St Lucie County
Regional Resilience Vulnerability Assessment
DRAFT REPORT

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TETRA TECH

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WITH SPECIAL GRATITUDE

To the residents, businesses, organizations and leaders of

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EXECUTIVE SUMMARY

St. Lucie County (SLC), the City of Port St. Lucie (PSL), the City of Fort Pierce (FP) and St. Lucie Village (SLV) joined together to take a collaborative approach toward short- and long-term resilience planning. This St. Lucie County Regional Resilience Vulnerability Assessment (RVA) represents a foundational step in developing a community-wide resilience plan. The RVA takes a local, data-driven approach to evaluate the vulnerability of community-wide assets to the risks posed by flood impacts from sea level rise, and extreme rainfall and storm surge events.

The County and municipalities have a long history of collaborating to address a wide range of issues and to implement initiatives that lay the foundation for sustainability and resilience. From the acquisition and restoration of natural areas to the development of stormwater storage and conveyance systems, septic-to-sewer projects, water quality improvement efforts, and disaster preparedness, the St. Lucie community is well-positioned to continue to enhance its resilience to future hazard threats.

The St. Lucie County RVA is being done in concert and coordination with the State of Florida's resilience planning initiative. Established In 2021, the State's Resilient Florida program, through Florida Statute (F.S.) Section 380.093, acknowledged that "…the State is particularly vulnerable to adverse impacts from flooding resulting from increases in frequency and duration of rainfall events, storm surge from more frequent and severe weather systems, and sea level rise, and that such adverse impacts pose economic, social, environmental, and public health and safety challenges to the State" (Florida Senate 2021). The Resilient Florida program set requirements for a Statewide Sea-Level Rise and Flooding Vulnerability Assessment. The Statute also requires the Florida Department of Environmental Protection (FDEP) and the regional Water Management Districts to develop annual Sea-Level Rise and Flood Resilience Plans to include prioritized projects. Finally, the Resilient Florida program created a funding mechanism to support local government infrastructure projects and vulnerability assessments with the goal that every County perform a local, data-driven vulnerability assessment, which will be integrated into the statewide assessment.

In 2023, SLC entered into an agreement with FDEP to develop this SLC RVA in compliance with Florida Statute 380.093 (2023). This RVA assesses flooding impacts on critical assets–generally those local and regional assets that are considered critical to the health and safety of residents, the vitality of the economy and the integrity of the environment. This RVA maintains the eligibility of SLC and its municipalities for future infrastructure funding through the Resilient Florida Grant Program.

To identify the most impacted geographic areas and vulnerable assets throughout the County, the RVA analyzed future flood scenarios for 2040 and 2070 as required by 380.093 F.S. and 2100 for longer-term planning considerations. This RVA is based on best-available science and data, including geographic information system (GIS) database details, inundation mapping, and critical asset evaluation. Findings from this RVA will form the foundation for a SLC Regional Resilience Plan (RRP) which will outline actions that can increase the County's and the municipalities' capacity to adapt to weather-related stressors; prioritize needs of the community; identify funding sources; and provide guidance on proactive responses to potential risks and impacts. The RVA and subsequent RRP will ultimately provide the data, vulnerability analysis, strategic planning, adaptation evaluation,

engineering, and community engagement, to create a more resilient and sustainable future for the County and municipalities.

The RVA includes a systematic process to identify the potential vulnerabilities of the community to adverse impacts from flood hazards. It incorporates scientific data from technical sources such as the National Oceanic and Atmospheric Administration (NOAA) and the Federal Emergency Management Agency (FEMA), topographic and elevation data, hydrologic data, asset data, and sea level rise and rainfall projections. In addition, supplemental information in existing local studies relative to flood risk were utilized, as well as input from residents, organizations, agencies, government entities, and businesses. The RVA incorporated critical county, municipal and regionally significant assets. Critical assets are public assets, networks, and essential systems crucial for the well-being of SLC and its municipalities. Four categories of assets were evaluated: Transportation and Evacuation Routes; Critical Infrastructure; Community and Emergency Facilities; and Natural, Cultural, and Historic Resources.

The RVA focused on the following flood hazards based on Section 380.093, F.S. requirements:

- **Extreme rainfall** - the increased intensity and duration of precipitation events that often leads to severe flash flooding in low-lying areas.
- **Sea level rise** (SLR) - the gradual expansion and rise in the level of the world's oceans due to increased atmospheric and water temperatures as well as the melting of ice caps.
- **High tide flooding** - a consequence of rising sea levels, involves the recurrent inundation of low-lying areas by tidal waters during high tide events.
- **Storm surge** - an abnormal rise of seawater levels during a storm, caused by intense sustained onshore winds and low atmospheric pressure during extreme weather events.
- **Compound flooding** - occurs when multiple causes of flooding coincide simultaneously or subsequently within a short period of time, such as tidal, storm surge, and rainfall-induced flooding, intensified by rising sea levels.

The RVA employed a sequential methods approach, first characterizing vulnerability as a function of exposure and then asset sensitivity:

- **Exposure** – for this RVA, exposure refers to the presence of assets and ecosystems in areas where they could be adversely affected by flood hazards. The SLC RVA assessed exposure levels to each flood hazard and identified the depth of inundation caused by each flooding scenario for three planning horizons: 2040, 2070, and 2100.
- **Sensitivity** - refers to the degree to which a system or resource is or might be affected by hazards.

Within the analysis, 3,015 assets owned or maintained by the County and the municipalities were classified as critical assets. Of these, 1,512 at-risk critical assets were prioritized for adaptation consideration throughout the County. The asset types include emergency facilities, healthcare facilities, community support buildings, water infrastructure, schools, historic structures, and similar resources.

Public stakeholders and steering committee members played a vital role in shaping the RVA by providing essential input and feedback. More than a dozen meetings or workshops were held to provide information on resilience planning and the development of the RVA, eliciting input from eleven different groups from neighborhood associations, non-profit organizations, and government and agency boards and committees. SLC and the municipalities established a resilience steering committee of key collaborators, comprising representatives from diverse backgrounds and associations. The resilience steering committee played a vital role in shaping the project by reviewing goals, offering input on study direction, identifying geographic context, guiding modeling methodologies, pinpointing available data and resources, providing specific asset information, and reviewing project findings. The steering committee represented various St. Lucie County, Port St. Lucie, Fort Pierce and St. Lucie Village departments including Planning & Development Services, Public Works, Utilities & Solid Waste, Engineering, Emergency Operations and Environmental Resources. The resilience steering committee was also comprised of various member agencies, including representatives from SLC Florida Department of Health, SLC School District, SLC Economic Development Council, St. Lucie Transportation Planning Organization and the Treasure Coast Regional Planning Council.

This RVA is the first step in developing a comprehensive approach to adapt to and mitigate the effects of unpredictable weather patterns and extreme weather events and lays the foundation for informed decision-making and a resilient future. This proactive approach, with a strong emphasis on community involvement, has laid the foundation for the development of this RVA. By adopting a forward-thinking philosophy, the County and the municipalities foster a sense of ownership and shared responsibility for addressing risks, while also enhancing preparedness and resilience. Furthermore, the recognition that identifying and addressing vulnerabilities, especially those related to critical assets, before they fail is the most fiscally responsible strategy - highlighting the County and municipality’s long-term commitment to resilience.

The St. Lucie Regional RVA increases our understanding of our community’s vulnerabilities. It serves as the foundation for evaluating natural hazard risks and identifying strategies for improved preparedness and responsiveness to crises, while informing future decision-making that leads to a more resilient and vibrant community. Again, the St. Lucie Regional RVA is prepared based on the criteria and standards set forth in state law and provides the necessary data and corresponding analyses for SLC and its municipalities to be eligible for future funding through the Resilient Florida Grant Program.

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Acronyms and Abbreviations

County	St. Lucie County
CVS	composite vulnerability score
DEM	digital elevation model
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FP	Fort Pierce
F.S.	Florida Statute
GIS	geographic information system
gSSURGO	Gridded Soil Survey Geographic Database
HEC-RAS	Hydrologic Engineering Center's River Analysis System
HSG	Hydrologic Soil Group
HTF	high tide flooding
HUD	U.S. Department of Housing and Urban Development
LMS	Local Mitigation Strategy
MHHW	mean higher high water
MHW	mean high water
MLW	mean low water
MLLW	mean lower low water
MSL	mean sea level
Municipalities	Port Saint Lucie, Fort Pierce, and Saint Lucie Village
NAVD 88	North American Vertical Datum 88
NIH	NOAA intermediate-high (sea level rise projection)
NIL	NOAA intermediate-low (sea level rise projection)
NOAA	National Oceanic and Atmospheric Administration
PSL	Port St Lucie
RRP	Regional Resilience Plan
RVA	Resilience Vulnerability Assessment
SFWMD	South Florida Water Management District
SLC	St. Lucie County
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SLR	sea level rise
SLV	St. Lucie Village
T&E	threatened and endangered species
USACE	U.S. Army Corps of Engineers
VA	Vulnerability Assessment

Glossary

Adaptation: The process of adjustment to actual or expected threats and impacts, in order to moderate harm or exploit beneficial opportunities. Adaptive capacity is the ability to make these adjustments based on feedback loops.

Assets: People, resources, ecosystems, infrastructure, and the services they provide. Assets are the tangible and intangible things people or communities' value.

Asset Criticality Index: The metric used to account for a critical assets' significance during and immediately after crisis events.

Bathtub Method/Model: The projected sea level rise at a point in time that is added to the current water elevation and overlaid on the existing topography to identify potential future inundated areas.

Composite Vulnerability Score: The comprehensive metric (derived from the risk assessment), integrating weighted components to offer a holistic measure of flood-related risk to County assets.

Critical Assets/Infrastructure: Public assets, networks, and essential systems crucial for the well-being of St Lucie County and the municipalities. Disruption or damage to critical infrastructure would lead to negative community, environmental, and/or economic consequences.

Days of Tidal Flooding: The number of days that the water level exceeds mean higher high water at (in this study) the Virginia Key Tide Gauge, when that water level is adjusted for sea level rise.

Exposure: The presence of people, assets, and ecosystems in places where they could be adversely affected by hazards.

Flood Mitigation: Structural changes to reduce the frequency and severity of flood damages.

Hazard: An event or condition that may cause injury, illness, or death to people or damage to assets or otherwise impede their normal function.

Hazard Mitigation: When used by the Federal Emergency Management Agency (FEMA), the actions taken to reduce loss of life and property by lessening the impact of near future disasters.

Hazus: A GIS-based software tool that applies engineering and scientific risk calculations to provide defensible damage and loss estimates.

Horizon Index: The metric used to assess the immediacy of flooding impacts by categorizing planning horizons and utilizing a multiplier system to emphasize the criticality of near-term impacts. This tool aids in prioritizing adaptation measures, infrastructure investments, and policy responses based on the expected timeframe of weather-related challenges.

Impacts (negative impacts in this discussion): Effects on natural and human systems that result from hazards. Evaluating potential impacts is a critical step in assessing vulnerability.

Impact Index: The metric used to assess potential impacts of flooding by considering average flood depths, to prioritize resource allocation and improve community resilience.

Infrastructure: Fundamental physical and organizational structures (man-man and natural) and facilities necessary for the functionality of a community.

Likelihood: The probability of an asset being impacted by a hazard based on its geographical position.

Mitigation: A human intervention to reduce impacts from current or future impacts.

Nature-based Solutions: Efforts to safeguard, sustainably manage, and restore natural or altered ecosystems, addressing societal challenges in an adaptive and effective manner, while simultaneously enhancing human well-being and biodiversity.

Planning Horizon: The projected conditions at a future date, in this study the planning horizons are 2040, 2070, and 2100.

Projections: Potential future conditions calculated by computer-based models of the earth system. Projections are based on sets of assumptions about the future scenarios of human actions that may or may not be realized.

Regionally Significant Assets: Vital facilities within the County that cater to a wider geographic scope, spanning neighboring communities, and may be but are not inherently under the County's ownership and maintenance.

Resilience: The capacity of a community, business, or natural environment to prevent, withstand, respond to, and recover from a disruption.

Risk: The potential total cost if something of value is damaged or lost, considered together with the likelihood of that loss occurring. Risk is often evaluated as the probability of a hazard occurring multiplied by the consequences that would result if it did happen.

Risk Assessment: The process of evaluating and prioritizing critical assets by using a weighted system that combines three indexes—flood risk index, horizon index, and social index—to produce a comprehensive measure of flood related risk.

Risk Index: The metric used to assess County critical assets based on their exposure to various flood scenarios. This index considers both the type of flood impact and the frequency of exposure. This approach prioritizes critical assets by employing a tiered system to identify those facing the highest risks to flooding-related hazards.

Scenarios: A set of assumptions about the future regarding the level and effectiveness of mitigation efforts and other physical processes, each with a level of uncertainty associated with it.

Sea Level Rise (Absolute Sea Level Rise): An increase in the height of the ocean surface above the center of the earth, without regard to whether nearby land is rising or falling.

Section 380.093(3), F.S.: A Florida statute passed in 2021, 380.093(3), F.S. pertains to vulnerability assessments related to flooding and sea level rise in the state of Florida. It requires the state to compile a comprehensive statewide assessment of specific risks posed by flooding and sea level rise.

Sensitivity: The degree to which a system, population, or resource is or might be affected by hazards.

Stillwater Elevations: The level of water in a body of water, such as a lake or river, under various conditions but not including wave action. This measurement is crucial in understanding water levels for purposes like flood prediction, navigation safety, and water resource management. It represents the height of the water surface when it is not affected by wind waves or tidal forces, providing a baseline for gauging water levels and their potential impacts.

Tidal Flooding: Defined in Subparagraphs 380.093(3)(d)1. and 380.093(3)(d)2., F.S. as "Depth of tidal flooding, including future high tide flooding. The threshold for tidal flooding is 2 feet above mean higher high water."

Uncertainty: The inability to predict, with 100 percent accuracy, a particular outcome because future weather and climate arise from the complexity of variables within the system, including adaptations or other human actions, and the ability of models to represent scenarios with absolute certainty, as well as the inability to predict the decisions that society will make.

Vulnerability: The propensity or predisposition of assets (human, ecological, and man-made) to be adversely affected by hazards. Vulnerability encompasses the degree of exposure, sensitivity, risk, potential impacts, and adaptive capacity.

Vulnerability Assessment: A process for identifying who or what is vulnerable to certain conditions and impacts. It is the combination of exposure, sensitivity, and adaptive capacity.

24-Hour Rainfall: In this document, the 25-, and 100-year 24-hour rainfall. It is the amount of rainfall within a 24-hour period that has either a 4 percent (25-year), or a 1 percent (100-year) chance of occurring in any given year.

1.0 INTRODUCTION

1.1 Project Background

St. Lucie County (SLC), the City of Port St. Lucie (PSL), the City of Fort Pierce (FP) and St. Lucie Village (SLV) joined together to take a collaborative approach toward short- and long-term resilience planning. This St. Lucie County Regional Resilience Vulnerability Assessment (RVA) represents a foundational step in developing a community-wide resilience plan. The RVA takes a local, data-driven approach to evaluate the vulnerability of community-wide assets to the risks posed by flood impacts from sea level rise, extreme rainfall, storm surge and compound events.

