738	28-1-2021 13:47:23	az2z2x	mobile	Public Services & Safety	Natural Stormwater Management	We have to mitigate added nutrients to the lagoon and Lake Washington through all means available.	0%	99%	1%
163738	28-1-2021 13:49:06	az2z2x	mobile	Public Services & Safety	Resilient Utilities	This must be a driving factor as Brevard's new WISER Board identifies and recommends the first sites for the transition to renewables…	2%	27%	71%
165634	30-1-2021 17:43:30	az2z2x	web	Resilient Development	Design features for flood protection	Build reservoirs to prevent Crane Creek (Canal)from flooding downstream of airport and industrial areas on West Nasa Blvd., Evans, Hibiscus, etc.(Grumman, Harris, Collins, and others).	2%	97%	1%
165867	1-2-2021 02:00:23	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	Stopping density growth/expansion will best support nature. Our current density in Brevard County far exceeds what our fragile lagoon can support or recover from.	3%	9%	88%
165867	1-2-2021 02:01:35	az2z2x	web	Public Health & Equity	Growth Policy for Equity & Public Health	Density in Brevard County should not be increased at all. Our current density is the primary problem facing our lagoon and it's native inhabitants.	100%	0%	0%
165867	1-2-2021 02:05:23	az2z2x	web	Public Health & Equity	Green / Natural Infrastructure	This is critical! Including NOT replacing structures that have been razed, but instead turning them into green spaces (e.g. the corner of MinutemanCswy and northbound A1A where the Surf stood). Restoring native and natural groundcover and shoreline foliage are essential for our beachside ecosystems.	97%	2%	1%
165867	1-2-2021 02:08:02	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	My beloved family home was built in one of these areas more than 50 years ago … but perhaps it wasn't a wise plan. Development should not occur in these areas today, considering the threat of sea level rise and increased storms.	92%	6%	2%
165867	1-2-2021 02:08:38	az2z2x	web	Resilient Development	Incentives to Exceed Design Requirements	… and don't build in flood plains.	5%	94%	1%
165867	1-2-2021 02:09:29	az2z2x	web	Resilient Development	Direct Growth Pattern	And reduce density and capacity limits for high-risk areas.	94%	6%	0%
165986	1-2-2021 14:53:58	az2z2x	web	Resilient Development	Direct Growth Pattern	Save more land for our future	0%	1%	99%
165986	1-2-2021 14:56:20	az2z2x	web	Economic Resiliency	Mobility for Resiliency	Need bike and walking access on major roads	5%	71%	24%
166222	1-2-2021 17:12:58	az2z2x	web	Public Health & Equity	Green / Natural Infrastructure	We know how this works in Florida - green spaces are maintained to mitigate flooding elsewhere.	27%	68%	5%
166222	1-2-2021 17:14:00	az2z2x	web	Public Health & Equity	Growth Policy for Equity & Public Health	I am grateful to see this in practice - it needs to be maintained.	0%	0%	100%
166222	1-2-2021 17:15:03	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	And out of our intracoastal waterways.	1%	97%	2%
166222	1-2-2021 17:20:50	az2z2x	web	Resilient Development	Determine What Will Flood	Tricky. It is very difficult to justify w/o incentives. Nashville metro significantly increased rates related to storm water runoff after the 2010flood. This has created both economic incentive to develop infrastructure as well as funding futureflooding events when actions are not taken.	100%	0%	0%
175088	10-2-2021 12:46:43	az2z2x	web	General Comment	General Comment	I had to select the three priorities to get here.	2%	96%	2%
175956	11-2-2021 17:54:50	az2z2x	web	General Comment	General Comment	Testing again	6%	56%	38%
179300	17-2-2021 22:49:25	az2z2x	mobile	Resilient Nature Based Practices	Beach Quality & Quantity	Water quality affects us all. Florida aquatic habitat are important to everyone even if they don't fish or use the public waterways.	3%	88%	9%
179300	17-2-2021 22:55:40	az2z2x	mobile	Public Health & Equity	Growth Policy for Equity & Public Health	Southern Brevard needs an area where people canlive, work, and shop without having to get in a car. We need more single story townhouses for the elderly. We need zero lot housing developments that aren't solely for the impoverished. I would loveto take my bike from my home to a grocery store without having to bike for miles along busy roads. Or live a few doors down from a diner or coffee shop. Have a public community center nearby.	12%	42%	46%
179340	17-2-2021 23:37:08	az2z2x	mobile	Public Services & Safety	Improve Mobility Through Transit	Buses or public transport	1%	98%	1%
179414	18-2-2021 00:57:46	az2z2x	web	Resilient Development	Determine What Will Flood	It's impossible to capture 100%. Better to aimfor 80-90%	50%	2%	48%
179414	18-2-2021 01:00:36	az2z2x	web	Resilient Development	Stricter Standards for Higher Risk Areas	The 100 year flood zone is for rare events. Much more practical would be 50 year flood zone.	1%	97%	2%
179414	18-2-2021 01:05:28	az2z2x	web	Public Services & Safety	Resilient Utilities	After seeing how inadequate wind and solar power are in harsh conditions, I would strongly support upgrades using traditional means, e.g. hydro, oil, natural gas.	100%	0%	0%