The St. Lucie County RVA is being done in concert and coordination with the State of Florida's resilience planning initiative. Established In 2021, the State's Resilient Florida program, through Florida Statute (F.S.) Section 380.093, acknowledged that "…the State is particularly vulnerable to adverse impacts from flooding resulting from increases in frequency and duration of rainfall events, storm surge from more frequent and severe weather systems, and sea level rise, and that such adverse impacts pose economic, social, environmental, and public health and safety challenges to the State" (Florida Senate 2021). The Resilient Florida program set requirements for a Statewide Sea-Level Rise and Flooding Vulnerability Assessment. The Statute also requires the Florida Department of Environmental Protection (FDEP) and the regional Water Management Districts to develop annual Sea-Level Rise and Flood Resilience Plans to include prioritized projects. Finally, the Resilient Florida program created a funding mechanism to support local government infrastructure projects and vulnerability assessments with the goal that every County perform a local, data-driven vulnerability assessment, which will be integrated into the statewide assessment.

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The RVA includes a systematic process to identify the potential vulnerabilities of the community to adverse impacts from flood hazards. It incorporates scientific data from technical sources such as the National Oceanic and Atmospheric Administration (NOAA) and the Federal Emergency Management Agency (FEMA), topographic and elevation data, hydrologic data, asset data, and sea level rise and rainfall projections. In addition, supplemental information in existing local studies relative to flood risk were utilized, as well as input from residents, organizations, agencies, government entities, and

businesses. The RVA incorporated critical county, municipal and regionally significant assets. Critical assets are public assets, networks, and essential systems crucial for the well-being of SLC and its municipalities. Four categories of assets were evaluated: Transportation and Evacuation Routes; Critical Infrastructure; Community and Emergency Facilities; and Natural, Cultural, and Historic Resources.

The RVA focused on rainfall-induced flooding, high tide flooding, storm surge flooding, sea level rise flooding and compound flooding, which occurs when multiple causes of flooding coincide simultaneously or within a short period of time.

This RVA is the first step in developing a comprehensive approach to adapt to and mitigate the effects of unpredictable weather patterns and extreme weather events and lays the foundation for informed decision-making and a resilient future. This proactive approach, with a strong emphasis on community involvement, has laid the foundation for the development of this RVA. By adopting a forward-thinking philosophy, the County and the municipalities foster a sense of ownership and shared responsibility for addressing risks, while also enhancing preparedness and resilience. Furthermore, the recognition that identifying and addressing vulnerabilities, especially those related to critical assets, before they fail is the most fiscally responsible strategy - highlighting the County and municipality's long-term commitment to resilience.

The St. Lucie Regional RVA increases our understanding of our community's vulnerabilities. It serves as the foundation for evaluating natural hazard risks and identifying strategies for improved preparedness and responsiveness to crises, while informing future decision-making that leads to a more resilient and vibrant community. Again, the St. Lucie Regional RVA is prepared based on the criteria and standards set forth in state law and provides the necessary data and corresponding analyses for SLC and its municipalities to be eligible for future funding through the Resilient Florida Grant Program.

The core project milestones are delineated in Figure 1-1.

Figure 1-1. Project Milestones

1.2 Disclaimer

The SLC Regional RVA uses publicly available data, asset data provided by SLC and the municipalities, and standard practices and methodologies for evaluating flood hazards available at of the time of this study (March 2025). The RVA results are formulated using GIS modeling that projects water levels across the ground elevation of the study area but does not factor specific drainage pathways. The

findings presented in this report are derived from data with varying degrees of uncertainty and underlying assumptions and should be viewed as indicators of relative risk across different areas of SLC and the municipalities. The analysis results provided in this report are intended to aid inquiries regarding asset vulnerability and provide basic planning level information.

1.3 St. Lucie County, Port St. Lucie, Fort Pierce, St. Lucie Village Background

1.3.1 Physical Descriptors of the Area

1.3.1.1 Geographical Setting and Characteristics

St. Lucie County, located along Florida's Treasure Coast, is known for its beautiful beaches, vibrant communities, and rich agricultural history. St. Lucie County is home to a mix of urban and suburban communities, economic hubs, agricultural lands, and protected natural areas. The largest city, Port St. Lucie, is one of the fastest-growing cities in Florida, while Fort Pierce and St. Lucie Village are smaller and have a more historic and maritime character.

Spanning approximately 688 square miles, natural resources have defined the culture of the community throughout its history. There are more than two dozen natural areas within St. Lucie County encompassing more than 25,000 acres of parks and preserves, from pristine beaches to cypress hammocks and freshwater marshes.

With 21 miles of Atlantic coastline, as well as the North Fork St. Lucie River and the Indian River Lagoon within its boundaries, water is a way of life in St. Lucie County.

The Indian River Lagoon (IRL) is a shallow-water estuary that spans 156 miles from Brevard County to just south of St. Lucie County. It is one of North America’s most diverse estuaries with more than 4,400 species of plants and animals, including 35 that are listed as threatened or endangered. For more than a century, people have been drawn to the Lagoon for its biodiversity, temperate climate and close proximity to the Atlantic Ocean. The IRL supports commercial and recreational fisheries and acts as an economic engine for the region. As of 2016, the annual economic value of the Lagoon was estimated to be $7.6 billion, which included nearly 72,000 jobs, and recreational opportunities for more than 7.4 million visitors per year.

The North Fork St. Lucie River (NFSLR) was designated as an aquatic preserve in 1972 and is a freshwater system upstream and a brackish system near the St. Lucie Estuary. The NFSLR river supports a variety of federally and state protected species such as American alligators, manatees, wood storks and tricolored herons. The North Fork is home to more species of fish than any other river in the state and provides important habitat for the juvenile phases of commercially important species such as blue crabs, snook, snapper, drum and shrimp. The NFSLR drains an area of approximately 108,165 acres (169 square miles) in eastern St. Lucie County and northeastern Martin County. Historically, it was a slow-moving and meandering river in a largely forested catchment until dredge and fill operations to “straighten” the river were completed in the early 1900’s. These activities and accelerated growth in SLC have resulted in long-standing impacts, including loss of natural stormwater storage and filtration, severe erosion of channel banks and increased sedimentation, all of which increase the risk of flooding in surrounding areas. Working collaboratively, the County and

municipalities launched the Environmentally Significant Lands Program in 1994, following overwhelming citizen approval of a $20 million local bond referendum. The goal of the Program is to conserve and safeguard ecosystems in their natural condition while allowing for appropriate public access. Through additional partnerships and leveraging bond funding, the more than two dozen preserves have been established totaling over 11,000 acres.

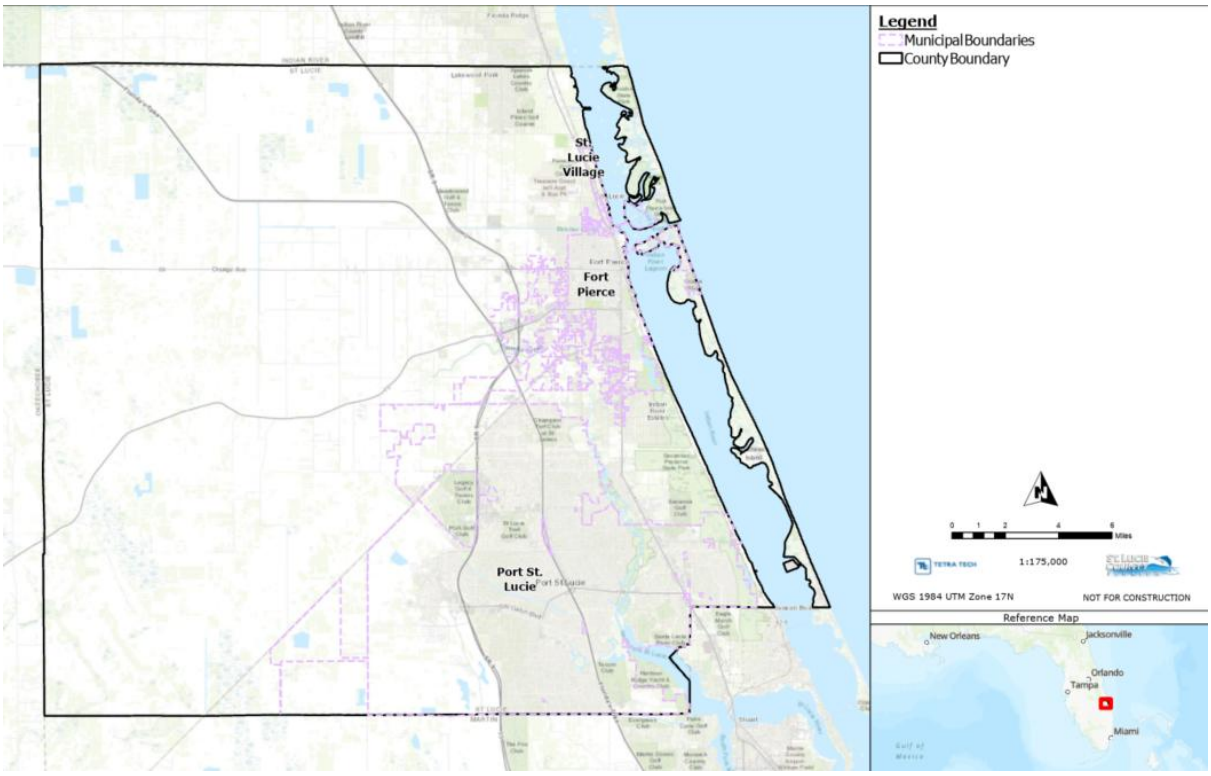


Figure 1-2. St Lucie County Boundary

1.3.1.2 Economic & Demographic Overview

Together, St. Lucie County and the municipalities have a population of approximately 385,746 residents (Florida Bureau of Economic and Business Research, 2024 current population estimate). The County has a relatively diverse economy, with tourism, healthcare, retail, and agriculture representing its major sectors. Proximity to the coast makes tourism and recreational industries important contributors to the local economy, with visitors drawn to the county's beaches, parks, and fishing spots. Additionally, the county benefits from a strong retail and service sector, which caters to both residents and tourists.

The County's demographic landscape features a balanced age distribution, with around 19.6 percent of the population under the age of 18 and approximately 24.8 percent aged 65 and older. Ethnically, the County's population is comprised of about 71.2 percent White, 23.4 percent Black or African American, 22.3 percent Hispanic or Latino, and a smaller percentage of other racial groups (U.S. Census Bureau 2023).

Educational attainment shows that roughly 88.6 percent of the population holds a high school diploma or higher, while about 25.4 percent have a bachelor's degree or advanced degree. Economically, St Lucie County's median household income stands at $69,027, with a poverty rate of about 10 percent (U.S. Census Bureau 2023). Housing in the County is characterized by a split between renters and homeowners, with 77.7 percent of residents owning their homes and 22.3 percent renting. The housing market in SLC reflects the rising demand for coastal living, with rental and home ownership costs steadily increasing, contributing to a dynamic but increasingly competitive housing landscape.

1.3.1.3 St. Lucie County Vulnerabilities

As a low-lying coastal community, SLC and the municipalities are at the forefront of impacts from more frequent extreme weather occurrences, highlighting the need for proactive planning to safeguard its residents, assets, and resources.

In the context of SLC and the municipalities, the RVA's primary goal is to understand these unique conditions, the interaction of various systems and the complex array of challenges to assess and develop appropriate and proactive responses. With rising atmospheric and ocean temperatures, shifting weather patterns, and increased frequency of extreme events, these changes create direct and indirect impacts across different areas in SLC and the municipalities, affecting various facets of the region's environment, economy, and society. As sea level continues to increase, heightened risks include coastal erosion, more frequent and severe flooding both seasonal and year-round, and compromised infrastructure.

Moreover, the heightened occurrence and severity of storms, encompassing hurricanes and tropical cyclones, represent a significant threat to SLC's coastal regions. Higher ocean temperatures fuel hurricane intensity as they approach the coast, while elevated sea level amplifies the impact of storm surges, heightening the likelihood of severe inundation during storm events.

1.3.2 Resilience Initiatives

1.3.2.1 Background

The County and municipalities demonstrate their commitment to community resilience planning through a proactive approach, implementing several adaptation and mitigation projects. Notable examples include the floodproofing and elevation of critical infrastructure, the construction of living shorelines, acquisition and conservation of natural lands, and the installation of stormwater storage and management systems to reduce flooding risks. Additionally, the County and municipalities have a range of approved projects within its Local Mitigation Strategy (LMS), such as retrofitting public buildings to serve as emergency shelters, enhancing seawall structures, and storm hardening of essential facilities. To lead resilience efforts, the County completed a community-wide Sea Level Rise Vulnerability Assessment in 2021, prior to the Resilient Florida Program being launched. The County and municipalities have produced disaster and hurricane preparedness guides and worked with numerous agencies for distribution. Recognizing the importance of community involvement, SLC encourages residents to participate in documenting real-time flooding events. By uploading

photographs and information to the South Florida Water Management District's (SFWMD) Flood Observation Survey tool, residents assist local and regional stormwater management planners in developing strategies to reduce flood risks. The County and municipalities also participate in FEMA National Flood Insurance Program's (NFIP) Community Rating System program, which brings significant cost savings to residents for NFIP flood insurance policies. Achieving a Class 5 rating, which underscores its strong commitment to floodplain management policies and regulations.

This proactive approach, with a strong emphasis on community involvement, has laid the foundation for the development of this RVA update. By adopting a forward-thinking philosophy, the County and municipalities foster a sense of ownership and shared responsibility for addressing risks, while also enhancing preparedness and resilience. Furthermore, the recognition that identifying and addressing vulnerabilities, especially those related to critical assets before they fail, is the most fiscally responsible strategy – highlights the County's and municipality's long-term commitment to resilience.

1.3.2.2 Stormwater Master Plans

The County is currently (2025) undertaking a Stormwater Master Plan that will serve as a comprehensive roadmap for managing stormwater in a sustainable and cost-effective manner. The plan aims to reduce flood risks, protect water quality, and support community and economic development. Key initiatives include the inventory of existing stormwater systems, identification of high-risk flood areas, and implementation of advanced stormwater management technologies. The plan also emphasizes the importance of community engagement, encouraging residents to participate in documenting real-time flooding events through tools like the SFWMD's Flood Observation Survey. By integrating these efforts, the County aims to enhance the resilience of its infrastructure, improve the health of local water bodies such as the Indian River Lagoon and St Lucie River, and ensure a safer, more sustainable future for its residents.

1.3.2.3 Environmentally Significant Lands Program

SLC, PSL, FP and SLV worked together on a 1994 ballot initiative to protect environmentally significant lands throughout the County. SLC citizens overwhelmingly passed this $20 million bond referendum, resulting in the acquisition and management of over 11,000 acres. The goal of the Environmentally Significant Lands Program is to conserve, safeguard, and rehabilitate ecosystems in their natural condition while allowing for appropriate public access. These protected ecosystems enhance the quality of life for residents while acting as a natural defense against stormwater runoff and flooding.

1.3.2.4 Half Cent Sales Tax

In 2018, SLC, PSL, FP and SLV residents approved a ballot proposal to increase the sales tax by ½ cent to fund projects to reduce neighborhood flooding, improve water quality, improve local roads, reduce traffic congestion and add sidewalks.

1.3.2.5 Port St. Lucie's Grown Green Urban Forestry & Neighborhood Parks

Based on community workshops, Port St. Lucie is committed to increase neighborhood greenspaces, regional parks, and high performance public spaces that integrate conservation,

stormwater storage and management, and easy access for residents to exercise, play, and learn and enjoy the community's natural assets. Examples of this include Mariposa Preserve that is managed for conservation and stormwater attenuation purposes, McCarty Ranch Preserve that acts as critical stormwater storage and a destination for special events; Torino Regional Park currently in design and will include wetland and forest preservation, and the Grow Green Urban Forestry campaign to plant 1,000 trees to expand the tree canopy throughout the community.

1.3.2.6 FEMA Community Rating System

The County currently maintains a Class 5 rating in FEMA's Community Rating System, which measures a community's readiness and resilience to future natural disasters. SLC and the municipalities recognize the importance of floodplain management as a community-based effort to prevent or reduce the risk of flooding, resulting in a more resilient community and reducing the financial impacts of flooding. For each higher Class rating a local government obtains (higher class rating is lower class number), the entire community receives 5 percent off their flood insurance premiums. Currently, the City of Fort Pierce maintains a Class 6 rating, and St. Lucie County and Port St. Lucie a Class 5 rating, resulting in a 20% and 25% reduction in flood insurance rates for the entire community.

1.3.2.7 St. Lucie County Unified Local Mitigation Strategy

The St. Lucie County Unified Local Mitigation Strategy (LMS) establishes a framework for implementing and coordinating mitigation goals, objectives, and projects aimed at reducing impacts on the public, property, and the environment. The Unified Local Mitigation Strategy Working Group (consisting of St. Lucie County, the cities of Port St. Lucie, Ft. Pierce, and St. Lucie Village, and multiple agencies and non-profits countywide) updates the Local Mitigation Strategy document every 5 years which outlines the various hazards we face within St. Lucie County.

1.3.2.8 St. Lucie Community Resilience Steering Committee

In February 2021, the county established a steering committee comprising representatives from all three city governments within the county, as well as county staff specializing in emergency management, community health, regional planning, transportation, economic development, and the school board. This multi-jurisdictional and multi-agency committee collaborates on developing and implementing resilience strategies. The steering committee aims to take systematic approaches that reduce risk to people, infrastructure, the environment, and the economy from potential impacts to the local community. The committee strives to provide robust avenues for citizen and sector stakeholder engagement in plan development process, to realize a resilience plan that protects the health, safety and well-being of all residents in an equitable way.

1.3.2.9 St. Lucie County 2021 Vulnerability Assessment Study

In June 2021, SLC conducted a vulnerability assessment study that involved the development of a community-wide resilience plan. Funded by a grant from the FDEP, the project involved a VA that analyzed risks from sea level rise. The assessment covered water issues, critical infrastructure, historic resources, and at-risk populations. The report also included comprehensive maps showing projected SLR impacts for 2040, 2070, and 2100 (Tetra Tech 2021).

1.3.2.10 Comprehensive Planning

Coastal Management Element

Required by Florida Statute (Sections 163.3177(6)(g) and 163.3178, F.S.), the Coastal Management Element of the St. Lucie County Comprehensive Plan aims to maintain, restore, and enhance the overall quality of the coastal zone environment and protect human life and limit public expenditures in areas prone to natural disasters. It also seeks to plan for and, where necessary, restrict development activities that could damage or destroy coastal resources. The Coastal Planning Area includes unincorporated regions adjacent to the ocean, estuarine shorelines, and the shoreline of the North Fork of the St. Lucie River and its tributaries.

The 2019 Comprehensive Plan inventories natural resources, land use, historical resources, and critical infrastructure within the coastal zone of St. Lucie County. It analyzes their risks in relation to stressors and outlines disaster planning strategies and adaptation plans to mitigate these risks. The plan aligns with the St. Lucie County Local Mitigation Strategy, ensuring a coordinated approach to enhancing resilience and protecting coastal resources (SLC 2019).

Conservation Element

The Conservation Element of the St. Lucie County Comprehensive Plan aims to promote the conservation, appropriate use, and protection of natural resources within the County. Required by Florida Statute (Section 163.3177(6)(d), F.S.), this element covers various aspects including the general characteristics of the land, air quality, local ecosystems, water resources, natural flood plains, and important resources for commercial and recreational uses. It also emphasizes water conservation, energy conservation and resilience planning.

The 2019 Comprehensive Plan addresses the conservation of local ecosystems, such as wetlands and forests, and the protection of water resources, including rivers, lakes, and aquifers. The plan also identifies natural flood plains and outlines strategies to preserve these areas to mitigate flood risks.

Additionally, the Conservation Element highlights the importance of maintaining resources that support commercial and recreational activities, such as fisheries and parks. Resilience planning is a key focus, with strategies to adapt to and mitigate impacts, ensuring the long-term sustainability of St. Lucie County's natural resources (SLC 2024).

2.0 RESILIENCE PLANNING GRANT 22PLN22 OVERVIEW

2.1 Introduction to Resilience Planning Grant 22PLN22

The County received a grant from the Resilient Florida Grant Program through the FDEP to prepare a countywide RVA update pursuant to Section 380.093, F.S. [2023]. The objective of the Resilient Florida program is to identify and address the risks of flooding hazards on critical and regionally significant assets.

The County's resulting RVA update adheres to vulnerability assessment requirements contained within Section 380.093(3), F.S. [2023] The St. Lucie Regional RVA will support Florida's coordinated approach to address coastal and inland resiliency through the Statewide Flooding and Sea Level Rise Resilience Plan. The Florida Legislature acknowledged "…the State is particularly vulnerable to adverse impacts from flooding resulting from increases in frequency and duration of rainfall events, storm surge from more frequent and severe weather systems, and sea level rise, and that such adverse impacts pose economic, social, environmental, and public health and safety challenges to the State" (Florida Senate 2021).

2.2 Project Goals and Objectives

The key primary goals and objectives of the RVA project are as follows:

- Model the exposure of County and municipal assets to the flood hazards
- Determine the sensitivity and risk related to exposed assets
- Gather and incorporate public and stakeholder input
- Assign a vulnerability level to exposed assets for prioritization
- Incorporate results into future County and municipal planning initiatives and the RRP

2.3 Incorporation with the Community Development Block Grant Mitigation Program

The methodologies and results within this Resilient Florida funded RVA will complement the U.S. Housing and Urban Development's (HUD) Community Development Block Grant (CDBG) Mitigation Program RVA also being conducted by SLC. This Resilient Florida RVA focuses on flood related hazards while the CDBG RVA will evaluate additional hazards and socioeconomic elements (Figure 2-1). Results from both RVAs will form the foundation of the community-wide RRP.

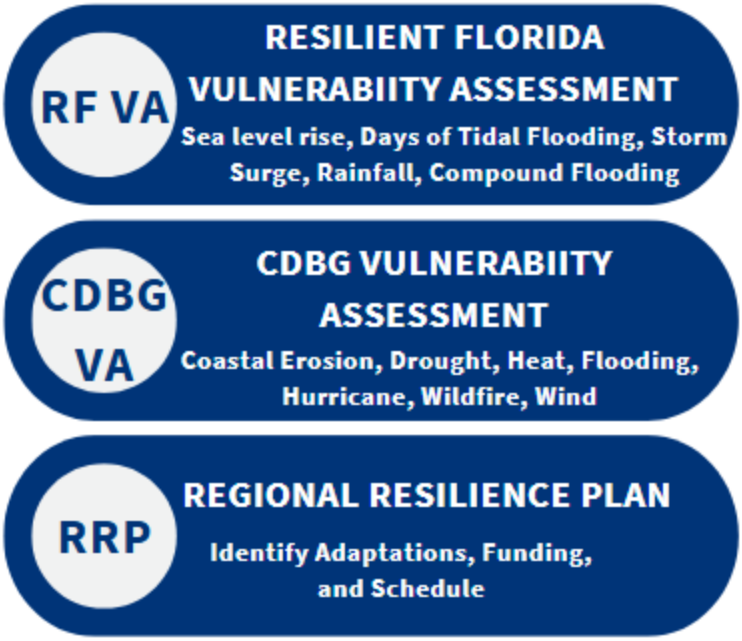


Figure 2-1. Overview of Resilience Initiatives

2.4 Steering Committee

SLC and the municipalities established a resilience steering committee of key collaborators, comprising representatives from diverse backgrounds and associations. The resilience steering committee played a vital role in shaping the project by reviewing goals, offering input on study direction, identifying geographic context, guiding modeling methodologies, pinpointing available data and resources, providing specific asset information, and reviewing project findings. The steering committee represented various County and municipal departments including Planning & Development Services, Public Works, Utilities & Solid Waste, Engineering, Emergency Operations, and Environmental Resources. The resilience steering committee was also comprised of various member agencies, including representatives from SLC Florida Department of Health, SLC School District, SLC Economic Development Council, St. Lucie Transportation Planning Organization, and the Treasure Coast Regional Planning Council. The resilience steering committee met throughout the process to review information, recommendations and discuss key project milestones and decisions.

2.5 Public Engagement

Community resilience refers to the ability of governments, individuals, organizations, institutions, and businesses to anticipate, respond to, endure, and recover from both immediate and prolonged pressures stemming from unpredictable weather patterns and extreme events, rising sea levels, increased flooding frequency, and heightened storm severity. To establish community resilience, it is essential to actively engage stakeholders when shaping planning efforts and determining adaptation strategies and infrastructure priorities. Without this inclusive approach, policies or projects may lack sufficient public backing that would be needed to implement policy recommendations over time, particularly amidst political or economic uncertainties.

Public involvement for the RVA was focused on sharing resilience information and the findings of the RVA and gathering feedback from community members. Information was provided to and received from members of the community through public meetings and surveys. Public engagement and outreach efforts for this project were geared toward communicating relevant science-based information that engaged the public, community leaders, and subject matter experts, regardless of education and technical background. Utilizing various methods and multimedia tools collaboratively, the outreach initiatives aimed to enhance community understanding and involvement in the science and technical aspects behind the RVA. The approach to public engagement empowered the community to engage, share, help formulate the RVA and to take informed actions in safeguarding their quality of life within the community.

Figure 2-2 outlines the public engagement approach utilized by the Project Team. The public engagement process was integral to the project's success, encompassing multiple phases to ensure comprehensive community involvement and support. The process began with strategic planning for engagement events, followed by listening sessions to better understand stakeholders' priorities and insights at these events.

Plan Engagement
Listen to Stakeholders
Evaluate & Coordinate
Present Hazards & Adapatation
Further Coordination & Validation
Document Engagement Outcome

Figure 2-2. Public Engagement Process

Public input and feedback were actively sought in public workshops, surveys, and engagement activities promoted through various relevant websites, calendars, email lists, newsletters, and social media platforms.

Community involvement played a pivotal role in identifying factors crucial to this project. The Project Team evaluated the information gathered from the community and coordinated efforts to integrate the input into the project, while documenting the engagement outcomes to provide a transparent record of the community's contributions.

2.5.1 Stakeholder and Public Engagement Events

St. Lucie County hosted more than a dozen engagement sessions within the community beginning in March 2023 to introduce the upcoming vulnerability assessment and resilience planning efforts. Three community workshops were conducted between April and June 2025 to present the results of the St. Lucie RVA. [Placeholder]

The purpose of these meetings was to allow the public to enter a dialogue where they were able to ask questions and provide community-specific input on the results of the analyses as well as the methodologies and assumptions. During these meetings, the County conducted exercises

encouraging the public to identify areas of flooding and the critical assets important to them as part of the adaptation strategy development. Figure 2-3 and Figure 2-4 exhibit examples of the outputs derived from the input provided by participants during these public workshops.

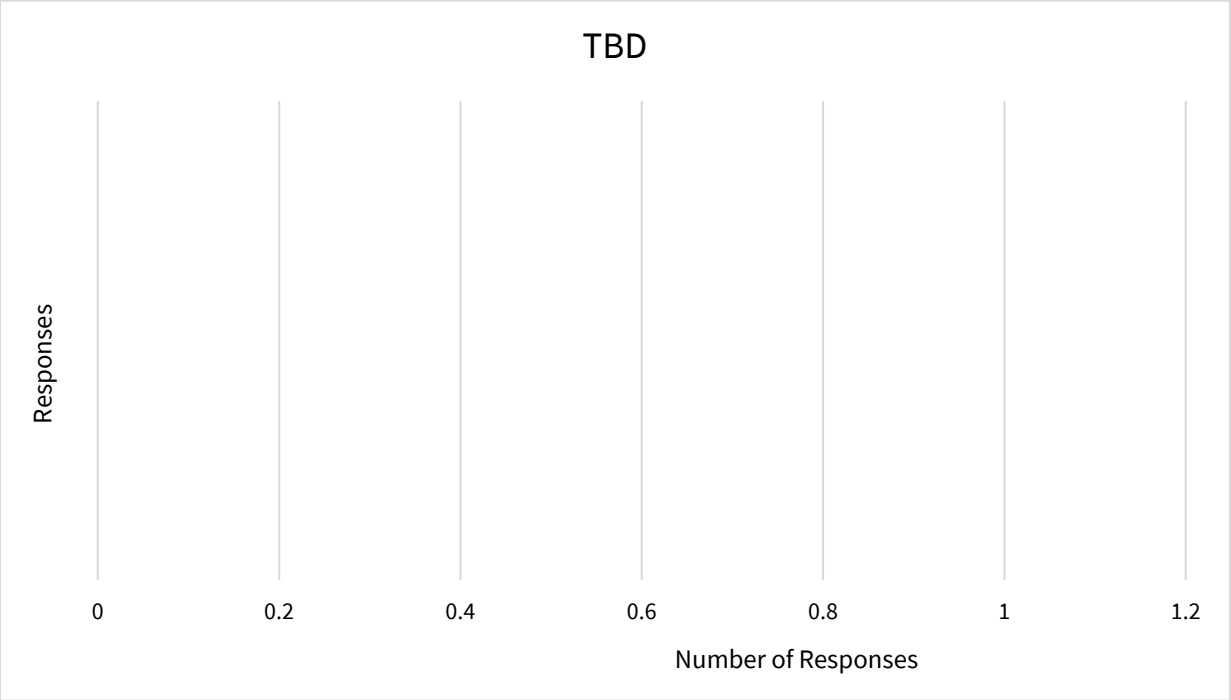


Figure 2-3. April 2025 Public Workshop Interactive Survey Question #1

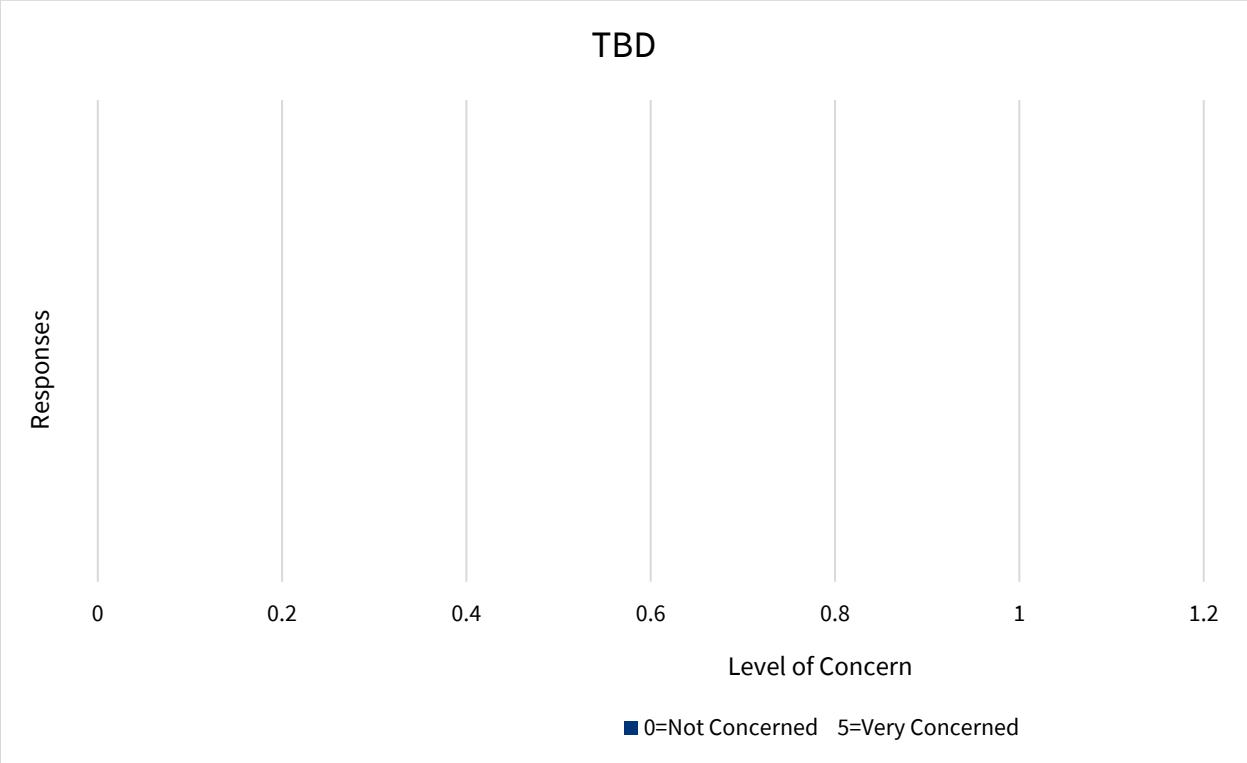


Figure 2-4. April 2025 Public Workshop Interactive Survey Question #2

3.0 HAZARDS

The County and municipalities are committed to protect their future against various flood-related hazards such as sea level rise, high tide flooding, storm surge, and extreme rainfall. Flooding resulting from any of these events poses a significant threat to SLC and the municipalities (Figure 3-1). The likelihood of flooding events occurring more frequently and impacting a larger area is increasing, especially in light of the barrier island, intracoastal waterway, and St. Lucie River systems. To assist communities experiencing these increasing threats, the Resilient Florida program has been strategically designed to guide cities and counties as they adapt to flood-based risks and ensure a resilient future.