179455	18-2-2021 02:58:53	az2z2x	web	Public Health & Equity	Phase Out Septic Tanks	Would there be a plan to help low income homeowners, senior citizen for instance, to help them connect to the community's systems. I know I couldn't afford the removal of my system, nor pay to become part of the sewerage system.	31%	25%	44%
179461	18-2-2021 03:32:15	az2z2x	web	Resilient Development	Design features for flood protection	I wish that the county could effectively correct the drainage issues in my neighborhood of Dalehurst Ranches. They have been wasting my taxpayer dollars for the past 1 1/2 years, and doing an incredibly bad job of it. So bad of a job that they nowhave returned to re-do a job they did poorly a year ago. I'm outraged as a taxpayer about this. Andon my street, it would simply take requiring one homeowner to replace their two crushed driveway pipes.	76%	1%	23%
179466	18-2-2021 03:54:45	az2z2x	web	Public Health & Equity	Phase Out Septic Tanks	We should extend sewer lines and eliminate theuse of septic tanks	0%	100%	0%
179611	18-2-2021 16:59:32	az2z2x	web	Public Services & Safety	Efficient Use of Taxpayer Dollars	If retreat is inevitable, we must spend on themountain not the valley. Development in less vulnerable areas should be encouraged.	89%	10%	1%
179611	18-2-2021 17:00:40	az2z2x	web	Public Services & Safety	Resilient Utilities	See: Texas	1%	95%	4%
179611	18-2-2021 17:03:47	az2z2x	web	Public Health & Equity	Phase Out Septic Tanks	Phasing out septic protects our aquifer,whichis threatened by more flooding.	81%	8%	11%
179611	18-2-2021 17:06:21	az2z2x	web	Public Health & Equity	Green / Natural Infrastructure	We need a public campaign to influence homeowners to replace lawns with native landscaping.	9%	85%	6%
179611	18-2-2021 17:09:08	az2z2x	web	Resilient Nature Based Practices	Conservation Lands	We must have adequate recharge areas to protectour aquifer. If we don't have enough clean water, all of our best practices are moot.	31%	0%	69%
179682	18-2-2021 18:32:14	az2z2x	web	Public Services & Safety	Resilient Transportation Infrastructure	Proactive planned evacuation does not require elevate roads.	41%	50%	9%
180129	19-2-2021 03:13:57	az2z2x	web	Public Services & Safety	Resilient Transportation Infrastructure	developments should be built after the roads, sewers, water lines, gas lines, have been completed anticipating the needs of the new development. Texas is a good example of not building your infrastructure suffiecnt to the needs	3%	1%	96%
180129	19-2-2021 03:20:58	az2z2x	web	Public Services & Safety	Efficient Use of Taxpayer Dollars	depends if the high-risk areas are developed. if so and people live in those houses you have a responsibility to take whatever measures necesary to protect those taxpaying residents. Don't understand if we know high-risk areas, why would we approve future development ?	67%	3%	30%
180129	19-2-2021 03:30:49	az2z2x	web	Public Services & Safety	Natural Stormwater Management	How can that be achieved in densely populated areas? Anything we can do that compliments nature with stormwater management is a plus. create retention overflow ponds, encourage nature to create a wetland. We destroyed the true Florida ecosystems back in 1900 for greed and riches. Like the everglades take it slow with development allowing natureto work side by side.	52%	11%	37%
180129	19-2-2021 03:37:20	az2z2x	web	Public Services & Safety	Improve Mobility Through Transit	as climates change, cities will have to changeor relocate. I would recommend planning on a 10 - 20 - 30 - 50 year cycle updating the items that will need to be addressed every 5 years.	1%	10%	89%
180129	19-2-2021 03:44:51	az2z2x	web	Public Services & Safety	Resilient Utilities	no question utilities are a priority. we shouldo whatever it takes to minimize any power grid interruptions.Lives are at stake relating to ourpower sources lighting, heating, cooling, medical, food safety. Our standard of living would be in jeoparty	1%	98%	1%
180194	19-2-2021 13:51:45	az2z2x	web	Resilient Development	Incentives to Exceed Design Requirements	Go to You Tube and check "High Tide Homes".My son is a partner in that company. Builders should be looking at building homes like hose.	1%	94%	5%
180194	19-2-2021 13:57:01	az2z2x	web	Public Health & Equity	Phase Out Septic Tanks	Remove septic tanks from homes on canals also	1%	98%	1%
180230	19-2-2021 14:43:34	az2z2x	mobile	Resilient Nature Based Practices	Beach Quality & Quantity	I'm not sure exactly what this means- treatedwastewater? During flooding events?	17%	78%	5%
181082	22-2-2021 14:44:22	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	too much concrete going up	97%	3%	0%
181082	22-2-2021 14:45:08	az2z2x	web	Resilient Nature Based Practices	Beach Quality & Quantity	Love the renourishment. Stop with the concretestructures. Create public space and protect residences	0%	14%	86%
184009	25-2-2021 20:56:45	az2z2x	web	Resilient Nature Based Practices	Adopt Growth Patterns that Support Nature	And decrease development in general. Stop destroying more land to build houses and shopping. There are plenty of areas that can be redeveloped thathave already destroyed the land, so stop destroying MORE LAND!	94%	2%	4%
184009	25-2-2021 21:28:50	az2z2x	web	Public Health & Equity	Green / Natural Infrastructure	And actually create more green spaces. Don't allow the existing ones to be developed.	24%	75%	1%