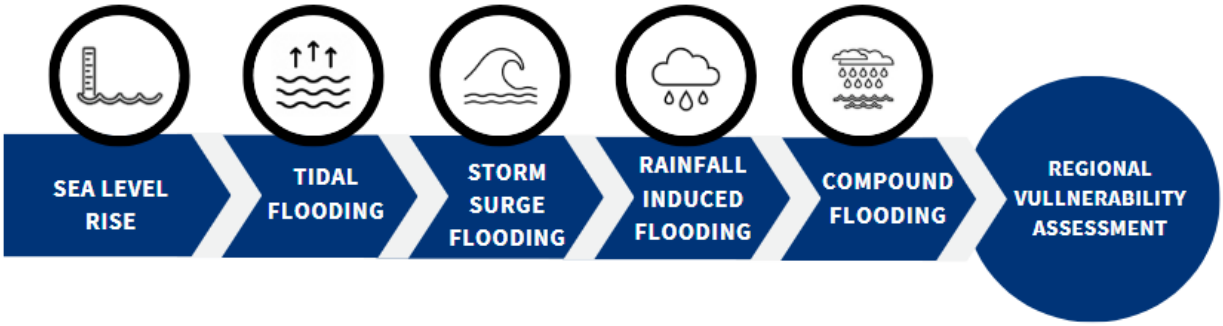


Figure 3-1. FDEP Resilient Florida Flood Hazards

3.1 Sea Level Rise

As sea levels rise, the effect is not uniform around the globe, and recent studies indicate that South Florida will experience more rapid SLR than the overall average (Miami Herald 2024). SLR is influenced by ocean currents, wind, thermal expansion of water, and geologic uplift or subsidence. SLR poses a significant threat to coastal communities, ecosystems and infrastructure, and can be associated with increased coastal flooding, shoreline erosion, natural habitat transition, and saltwater intrusion. Numerous studies have determined that SLR will increase saltwater intrusion and flood risks in Florida's coastal regions. As local SLR continues to accelerate, it poses a mounting threat to County and municipal assets.

3.2 Tidal Flooding

Tidal flooding refers to the high tide impacts from rising sea levels which often leads to the recurrent inundation of low-lying areas by tidal waters. Compared to the frequency 50 years ago, high tide flooding (HTF) now occurs 300 to 900 percent more frequently (NOAA 2022). Tidal flooding can occur during normal or extreme tide events. This type of flooding has often been called "nuisance flooding" since it is disruptive but does not threaten human life directly. However, as sea levels continue to rise, this flooding is expected to be more constant, becoming more than a nuisance. High tide flooding can interrupt traffic flow, impeding not only residents in transit but also emergency vehicle movement. Moreover, the intrusion of saltwater into urban environments accelerates corrosion of infrastructure

components, including electrical systems and transportation networks. High tide flooding also impacts the functionality of essential services like sewage systems and water treatment plants. Sustained ponding from these events can also result in increased mosquito populations and the vector-borne diseases they carry.

3.3 Storm Surge Flooding

Storm surge is the abnormal rise of seawater levels during a storm, caused by intense sustained onshore winds and low atmospheric pressure during extreme weather events. It can occur during extreme weather events such as hurricanes and often results in severe flooding. This impact is especially pronounced for its assets along coastlines on the open ocean and along other tidally influenced canals, rivers, and waterways. Storm surge can lead to widespread and rapid inundation of the County's shoreline, causing extensive damage to infrastructure, homes, and critical facilities. It further threatens the shoreline as it accelerates coastal erosion, reducing the protection afforded by a healthy beach and dune system where they exist, and can compromise the stability of other coastal protection structures such as rock revetments and seawalls. Additionally, surges can introduce saltwater into freshwater systems, posing risks to natural systems and water supplies and further accelerating the deterioration of infrastructure components.

3.4 Rainfall Induced Flooding

Extreme rainfall occurs when precipitation amounts experienced by a region are more intense and prolonged than average. In low-lying areas, this phenomenon often results in severe flash flooding, overwhelming stormwater management systems and leading to widespread damage to many types of infrastructure. The asset types that may be impacted can include roads, bridges and buildings, as well as homes and businesses. Extreme rainfall can interrupt essential services and transportation networks. The project analyzes flooding that results from extreme precipitation with volumes equal to 25- and 100-year rainfall events.

3.5 Compound Flooding

Compound flooding occurs when multiple forms of flooding coincide simultaneously or subsequently within a short period of time. Various combinations of high tidal flooding, storm surge, and rainfall-induced flooding, all occurring in addition to rising sea levels, produced the compound flood modeling results that informed this assessment.

4.0 DATA COLLECTION AND ASSET INVENTORY

In an effort to assemble the most comprehensive database possible, information was sourced from multiple entities, including federal agencies such as the NOAA, Homeland Infrastructure Foundation-Level Data, and FEMA; state bodies such as the FDEP, Florida Geographic Data Library, Florida Department of Transportation, and the Fish and Wildlife Conservation Commission; as well as local authorities such as SLC and the municipalities.

4.1 Asset Classes

The asset data collection effort was divided into four main categories based on the statutorily defined (Section 380.093 F.S.) asset classes: transportation assets and evacuation routes; critical infrastructure; critical community and emergency facilities; and natural, cultural, historical resources (Figure 4-1). An additional category was provided for supplemental information to enhance resilience planning and is discussed in Section 4.2.

Figure 4-1. FDEP Resilient Florida Program's Asset Classes

4.1.1 Transportation Assets and Evacuation Routes

The Transportation Assets and Evacuation Routes asset class includes various transportation facilities that serve as key components of a community's infrastructure. Specific to SLC and Municipalities these would include airports, bridges, roads (including major roadways and evacuation routes), bus terminals, port facilities, boat ramps and marinas. The County includes a network of crucial transportation assets, serving as the arteries of connectivity. These assets are integral not only to daily routines but also to emergency response and evacuation efforts during incidents. A sample is provided in Figure 4-2, which showcases a range of transportation assets located within a defined portion of the County.

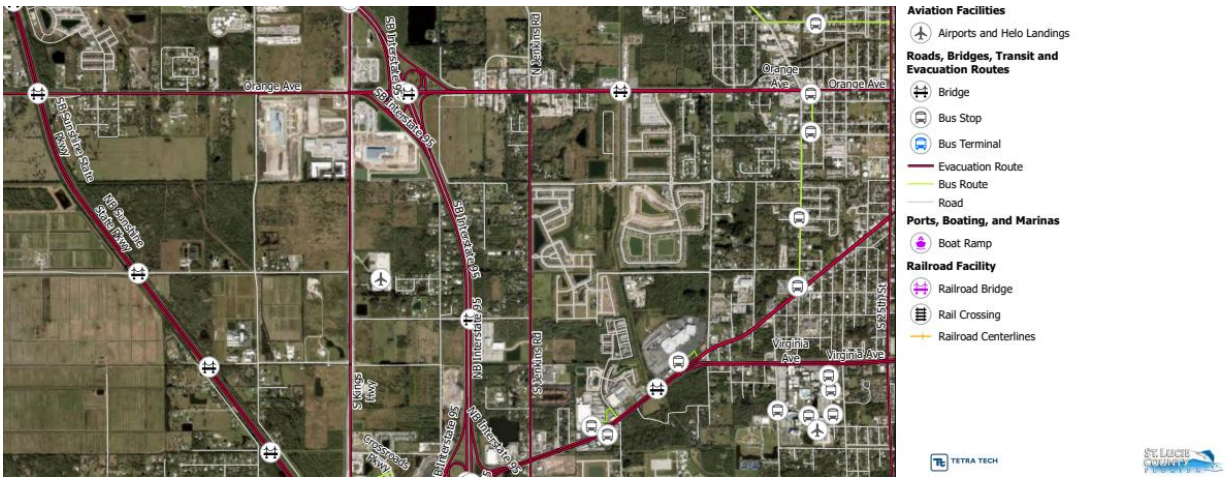


Figure 4-2. Transportation Assets within St. Lucie County

4.1.2 Critical Infrastructure

The Critical Infrastructure asset class focuses on the core facilities and systems that SLC and the municipalities rely on, including wastewater treatment facilities and lift stations, stormwater facilities, treatment facilities and pump stations, drinking water facilities, water utility conveyance systems, electric distribution and supply facilities, solid and hazardous waste facilities, communication facilities, and disaster debris management sites. This infrastructure is necessary for maintaining essential services, and the vulnerability to disruptions can have cascading effects on the community. Some are owned by the County or municipalities, and some are regionally or privately owned. A sample is provided in Figure 4-3, which depicts a range of critical infrastructure assets located within a defined portion of the County.

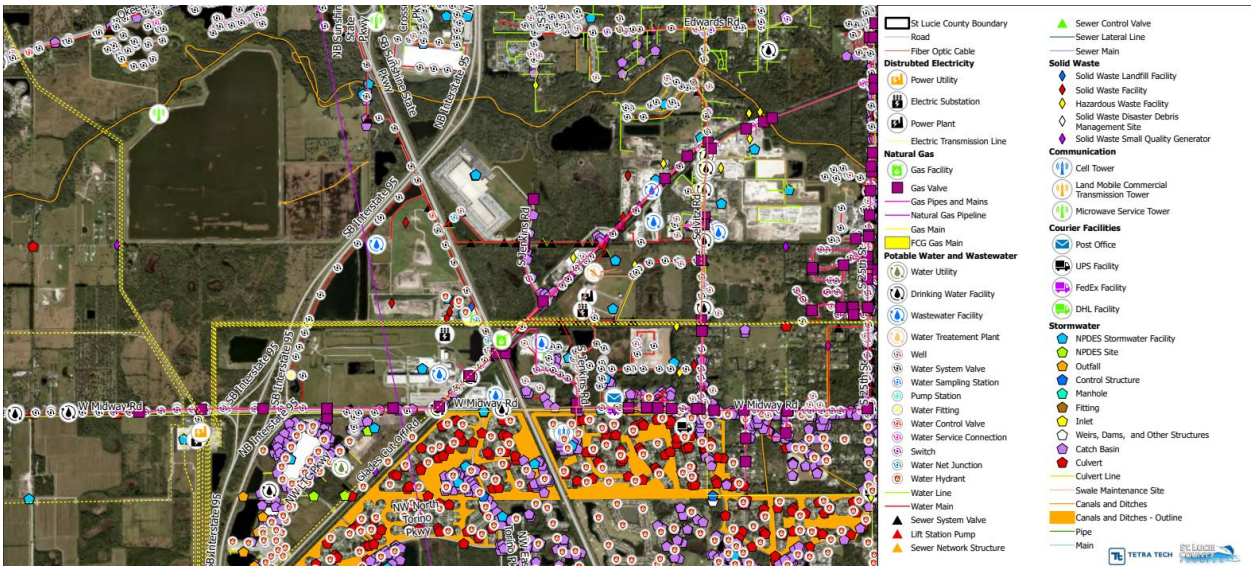


Figure 4-3. Critical Infrastructure Assets within St. Lucie County

4.1.3 Critical Community and Emergency Facilities

The Critical Community and Emergency Facilities asset class targets those facilities that support the County and help during emergencies, such as schools, colleges, community centers, correctional facilities, disaster recovery centers, emergency medical service facilities, emergency operation centers, fire stations, healthcare facilities, hospitals, law enforcement facilities, local government facilities, logistical staging areas, affordable public housing, and shelters.

Hospitals and healthcare establishments, typically not under the ownership and maintenance of the County, serve as lifelines during disaster response and recovery, particularly in the wake of severe weather occurrences. Ensuring their seamless operation is paramount for the community's welfare. Furthermore, they are mandated to undergo evaluations as per statutory requirements.

Likewise, emergency operational centers function as command centers for orchestrating emergency response endeavors. They are essential in disaster mitigation and necessitate sturdy infrastructure and connectivity to guarantee efficient responsiveness during emergencies. A sample is provided in Figure 4-4, which depicts a range of critical community and emergency facility assets located within a portion of the County.

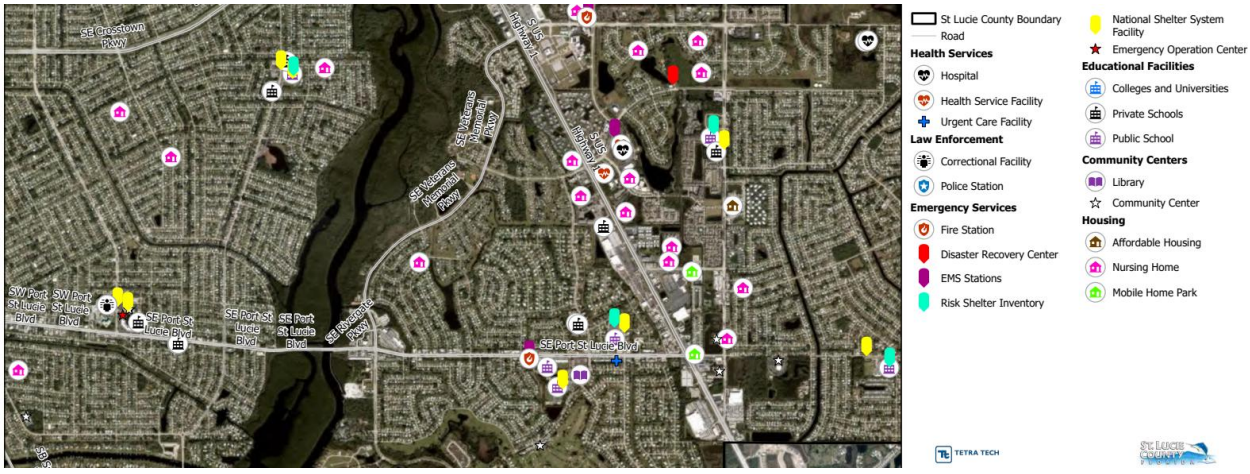


Figure 4-4. Critical Community and Emergency Facility Assets within St Lucie County

4.1.4 Natural, Cultural, and Historical Resources

The Natural, Cultural, and Historical Resources asset class encompasses the preservation and protection of natural areas and cultural/historical sites. This category includes assets such as conservation lands, parks, shorelines, surface waters, wetlands, and historical and cultural assets. These resources provide a sense of place and uphold the County's heritage. Additionally, where natural resource areas are more expansive, vital ecosystem services are inherently provided that mitigate risk of flooding and other extreme environmental events. Although conceptually different from the preceding three categories, these resources are equally important for the communities' well-being and necessitate safeguarding. A sample is provided in Figure 4-5, which depicts a range of natural, cultural, and historical assets located within a portion of the County.