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FOR IMMEDIATE RELEASE
Tuesday, December 29, 2020 8:05 AM

Brevard County Launches 'Resilient Brevard' Project on Climate Change

BREVARD COUNTY, FL. -- Natural Resources Management has launched "**Resilient Brevard,**" a project to develop proactive strategies, policies, and a plan of action to increase resilience to the impacts of climate change. "**Resilient Brevard**" seeks to identify coastal vulnerabilities and provide local policy recommendations to minimize and mitigate the effects of flooding, storm surge, and sea level rise. The project, launched by Brevard County and the East Central Florida Regional Planning Council (ECFRPC), is focused on five general areas:

- Economic resilience
- Public services & safety
- Resilient development
- Public health and equity
- Resilient nature-base practices

We want your input on creating an economically and environmentally resilient community!

- What about the quality of life in Brevard County matters most to you?
- What are the impacts of climate on your quality of life?
- What are the vulnerabilities we need to prepare for over the next 50-75 years?
- What are the most appropriate proactive strategies to make our community more resilient?
- Where would you apply those strategies in the unincorporated areas of Brevard County?

Please take our short survey by visiting https://www.perilofflood.net/resilient-brevard

The survey will be available through Friday, January 22, 2021. Two virtual public workshops will be held to discuss the survey findings and to update the community on strategy development and policy recommendations.

Please email resilientbrevard@ecfrpc.org to sign up for email notifications of upcoming public workshops. For more information on "Resilient Brevard" please visit https://www.perilofflood.net/resilient-brevard, or call Lori Cox, ECFRPC, at (407) 245-0300.

Please take our short survey by visiting https://www.perilofflood.net/resilient-brevard

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FOR IMMEDIATE RELEASE
Wednesday, December 30, 2020 12:41 PM

Brevard County Launches 'Resilient Brevard' Project on Climate Change

BREVARD COUNTY, FL. -- Natural Resources Management has launched "**Resilient Brevard,**" a project to develop proactive strategies, policies, and a plan of action to increase resilience to the impacts of climate change. "**Resilient Brevard**" seeks to identify coastal vulnerabilities and provide local policy recommendations to minimize and mitigate the effects of flooding, storm surge, and sea level rise. The project, launched by Brevard County and the East Central Florida Regional Planning Council (ECFRPC), is focused on five general areas:

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FOR IMMEDIATE RELEASE
Wednesday, January 20, 2021 10:47 AM

Public Survey Seeks Your Input on Brevard Flooding Resilience

BREVARD COUNTY, FL. -- "Resilient Brevard" is a project to increase Brevard County's local resilience to the impacts of flooding. "Resilient Brevard" seeks to identify coastal vulnerabilities and develop proactive strategies, policies, and a recommended plan of action to minimize and mitigate the effects of various types of flooding. The East Central Florida Regional Planning Council (ECFRPC) is under contract with Brevard County to launch this effort. The project is focused on five general areas:

- Economic resilience
- Public services & safety
- Resilient development
- Public health and equity
- Resilient nature-base practices

We want your input on creating an economically and environmentally resilient community!

- What about the quality of life in Brevard County matters most to you?
- What are the impacts of natural hazards, such as flooding, on your quality of life?
- What are the vulnerabilities we need to prepare for over the next 50-75 years?
- What are the most appropriate proactive strategies to make our community more resilient?
- Where would you apply those strategies in the unincorporated areas of Brevard County?

Please take our short survey by visiting www.perilofflood.net/resilient-brevard. The website also contains a short presentation with more information about the survey, and a glossary of terms used in the survey. The survey will be available through Friday, January 22, 2021. The first virtual public workshop will be held on February 2nd at 6:00 p.m. to discuss the survey findings. A second virtual workshop will be held in March to update the community on strategy development and policy recommendations.

Por favor, complete nuestra breve encuesta visitando www.perilofflood.net/resilient-brevard. La página web también contiene un presentación corta con información adicional sobre la encuesta, y un glosario con los términos utilizados en la encuesta. La encuesta estará disponible hasta el viernes, 22 de enero del 2021. *La primera reunión virtual pública se realizará el 2 de febrero, 2021, a las 6:00 p.m. para discutir los resultados de la encuesta.*

Please email resilientbrevard@ecfrpc.org to sign up for email notifications of upcoming public workshops. For more information on "Resilient Brevard" please visit www.perilofflood.net/resilient-brevard, or call Lori Cox, ECFRPC, at (407) 245-0300.

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FOR IMMEDIATE RELEASE
Friday, January 22, 2021 2:15 PM

Public Survey Seeks Your Input on Brevard Flooding Resilience

BREVARD COUNTY, FL. -- "Resilient Brevard" is a project to increase Brevard County's local resilience to the impacts of flooding. "Resilient Brevard" seeks to identify coastal vulnerabilities and develop proactive strategies, policies, and a recommended plan of action to minimize and mitigate the effects of various types of flooding. The East Central Florida Regional Planning Council (ECFRPC) is under contract with Brevard County to launch this effort. The project is focused on five general areas:

- Economic resilience
- Public services & safety
- Resilient development
- Public health and equity
- Resilient nature-base practices

We want your input on creating an economically and environmentally resilient community!

- What about the quality of life in Brevard County matters most to you?
- What are the impacts of natural hazards, such as flooding, on your quality of life?
- What are the vulnerabilities we need to prepare for over the next 50-75 years?
- What are the most appropriate proactive strategies to make our community more resilient?
- Where would you apply those strategies in the unincorporated areas of Brevard County?

Please take our short survey by visiting www.perilofflood.net/resilient-brevard. The website also contains a short presentation with more information about the survey, and a glossary of terms used in the survey. The survey will be available through Wednesday, January 27, 2021. The first virtual public workshop will be held on February 2nd at 6:00 p.m. to discuss the survey findings. A second virtual workshop will be held in March to update the community on strategy development and policy recommendations.

Please email resilientbrevard@ecfrpc.org to sign up for email notifications of upcoming public workshops. For more information on "Resilient Brevard" please visit www.perilofflood.net/resilient-brevard, or call Lori Cox, ECFRPC, at (407) 245-0300.