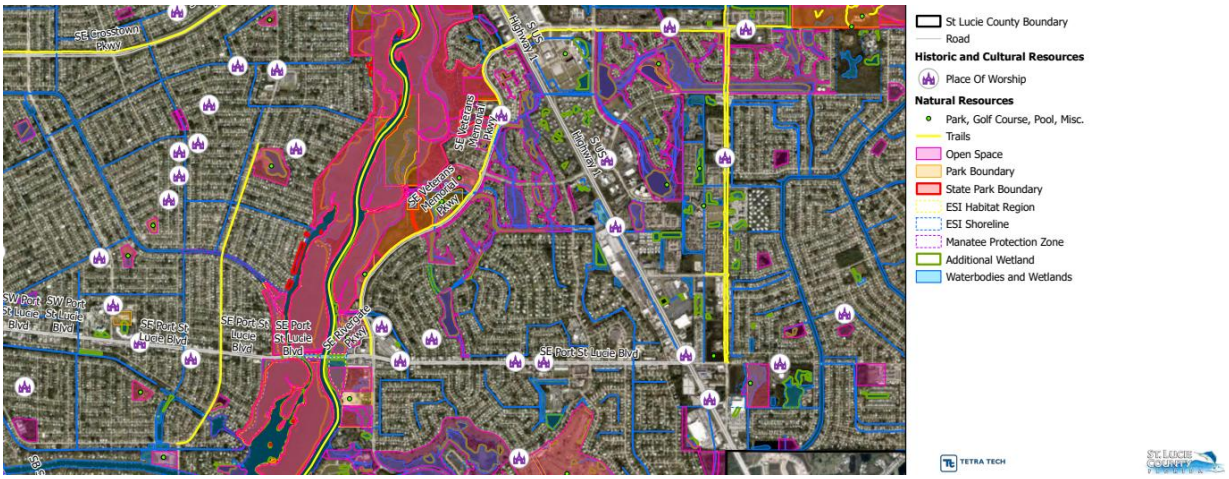


Figure 4-5. Natural, Cultural, and Historical Assets within St Lucie County

4.2 Supplementary Information

The supplementary information category included data that might not be required under Section 380.093, F.S., but helped create a more detailed RVA. The supplementary information included flood analysis data such as FEMA's Flood Insurance Study and flood zones in addition to local flood complaint areas, geomorphological feature data, hurricane damage assessments, and information provided in the SLC VA published in 2021 (Tetra Tech 2021). Supplemental information is provided to enhance resilience planning, encompassing assets that may not be explicitly outlined in the statutory framework. This type of information will be valuable when the County conducts more detailed studies in the future.

4.3 Regionally Significant Assets

As outlined in Section 380.093, F.S., regionally significant assets denote vital facilities that cater to a wider geographic scope, spanning neighboring communities, and are not inherently under local government ownership and maintenance responsibilities. They do, however, serve the needs of communities across various geopolitical boundaries. These assets can include water resource facilities, regional medical centers, emergency operation centers, regional utilities, major transportation hubs, airports, and seaports. Recognizing and protecting these assets will improve regional resilience and response efforts.

Statutorily, these assets encompass Commercial and Strategic Intermodal System ports, spaceports, waterways, railroad crossings, railroads, rail terminals, rail bridges, bus terminals, evacuation routes, electric power plants, electric power transmission lines, dams, as well as drainage assets maintained by water management districts. Additionally, stormwater ponds, wastewater facilities, public water supply tanks, public water supply plants (non-federal), emergency medical services facilities, emergency operations centers, shelters for the general population, and shelters for those with special needs are deemed essential in fulfilling the infrastructure and safety requirements of multiple regions.

4.4 Baseline Asset and Critical Asset Inventory Development

Based on the information gathered during the data collection phase of the project, a baseline inventory of County, municipal and private assets were established and organized by asset class. A completed baseline asset inventory map series was made available to the Project Team for review and to document all assets collected during this project.

Drawing from input collected from the public, key stakeholders, and County and municipal staff members, the baseline inventory of all County and municipal assets underwent refinement to create an inventory of "critical" assets. The list includes assets of economic significance and those facilitating access to healthcare facilities, serving as emergency evacuation routes, fostering social connectivity, bearing cultural significance, or upholding other fundamental values. The refined inventory of "critical" assets focuses on the most vital assets for the County and municipalities, emphasizing those critical to maintaining uninterrupted operations and services, including essential County- and municipality-related services.

Once the County and municipalities refined the asset categories from baseline to critical, they then categorized the critical assets into four different categories:

1. **Primary**: Vital assets to remain operational during crisis events
2. **Secondary**: Vital assets that are critical to immediate post-disaster recovery
3. **Tertiary**: Critical to short- and long-term recovery efforts
4. **Quaternary**: Special consideration—public/private assets of special consideration during short- and long-term recovery

Table 4-1 outlines the tiered asset categories within each of the four asset classes that the County and municipalities have deemed to be "critical".

Table 4-1. Critical Asset Tiers

Primary	Secondary	Tertiary	Quaternary
Transportation and Evacuation Routes			
Arterial and collector streets	Petroleum ports and terminals	Boat ramps	
Bridges	Aviation facilities		
Evacuation zones	Airports/runways		
	Port facilities		
Critical Infrastructure			
Electric production & supply facilities	Solid and hazardous waste facilities	Natural gas pipelines	
Substations	Gas utilities	Disaster debris management sites	
Drinking water facilities	Petroleum pump stations	Electricity transmission lines	
Wells and pumps		Potable water main	
Manually operated weirs			
Pump stations-sanitary sewer			
Wastewater facilities			
Power plants			

Primary	Secondary	Tertiary	Quaternary
Transmission towers			
Cellular and microwave towers			
Critical Community and Emergency Facilities			
Fire stations	Veterans' health facilities	Schools/colleges/universities	Senior communities
Hospitals	Urgent care	Disaster recovery centers	Affordable housing
Law enforcement	Treasure Coast Food Bank	Courthouses	Mobile home communities
EMS stations			Childcare facilities
Emergency operations centers			Nursing homes
Shelters			
Health department			
Local government facilities			
Correctional facilities			
Natural, Cultural, and Historical Resources			
		Environmentally sensitive index shoreline	
		County parks	
		Wetlands	
		Historical and cultural assets	

4.5 GIS Data Acquisition

The RVA relies on GIS-based modeling to predict future conditions. Even the best model will not produce reliable results if the data used to build it is incorrect or incomplete. Topographic data, hydrologic data, asset data, and tidal, surge, SLR and rainfall projection data were among the critical datasets gathered and used to develop the models. Publicly available resources from technical sources and agencies such as the Department of Homeland Security, NOAA, FEMA, and other relevant organizations were reviewed to obtain the more relevant data. These sources provided data at regional and national scales, offering a foundation for the Asset Inventory and Exposure and Sensitivity Analyses. The data inventory compilation process involved the following:

- **Systematic Identification:** Utilizing GIS and remote sensing technologies that provide information to categorize critical assets.
- **Research and Data Collection:** Sourcing from federal, state, and local databases.
- **Validation and Cross-Referencing:** Employing data quality assurance techniques to ensure the accuracy of information. It should be noted that some data sources provided contradictory or repeated asset data, so it was important to review the resulting information thoroughly in order to organize it clearly for further analysis.
- **Collaborative Efforts:** Engaging with local authorities and subject matter experts for incorporation of ground-truth data and local knowledge.

4.6 Data Gap Analysis: Gathering, Reviewing, and Updating Data

At the conclusion of the data acquisition phase of the project, a data gap analysis was produced. The data gap analysis report served as a qualitative assessment on the completeness, quality, and usefulness of the data provided to identify areas where data may be improved or acquired in the future. The data gap analysis conducted by the team identified several key challenges in data collection including insufficient geospatial data for specific assets; incomplete data on infrastructure, facilities, and resources; and discrepancies in terminology and inconsistencies in data coverage and metadata. The Project Team used several strategies to fill as many data voids as practicable within the assessment timeline. The comprehensive data collection approach ensured an inclusive dataset to support the exposure models and provide reliable results about future conditions.

The gap analysis conducted for the SLC RVA update identified key areas of data insufficiency and proposed strategic solutions and pathways to obtain more information. Overall, the County and municipalities possessed a comprehensive, well-organized database. Minimal suggestions were provided concerning the need to upgrade their metadata and the potential for crowdsourcing data and using on-site data collection to fill in gaps. It was recommended that the County and municipalities ensure comprehensive metadata compliance with Florida Geographic Data Library Content Standard for Digital Geospatial Metadata standards, optimize the use of Esri's ArcGIS Pro for metadata management, and maintain ongoing updates to metadata. The County and municipalities could improve geospatial data collection through in-person data gathering during routine maintenance and crowdsourcing from local stakeholders. Prioritizing local data sources, converting non-GIS data into usable formats, adopting standardized procedures for data collection, careful geocoding, and regular data validation are also essential. Additionally, continual staff training for data management will enhance data accuracy and reliability, supporting better decision-making in resilience planning.

By following this methodical approach to data gap identification and rectification, the project improves the accuracy and comprehensiveness of the St. Lucie Regional RVA. Ultimately, this ensures that future resilience planning is based on the most accurate and complete information possible.

5.0 ASSESSMENT ANALYSES METHODOLOGY

The methodology used in this RVA conforms to Section 380.093, F.S. and employs an array of data sources and modeling. The strategy delivers a review of the County and municipality's vulnerability to flooding-related hazards, capturing multiple types of flooding scenarios, including those exacerbated by sea level rise. An overall composite vulnerability score (CVS) was developed to prioritize each asset by combining exposure, vulnerability, and sensitivity to impacts. The composite vulnerability scoring system identifies the County's and municipalities' most vulnerable and critical assets and prioritizes them for future adaptation responses.

Recognizing the constraints of this methodology is essential. While it offers a valuable foundational evaluation, it cannot replace detailed, site-specific investigations. Future studies incorporating engineering-grade hydrologic and hydraulic modeling are advised for a more nuanced understanding of localized flood risks.

5.1 Exposure Analysis

For this RVA, exposure refers to the presence of assets and ecosystems in places where they could be adversely affected by hazards. SLC's RVA update assessed its exposure levels to flood hazards including SLR, storm surge, extreme rainfall, high tide flooding, and compound flooding.

An exposure analysis was performed for SLC and the municipalities to identify the depth and extent of inundation in the future years 2040, 2070 and 2100 by factoring the corresponding SLR and combining various flooding conditions over ground surface elevations. The water surface depths (i.e., flood scenarios) used to identify and evaluate the assets' vulnerability included the following conditions in the target years: current and future SLR and high tide flooding, rainfall-induced flooding, and compound flooding. The analysis was conducted in accordance with the requirements of the state statute and the rules and guidelines of FDEP. The full Exposure Map Series showing areas of flood risk is included as Appendix A.

5.1.1 Modeling Tools and Methodologies

The Project Team conducted the RVA by modeling multiple future scenarios within a spatial context. The goal of the assessment is to provide results that assist the County and municipalities in making decisions to enhance resilience to the impacts of flooding. The scenarios analyzed represent conditions that can be reasonably expected to occur in the future.

The RVA followed the Resilient Florida guidelines and utilized GIS-based methods to assess SLC and municipal assets with respect to the flood hazards identified. The modeling encompassed present-day conditions and planning horizons of scenarios for the years 2040, 2070 and 2100, incorporating assessments of 25- and 100-year storm events. A total of 54 scenarios were run for this assessment. SLR scenarios included the 2017 NOAA intermediate-low (NIL) and intermediate-high (NIH) SLR projections as required by Section 380.093, F.S. at the time of the analysis. To achieve the goal of accurate predictions of future conditions, a comprehensive strategy was employed, reviewing various data sources (Table 5-1). All analyses were conducted in the North American Vertical Datum of 1988 (NAVD 88).

Table 5-1. Data Sources for Flood Hazards

Flood Hazard	Data Source
Days of Tidal Flooding	NOAA Virginia Key Tide Guage (with statistical analysis and bathtub modeling)
Current Rainfall	NOAA Atlas 14 Rainfall Frequency Grids (with HEC-RAS and HEC-HMS modeling)
Future Rainfall	NOAA Atlas 14 Rainfall Frequency Grids (with HEC-RAS and HEC-HMS modeling modified by SFWMD change factors)
Current and Future SLR	NOAA Virginia Key Tide Guage and NOAA 2017 SLR Projections (with bathtub modeling)
Current and Future Storm Surge	NOAA 2017 SLR Projections and NOAA National Storm Surge Risk Maps (with Sea Lake and Overland Surges for Hurricanes Modeling)

The following sections on exposure and sensitivity are based on four analytics:

1. **Future Sea Level Rise and High Tide Flooding Modeling:** The analysis used ArcGIS Pro and a NOAA methodology for SLR inundation, which applies a bathtub model. A singular value, mean higher high water (MHHW) in NAVD 88 from the NOAA Virginia Key tide gauge, is input into the model to generate a static digital surface model of the ocean surface. Future SLR surfaces were created similarly, but with the MHHW being modified with NOAA 2017 SLR projections and with an added 2 feet to account for HTF, as required by Subsection 380.093(3)(d)2., F.S., before the digital surface model was created.

   For days of tidal flooding, the NOAA Tide Gauge for Virgina Key historic high tide values for the previous 19 years (which cover an entire Metonic Cycle) were extracted, and then the NOAA 2017 SLR projections were applied to estimate future high tide flood-water elevations. Maps illustrating the number of days of tidal flooding above current MHHW were produced for the NIL and NIH flooding scenarios at each planning horizon (2040, 2070, 2100), and a threshold of 2 feet above MHHW, as established in Subsection 380.093(3)(d)2. and Subsection 380.0937(1)(a), F.S was displayed as a colored band for reference. The associated map series titled “Days of Tidal Flooding” is in **Appendix A**.
2. **Storm Surge Analysis:** NOAA has run the hydrodynamic Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model to simulate storm surge for various categories of storms and made the resulting 2022 inundation depths available for federal, state, and local partners for planning, risk assessment, and decision making. These surfaces were downloaded and formatted for this RVA.
3. **Rainfall-Induced Flooding Evaluation:** Adhering to specific legislative requirements, this analysis employs the Hydrologic Engineering Center’s Hydrologic Modeling System and River Analysis System (HEC-HMS and HEC-RAS) for rainfall simulation and runoff computation. It incorporates NOAA’s Atlas 14 data, including the SFWMD’s future rainfall change factors, to create baseline rainfall depth grids essential for a comprehensive evaluation of potential future rainfall-induced flooding (SFWMD 2022). This study focuses on impacts from the 25- and 100-year 24-hour events. These annual occurrences of precipitation are represented by return frequency, or a likelihood that a storm of a particular intensity will occur in any given year (Table 5-2).