Nuestras disculpas por el enlace roto en el previo anuncio de prensa. Todos los enlaces en este anuncio se encuentran actualmente funcionando. Estamos extendiendo el periodo para responder a la encuesta con el fin de brindar un lapso mayor de tiempo a los residentes interesados en participar. **La encuesta está activa ahora hasta el miércoles 27 de enero a la medianoche. Por favor, advierta que la fecha de la primera reunión virtual pública también ha sido cambiada al lunes, 8 de febrero, a las 6:00 p.m.**

Por favor, complete nuestra breve encuesta visitando www.perilofflood.net/resilient-brevard. La página web también contiene un presentación corta con información adicional sobre la encuesta, y un glosario con los términos utilizados en la encuesta. La encuesta estará disponible hasta el miércoles 27 de enero a la medianoche. *La primera reunión virtual pública se realizará el 8 de febrero, 2021, a las 6:00 p.m. para discutir los resultados de la encuesta.*

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FOR IMMEDIATE RELEASE
Friday, January 29, 2021 12:53 PM

Public Workshop Set For Feb. 8 on 'Resilient Brevard' Study

BREVARD COUNTY, FL. -- The East Central Florida Regional Planning Council will host a public workshop for the "Resilient Brevard" study on Monday, Feb. 8th, from 6 to 7:30 pm.

To protect the health and safety of the public, the meeting will be held virtually, via Zoom. To register for the workshop and learn more about the project, please visit the project site at https://www.perilofflood.net/resilient-brevard.

If you need assistance, please contact resilientbrevard@ecfrpc.org.

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FOR IMMEDIATE RELEASE
Wednesday, February 17, 2021 4:12 PM

"Resilient Brevard" Survey Reopened Through Feb. 28

BREVARD COUNTY, FL. -- The "Resilient Brevard" community survey is open again, through Sunday, February 28, 2021. If you didn't get an opportunity to take it on the first release, we invite you to now take the short survey. We want your input!

"Resilient Brevard" is a project to increase our local resilience to the impacts of flooding. "Resilient Brevard" seeks to identify coastal vulnerabilities and develop proactive strategies, policies, and a recommended plan of action to minimize and mitigate the effects of various types of flooding. The East Central Florida Regional Planning Council (ECFRPC) is under contract with Brevard County to launch this effort. The project is focused on five general areas:

- **Economic resilience**
- **Public services & safety**
- **Resilient development**
- **Public health and equity**
- **Resilient nature-base practices**

We want your feedback on creating an economically and environmentally resilient community! **Please take our short survey by visiting www.perilofflood.net/resilient-brevard. The website also contains a short presentation with more information about the survey, and a glossary of terms used in the survey.** A recording of the first virtual public workshop, held on February 8, is also available on the project site. A second virtual workshop will be held in March to update the community on strategy development and policy recommendations.

¡La Encuesta Comunitaria de "Resiliente Brevard" está nuevamente disponible hasta el domingo, 28 de febrero, 2021, a la medianoche. Les invitamos a tomar esta breve, pero importante encuesta si no tuvo la oportunidad antes. ¡Su opinión es importante para nosotros! Por favor, complete nuestra breve encuesta visitando https://www.perilofflood.net/resilient-brevard. La página web también contiene una presentación corta con información adicional sobre la encuesta, y un glosario con los términos utilizados en la encuesta. Nuestra primera reunión pública virtual se llevó a cabo el pasado 8 de febrero, 2021. La presentación de la misma se encuentra disponible en https://www.perilofflood.net/resilient-brevard. Una segunda reunión pública virtual se llevará a cabo a finales de marzo 2021 para actualizar a la comunidad sobre las recomendaciones de políticas y estrategias de desarrollo basadas en los resultados de las encuestas y del estudio de vulnerabilidad realizado para esa fecha. Envíe un correo electrónico a resilientbrevard@ecfrpc.org para recibir notificaciones sobre la próxima reunión. Para mayor información sobre Resilient Brevard, por favor visite https://www.perilofflood.net/resilient-brevard o comuníquese con Lori Cox, ECFRPC al (407) 245-0300.

Please email resilientbrevard@ecfrpc.org to sign up for email notifications of upcoming public workshops. For more information on "Resilient Brevard" please visit www.perilofflood.net/resilient-brevard, or call Lori Cox, ECFRPC, at (407) 245-0300.

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FOR IMMEDIATE RELEASE
Monday, March 29, 2021 11:24 AM

Workshop on April 12 To Focus on 'Resilient Brevard' Measures

BREVARD COUNTY, FL. -- The East Central Florida Regional Planning Council will host the second of two Public Workshops for "Resilient Brevard" from 6-7:30 p.m. on Monday, April 12.

To protect the health and safety of the public, this meeting will be held virtually, via Zoom.

To register for the workshop and learn more about the project, please visit the project site at https://www.perilofflood.net/resilient-brevard. If you need assistance, please contact resilientbrevard@ecfrpc.org, or call Lori Cox, AICP, at (407) 245-0300.