Table 5-2. Modeled Storm Events

Return Frequency (years)	% Chance of Occurrence in Any Year
25	4
100	1

4. **Compound Flooding Assessment:** This computation determines the compound effects of high tide flooding, storm surge, and rainfall-induced flooding. Each depth grid is generated separately before being overlaid in various combinations using ArcGIS Pro software to determine the combined effects of the different scenarios. Combined scenarios include variations on each sea level rise and high tide flooding projection, 25- and 100-year 24-hour rainfall events, and Category 3 and 5 storm surges to provide a wider scope of possible impact if events were to occur at the same time.

Taken together, these components provide a data-driven approach to assess community-wide vulnerability to flooding risks and hazard changes. The methodology is crafted to not only meet statutory compliance standards, but also to provide actionable insight into the County's and municipality's potential future flooding scenarios.

5.1.1.1 Scenario Development and Assumptions for Evaluations/Modeling

North American Vertical Datum of 1988

All elevations referenced in and analyzed for this RVA are expressed in NAVD 88 values, the current official vertical datum for North America.

Local Sea Level Rise Scenarios

The SLR scenarios included in the RVA include the 2017 NOAA Intermediate-Low and Intermediate-High Sea Level Rise Projections.

The benefit of evaluating a range of conditions is that the County and municipalities can determine its tolerance to risk for any asset and develop an adaptation strategy matching that tolerance. In the future, the County can act on data from this analysis that reflects a wide range of conditions. For critical assets, adaptation projects and policy decisions where there is a higher criticality associated with that decision, the higher end of the projections and output should be considered in design and formulation. Where there is a higher tolerance for flood impact, the lower end of the projections could be considered. The range provides options needed for more place-based and flood impact decision-making.

Planning Horizons

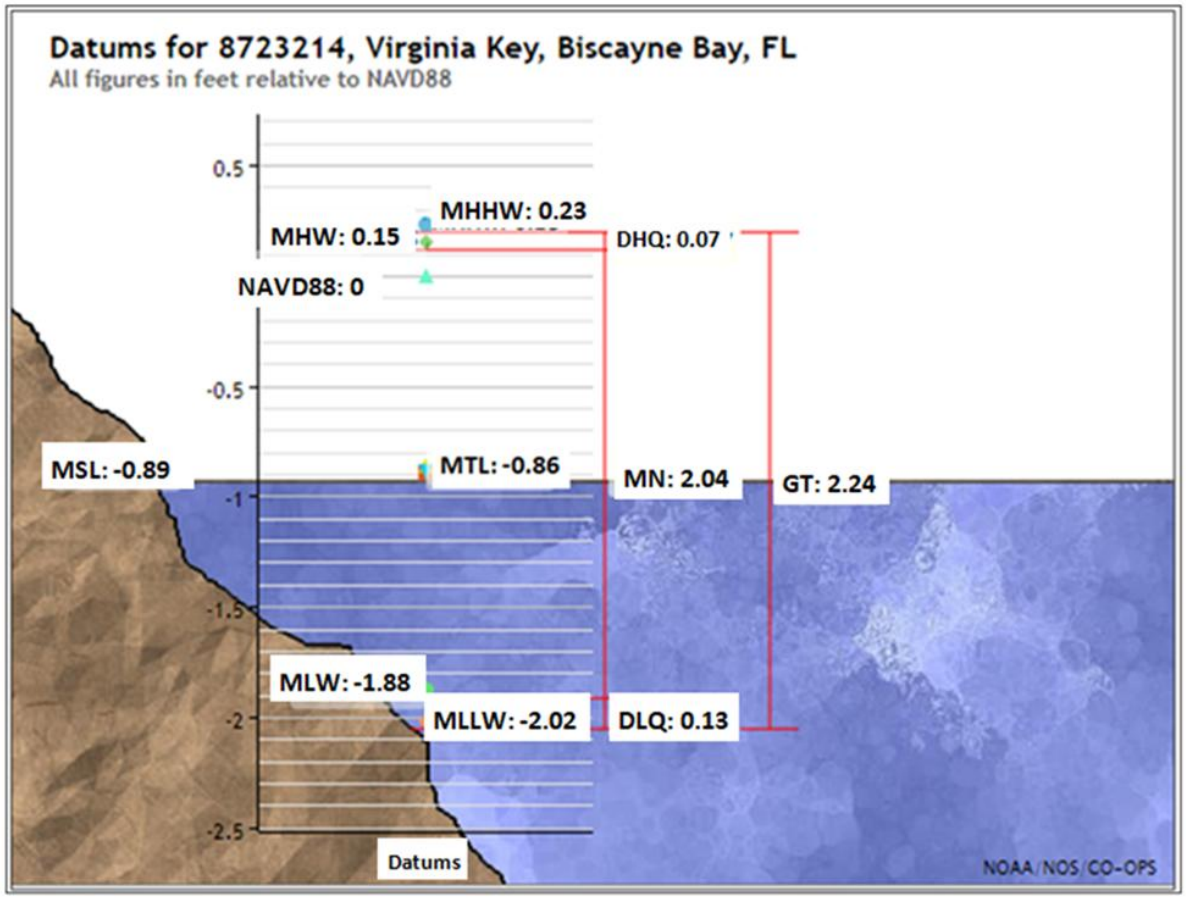
The planning horizons for this assessment coincide with NOAA's forecasting years: 2040, 2070, and 2100. While Subsection 380.093(3), F.S. only requires the years 2040 and 2070 planning scenarios, currently, this RVA also includes the 2100 condition for an extended vision for adaptation response and long-term strategic planning.

Sea Level Data Selection

The nearest NOAA tide gauge to SLC is located approximately 100 miles south at Virginia Key (Station ID 8723214). Installed in 1994, the tide gauge has supplied consistent data for three decades, providing a highly accurate record of water levels in the surrounding areas.

State statute provides multiple alternatives for using the tide records to determine SLR water elevations. One option includes interpolation between the two closest NOAA tide gauges, but another option provides that the higher of the two can be used if it has the higher mean sea level or an alternative gauge can be used with departmental approval. The highest mean sea level reported at the Virginia Key Tide Gauge is the greater of the two closest tide gauges. The benefits of using the Virginia Key Tide Gauge are that it exhibits a higher mean sea level (-0.89 feet NAVD 88) compared to other gauges in the region (Lake Worth Tide Gauge: -0.97 feet NAVD 88 and Trident Pier Tide Gauge: -0.95 feet NAVD 88) and it has an extensive and continuous tidal record. Using this gauge for calculations provides the most conservative approach for this assessment and is explicitly contemplated in Section 380.093(3)(d)3.d. The datum chart below (Figure 5-1) provides a visual representation of various reference levels (datums) related to the NOAA Virginia Key Tide Gauge. These datums are standardized elevations used to serve as reference points for measuring various water levels. Each datum is related to specific tidal conditions and is used to predict tidal elevations for specific purposes such as navigation, and coastal and marine engineering. Below is a brief explanation of common datums on Figure 5-1:

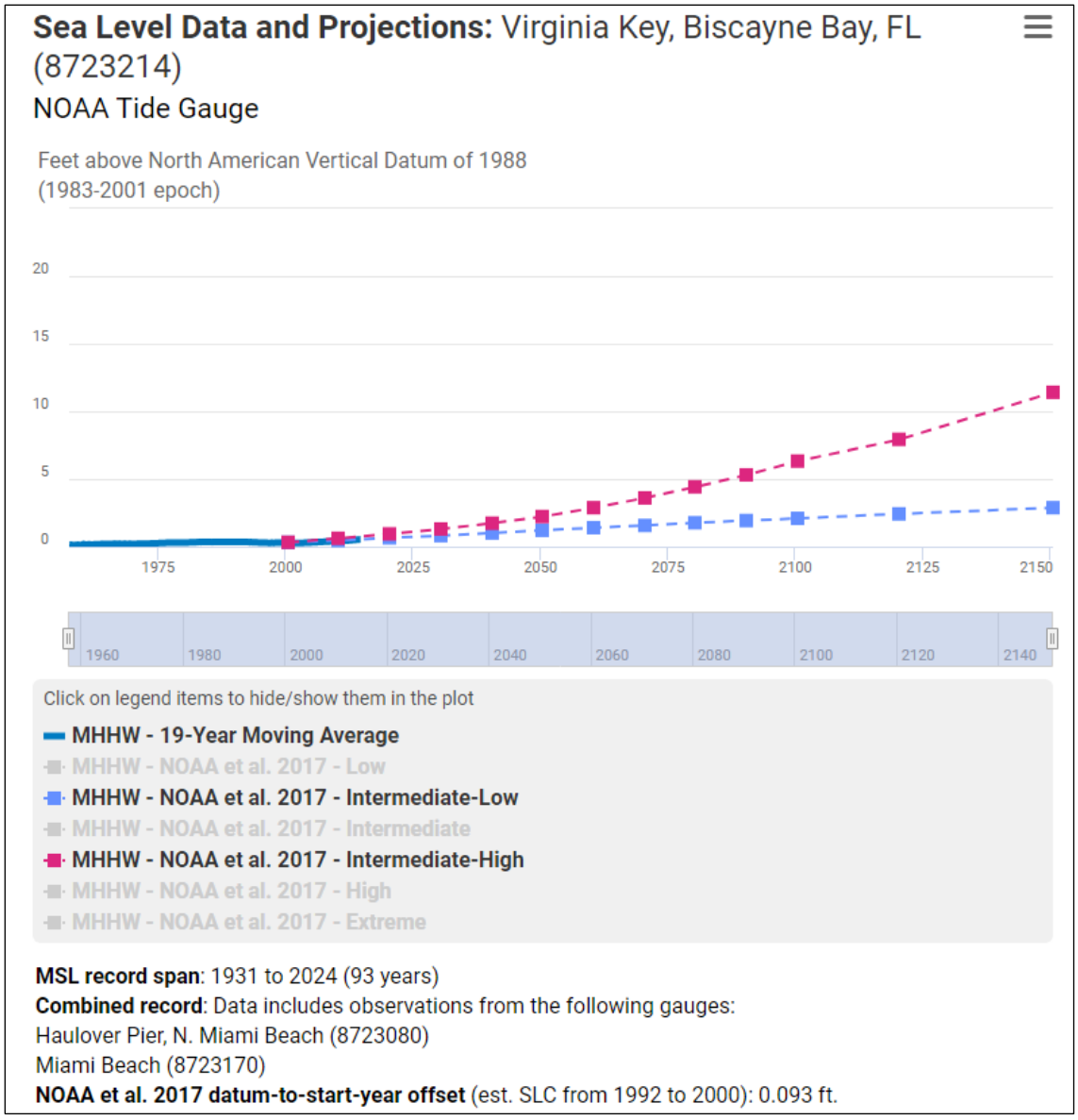
- **Mean Higher High Water (MHHW):** The average elevation of the highest high tides over a specific period. It is important for construction and development in coastal zones as it indicates the highest average water level that can be expected.
- **Mean High Water (MHW):** The average of all the high-water heights observed over the National Tidal Datum Epoch (usually a period of 19 years).
- **Mean Sea Level (MSL):** The average sea level. The mean level of the ocean's surface, calculated from hourly tidal heights measured over extended periods.
- **Mean Low Water (MLW) and Mean Lower Low Water (MLLW):** The average of the lowest tides and the lowest average tide recorded, respectively, often used for navigational purposes to ensure boats and ships do not run aground.



Source: NOAA n.d. (b); MHHW – Mean Higher High Water, MHW – Mean High Water, NAVD88 – **North American Vertical Datum of 1988, DHQ – Mean Diurnal High Water Inequality, MSL – Mean Sea Level, MTL – Mean Tide Level, DTL – Mean Diurnal Tide Level, MN – Mean Range of Tide, GT – Great Diurnal Range, MLW – Mean Lower Water, MLLW - Mean Lower Low Water, DLQ – Mean Diurnal Low Water Inequality**

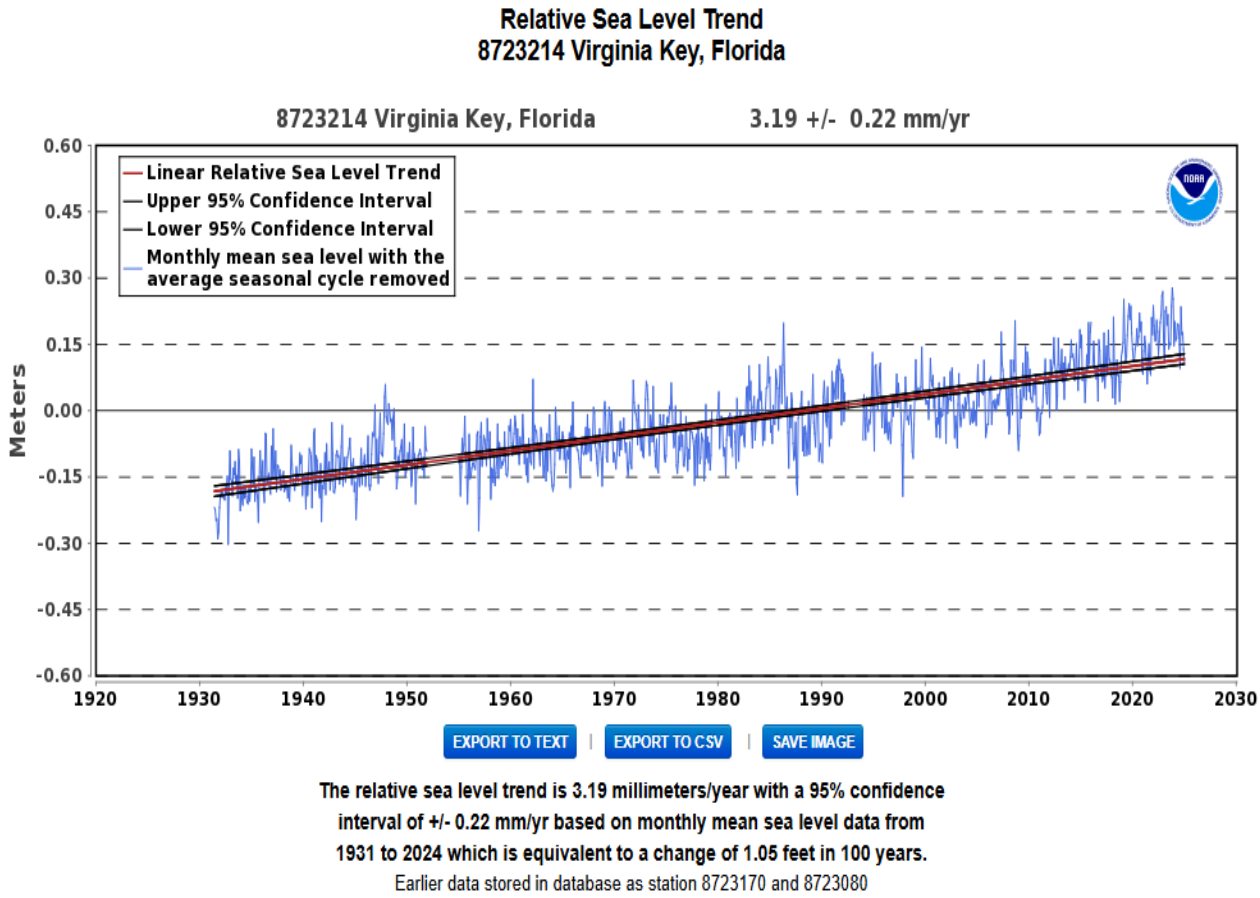
Figure 5-1. Datums for the Virginia Key Tide Gauge.

The U.S. Army Corps of Engineers (USACE) Sea Level Change Curve Calculator and Sea Level Analysis Tool (USACE n.d.) were utilized to calculate the sea level rise values required for NOAAs method for mapping SLR (NOAA 2017a) with the most recent digital elevation model and NOAA tide gauge derived tidal surfaces (NOAA n.d. (a)).The NOAA tide gauge, referenced as “Virginia Key, FL” (NOAA Gauge Station ID: 8723214, 2024) (Figure 5-2) was selected for its proximity to the study area along with the justification stated above. The Virginia Key Tide Gauge indicates a relative sea-level trend of 3.19 millimeters/year with a 95 percent confidence interval of +/- 0.22 mm/year based on data from 1931 to 2024 (Figure 5-3).



Source: USACE n.d.

Figure 5-2. Virginia Key Tide Gauge Sea Level Data (Measured) and Projections of Future Water Elevations

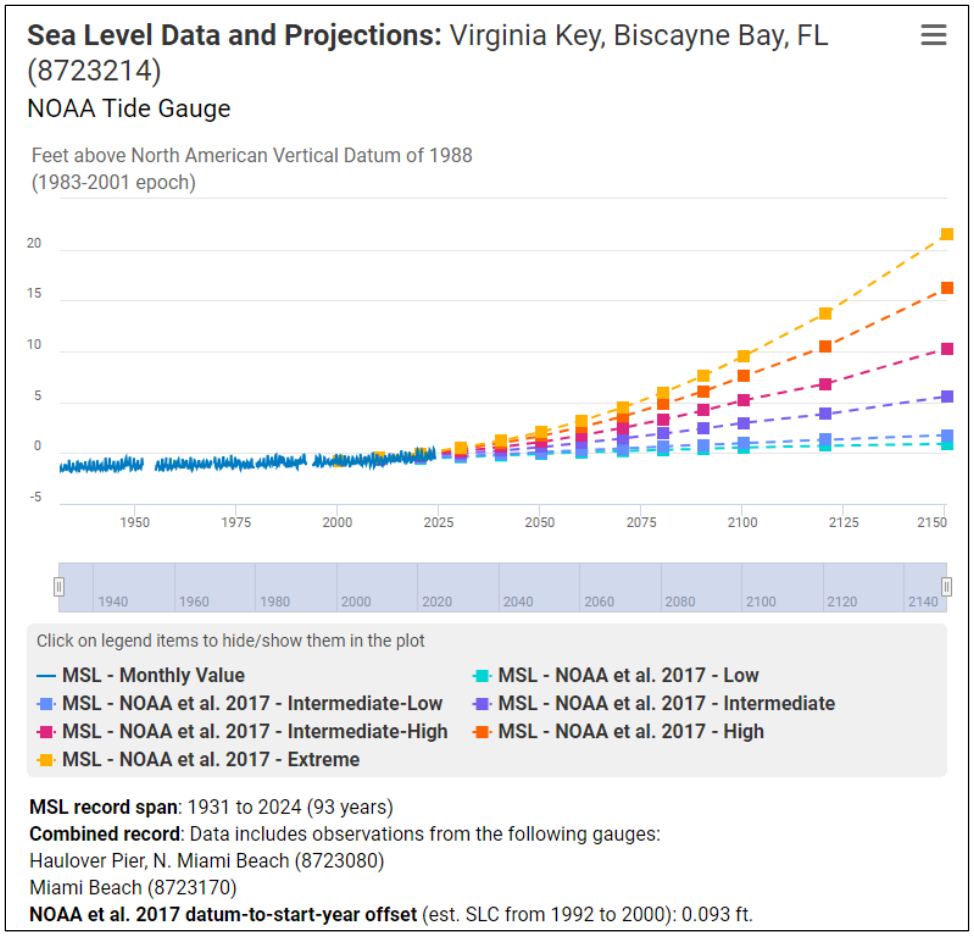


(3.19+/-0.22 mm/yr), equivalent to 1.05 ft in 100 years

Source: NOAA n.d. (b)

Figure 5-3. Sea Level Increase from 1931 to 2024

The plots above (Figure 5-2 and Figure 5-3) and below (Figure 5-4) describe the observed sea level and future projected increase in sea level within the region. Figure 5-5 provides the full suite of NOAA sea level projections. Modeling all of these projections would not be cost effective. The analysis here has been limited to NOAA intermediate low and intermediate high to comply with Florida Statute 380.093 [2023] requirements.



Source: NOAA n.d. (b)

Figure 5-4. Mean Sea Level Projections for Virginia Key

5.1.2 Hazard Projections and Modeling Results

5.1.2.1 Exposure: Future High Tide

Using a planning-grade static coastal hydrology SLR modeling approach (NOAA 2017b) commonly known as a "Bathtub Model," the assessment evaluated vulnerability to SLR inundation, layering future projections of SLR with an added 2 feet to account for SLR and HTF as required by Subsection 380.093(3)(d)2., F.S. The latest version of ArcGIS Pro was used to generate inundation results (Esri 2022). By following this modeling process, detailed future SLR and HTF maps are generated that display the resulting extent of tidal flooding. These maps also identify low lying areas with similar elevation that are not tidally connected according to the elevation surface but may still be vulnerable to flooding, especially if they connect to other tidal systems via stormwater conveyance or some other type of groundwater/surface water connection not captured within elevation data.

Table 5-3 shows the modeling results for SLC and Municipalities high tide flooding projections over the coming decades as sea levels rise. These projections serve as the foundation for flood risk assessment, enabling the evaluation of potential consequences from multiple flood scenarios.

Table 5-3. Projected Future High Tide Water Elevations

Timeframe	NOAA Intermediate Low 2017 (feet NAVD 88)	NOAA Intermediate High 2017 (feet NAVD 88)
Present Day	0.23	
2040	-0.11	0.61
2070	0.45	2.48
2100	0.95	5.21

The following map (Figure 5-5) provides an overview showing which regions, infrastructure, and natural areas are at increased risk due to HTF in the present day and under future conditions based on the NOAA Intermediate Low (NIL) and NOAA Intermediate High (NIH) SLR projections.

The County and municipalities' vulnerability to current and future flood risk in the face of accelerating SLR necessitates an examination of projections tailored specifically to this County. The analysis of SLR projections and potential impacts are greatly enhanced by the incorporation of SLC and municipal-specific data and scenarios. In SLC, the imminent threat of SLR has the potential to reduce the land area and thereby significantly impact communities, infrastructure, and environment.

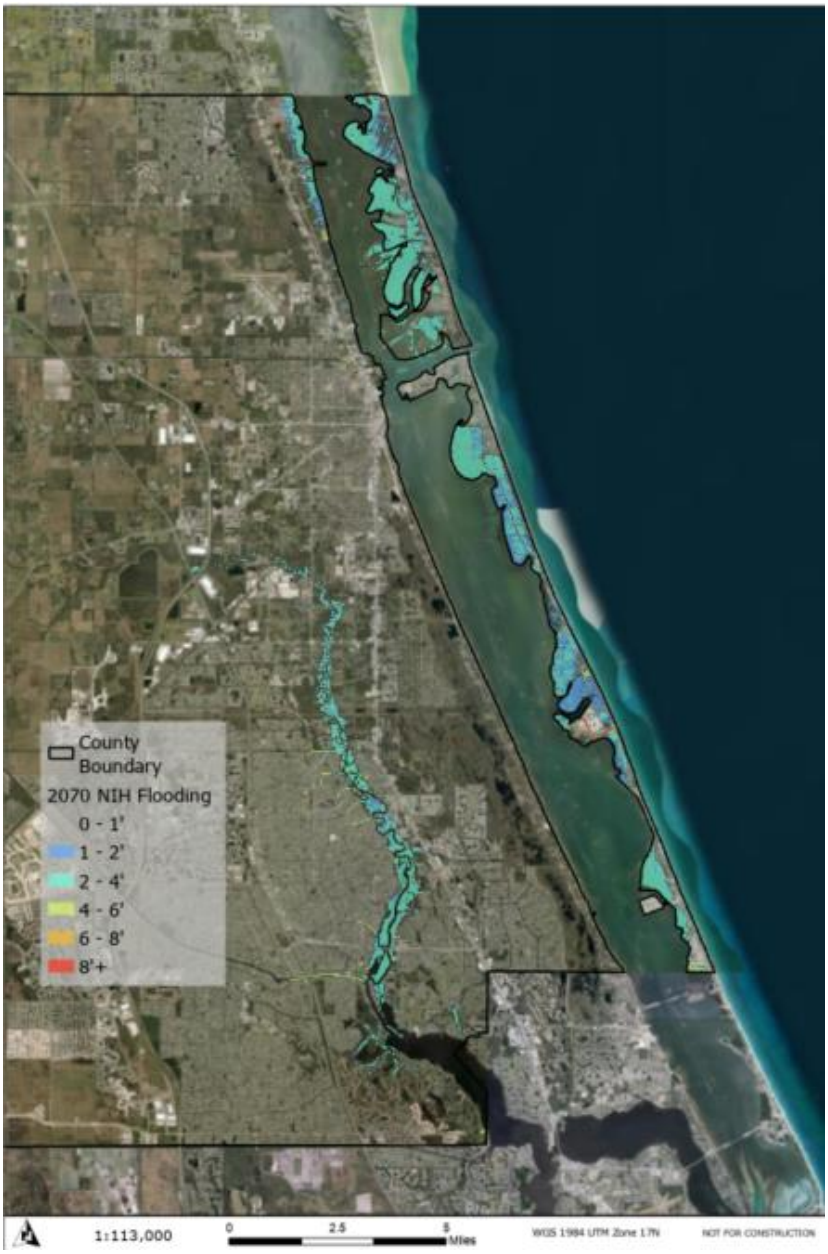


Figure 5-5. NIH 2070 Sea Level Rise + High Tide Flooding

5.1.2.2 Exposure: Depth of Tidal Flooding, Including Future Days of Tidal Flooding

The assessment of tidal flooding is the essential element of comprehensive vulnerability evaluations aimed at understanding the impacts of SLR on coastal communities. The analysis of tidal elevations is conducted through the collection and examination of high tide data spanning at least 19 years, a period that encompasses the full Metonic cycle, from specific NOAA tide gauges, such as the Virginia Key Tide Gauge (Table 5-4). The objective is to extrapolate current high tide values from historical data, project them forward using the observed sea level trend, and then assess the potential frequency of increasing high tide elevations in the future. Section 380.093(3)(d)2.a. provides that to

the extent practicable; the analysis should also geographically display the number of tidal flood days expected for each scenario and planning horizon. That representation is provided below.

Table 5-4. Statistical Analysis of Historical High Tide Record

2005-2023 (feet NAVD 88)	Approximate Days Tide Reached This Height
2.25	1
2	5
1.6	10
1.4	20
1.25	30
1.15	40
0.85	50
0.7	100
0.65	≥150

Note: This table calculates the number of days where water elevations surpass a "critical elevation", which is the elevation where flooding is expected to occur for a certain number of days per year.

The analysis utilized to develop Table 5-4 summarizes the number of days historic tide records surpassed flooding above MHHW (i.e., experienced tidal flooding). It reveals the changes in tide elevations over the 2005-2023 time period and associates these elevations with the observed frequency of tidal flooding events. "Critical elevations" above are defined by the number of tidal days. All elevations from MHHW forward, in increments of 0.1 foot, were evaluated for the number of flooding days. When a threshold of tidal days was reached (i.e., 1 day, 5 days, 10 days, etc.), the elevation that experienced that level of flooding was deemed critical.

Future frequencies in HTF can be estimated using the NOAA 2017 intermediate high and low projections. These methods are similar to those used for future SLR exposure, but instead of adding a static value of 2 feet MHHW to a digital surface model, they are added to the historic high tide values in the 2005-2023 time period. The results are summarized in Table 5-5. A key observation is the trend of increasing tide elevations over time, indicating rising sea levels and, consequently, an increased risk of tidal flooding.

Table 5-5 shows flooding trends continuing to increase in magnitude and frequency. They provide valuable insights for planning and adaptation strategies. For instance, the NIH scenario estimates that by 2040, HTF for 150 or more days out of the year will increase from 1.80 foot to 2.40 feet, escalating to 4.25 feet by 2070 and 7.00 feet by 2100. Viewed differently, in the 2040-NIL scenario, a tide stage of 2.80 feet is reached only one time per year, and 30 years later in the 2070-NIL scenario, an equivalent tide stage of 2.80 feet is reached 20 times per year. Figure 5-6 provides an overview showing which regions will be affected.

Table 5-5. Future Tidal Flooding Frequency

2040-NIL (feet NAVD 88)	2070-NIL (feet NAVD 88)	2100-NIL (feet NAVD 88)	2040-NIH (feet NAVD 88)	2070-NIH (feet NAVD 88)	2100-NIH (feet NAVD 88)	Approximate # of Days Tide Will Reach This Height
3.7	4.45	4.25	6.3	4.8	8.15	1
2.01	2.85	2.7	4.7	3.2	7.95	5
1.85	2.6	2.45	4.45	2.95	7.7	10
1.45	2.2	2.05	4.05	2.55	7.55	15
1.25	2	1.85	3.85	2.35	7.45	20
1.15	1.85	1.7	3.75	2.25	7.35	30
1.05	1.75	1.6	3.65	2.15	7.3	40
0.7	1.45	1.3	3.33	1.8	7.1	50
0.53	1.3	1.15	3.15	1.65	7	100
0.55	1.25	1.1	3.1	1.6	6.95	≥150

Maps displaying flooded conditions for SLC and Municipalities can be found in **Appendix A**. They identify which regions, infrastructure, and natural areas are at increased risk due to multiple days of tidal flooding.

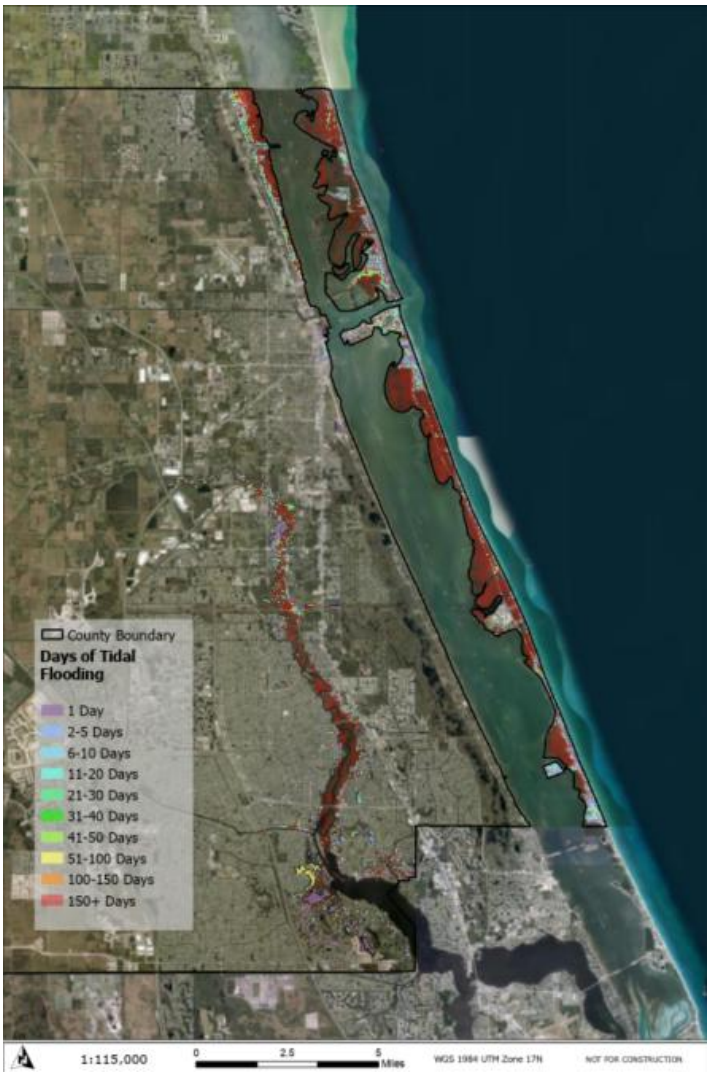


Figure 5-6. NIH 2070 Days of Tidal Flooding

5.1.2.3 Exposure: Storm Surge

Storm surge modeling uses NOAA's already created storm surge inundation grids for various intensities of storms (FEMA 2022). NOAA has run the hydrodynamic Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model to simulate storm surge for various categories of storms and made the resulting 2022 inundation depths available for federal, state, and local partners for planning, risk assessment, and decision making. Category 3 and Category 5 storms were downloaded and formatted for this RVA. Unlike SLR and high tide flooding, storm surge is a less permanent condition, but due to the force of fast-moving water and depth of flooding, it can be extremely destructive and debilitating to a community. A table of mean flood depths for each storm intensity is presented in Table 5-6.

Table 5-6. Storm Surge Inundation Depth

Storm Intensity	Mean Inundation (feet NAVD 88)	Max Inundation (feet NAVD 88)
Category 3	4.76	9
Category 5	6.94	10.80

5.1.2.4 Exposure: Depth of Current and Future Storm Surge Flooding

Figure 5-7 and Figure 5-8 identify the areas at increased risk from the combined effects of storm surges for Category 3 and Category 5 storms (see The Project Team conducted the RVA by modeling multiple future scenarios within a spatial context. The goal of the assessment is to provide results that assist the County and municipalities in making decisions to enhance resilience to the impacts of flooding. The scenarios analyzed represent conditions that can be reasonably expected to occur in the future.

The RVA followed the Resilient Florida guidelines and utilized GIS-based methods to assess SLC and municipal assets with respect to the flood hazards identified. The modeling encompassed present-day conditions and planning horizons of scenarios for the years 2040, 2070 and 2100, incorporating assessments of 25- and 100-year storm events. A total of 54 scenarios were run for this assessment. SLR scenarios included the 2017 NOAA intermediate-low (NIL) and intermediate-high (NIH) SLR projections as required by Section 380.093, F.S. at the time of the analysis. To achieve the goal of accurate predictions of future conditions, a comprehensive strategy was employed, reviewing various data sources (Table 5-1). All analyses were conducted in the North American Vertical Datum of 1988 (NAVD 88).

Table 5-1 for more information). In Figure 5-7 and Figure 5-8 below, the increased impact from storm surge can be seen, with even the Category 3 storm inundating the northern portion of the intracoastal waterway at a depth of 2 to 4 feet, more in areas of mangrove trees. Storm surge modeling focused exclusively on coastal regions as this is where the primary impacts would occur.

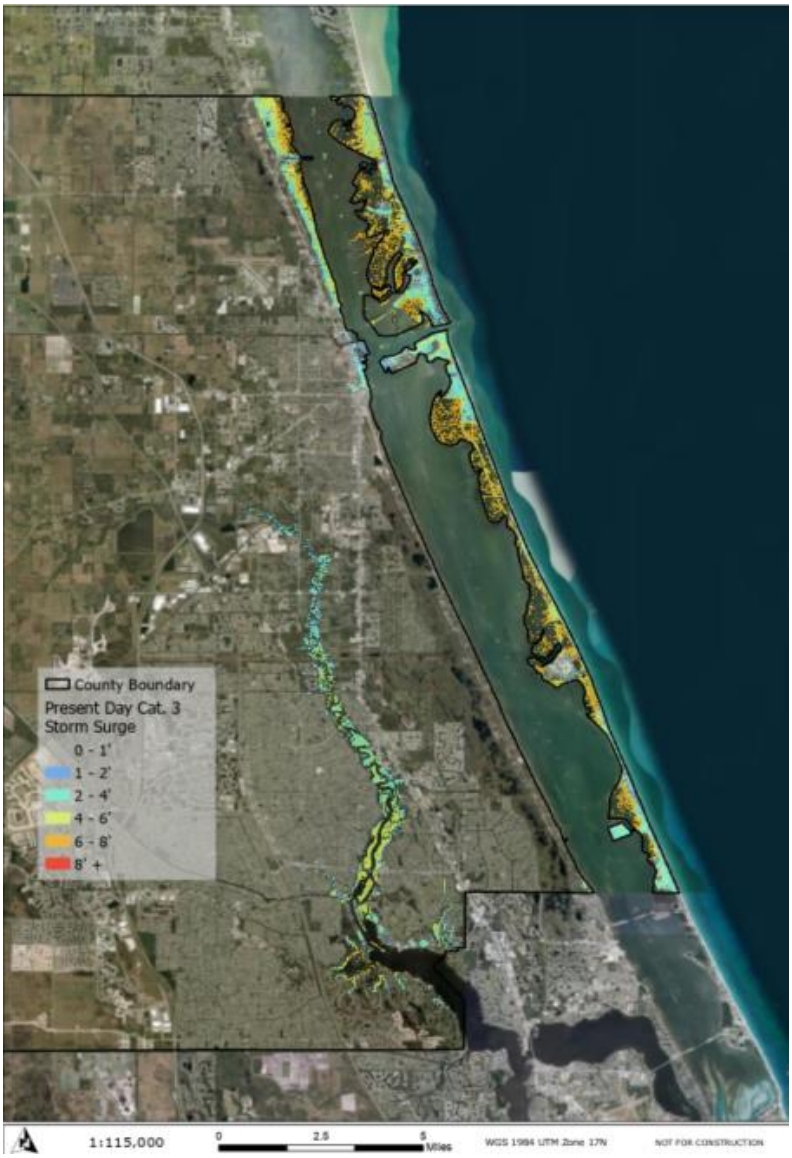


Figure 5-7. Category 3 Storm Surge

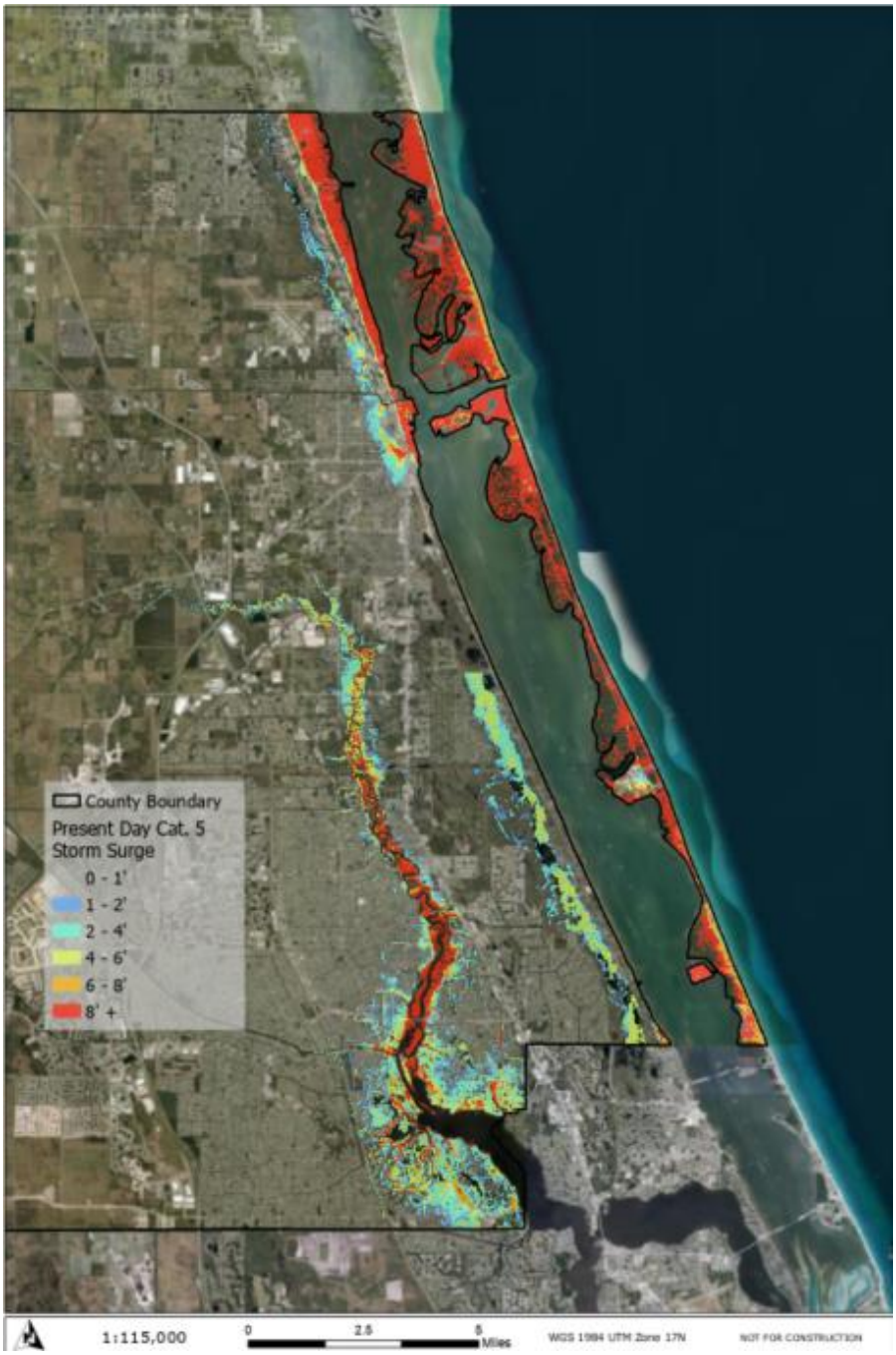


Figure 5-8. Category 5 Storm Surge

5.1.2.5 Exposure: Rainfall Induced Flooding

The rainfall analysis within the RVA employs HEC-HMS and HEC-RAS software for rainfall simulation and runoff computation. Modeling efforts related to rainfall-induced flooding integrate NOAA's Atlas 14 data and South Florida Water Management District (SFWMD) change factors to create baseline rainfall depth grids, aligning with legislative requirements to conduct such analyses (SFWMD 2022; NOAA 2023). The comprehensive modeling approach produces maps to help users understand and

prepare for future flood risks. The rainfall-induced flood modeling approach meets the statutory requirements for rainfall evaluation in VAs, modeling the 25-year and 100-year rainfall events required. NOAA Atlas 14 provides high-quality data based on ongoing investigations of historical rainfall patterns across the United States. It offers site-specific rainfall distributions, which are essential for accurate hydrologic modeling. Compared to previous volumes, Atlas 14 estimates have longer periods of record and greater station density. NOAA Atlas 14 defines standard design rainfall distributions based on integrating high-intensity short duration events within longer, lower-intensity precipitation. These distributions are used in hydrologic models to estimate rainfall intensity for specified durations and annual exceedance probabilities (Figure 5-9). The NOAA Atlas 14 serves as a guideline to assess flood potential in watersheds and design stormwater infrastructure. The accuracy of rainfall data provided by NOAA Atlas 14 allows engineers and planners to make informed decisions when designing and managing infrastructure (NOAA 2023).

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.561 (0.493-0.664)	0.641 (0.562-0.759)	0.774 (0.675-0.921)	0.888 (0.769-1.06)	1.05 (0.870-1.33)	1.18 (0.946-1.53)	1.31 (1.00-1.77)	1.45 (1.05-2.05)	1.64 (1.12-2.42)	1.79 (1.18-2.70)
10-min	0.822 (0.722-0.972)	0.938 (0.822-1.11)	1.13 (0.989-1.35)	1.30 (1.13-1.56)	1.54 (1.27-1.95)	1.73 (1.39-2.24)	1.92 (1.47-2.60)	2.12 (1.53-3.00)	2.40 (1.65-3.55)	2.62 (1.73-3.96)
15-min	1.00 (0.880-1.18)	1.14 (1.00-1.36)	1.38 (1.21-1.64)	1.59 (1.37-1.90)	1.88 (1.55-2.37)	2.11 (1.69-2.73)	2.34 (1.79-3.17)	2.59 (1.87-3.66)	2.93 (2.01-4.33)	3.19 (2.11-4.83)
30-min	1.42 (1.24-1.68)	1.63 (1.43-1.92)	1.98 (1.72-2.35)	2.28 (1.97-2.73)	2.70 (2.24-3.42)	3.04 (2.44-3.94)	3.38 (2.59-4.57)	3.74 (2.70-5.29)	4.23 (2.90-6.25)	4.62 (3.05-6.98)
60-min	1.92 (1.69-2.27)	2.16 (1.89-2.56)	2.58 (2.25-3.07)	2.96 (2.57-3.55)	3.54 (2.95-4.53)	4.03 (3.24-5.26)	4.55 (3.49-6.19)	5.11 (3.70-7.27)	5.92 (4.06-8.78)	6.56 (4.34-9.93)
2-hr	2.43 (2.14-2.85)	2.69 (2.37-3.16)	3.18 (2.79-3.76)	3.65 (3.18-4.35)	4.38 (3.69-5.60)	5.02 (4.07-6.55)	5.71 (4.42-7.76)	6.48 (4.73-9.20)	7.60 (5.26-11.2)	8.51 (5.66-12.8)
3-hr	2.77 (2.45-3.25)	3.04 (2.68-3.56)	3.57 (3.14-4.20)	4.11 (3.58-4.87)	4.98 (4.23-6.40)	5.77 (4.71-7.55)	6.65 (5.18-9.05)	7.65 (5.62-10.9)	9.11 (6.35-13.5)	10.3 (6.90-15.5)
6-hr	3.29 (2.92-3.82)	3.62 (3.21-4.21)	4.32 (3.81-5.05)	5.05 (4.43-5.95)	6.28 (5.38-8.09)	7.42 (6.10-9.70)	8.70 (6.82-11.8)	10.2 (7.53-14.4)	12.4 (8.67-18.2)	14.2 (9.54-21.1)
12-hr	3.67 (3.28-4.24)	4.17 (3.72-4.82)	5.20 (4.61-6.04)	6.25 (5.50-7.32)	7.99 (6.87-10.2)	9.56 (7.91-12.4)	11.3 (8.94-15.3)	13.4 (9.94-18.8)	16.3 (11.5-24.0)	18.8 (12.7-27.8)
24-hr	4.06 (3.64-4.66)	4.78 (4.28-5.49)	6.19 (5.53-7.15)	7.59 (6.72-8.83)	9.86 (8.50-12.5)	11.9 (9.84-15.3)	14.1 (11.2-18.9)	16.6 (12.4-23.2)	20.3 (14.4-29.5)	23.4 (15.9-34.3)
2-day	4.63 (4.18-5.28)	5.50 (4.95-6.28)	7.18 (6.44-8.23)	8.81 (7.84-10.2)	11.4 (9.88-14.4)	13.7 (11.4-17.6)	16.3 (12.9-21.6)	19.1 (14.4-26.5)	23.2 (16.6-33.5)	26.7 (18.3-38.9)
3-day	5.10 (4.62-5.79)	5.94 (5.37-6.76)	7.60 (6.83-8.68)	9.24 (8.24-10.6)	11.9 (10.3-14.9)	14.3 (11.9-18.2)	16.9 (13.5-22.4)	19.8 (15.0-27.4)	24.2 (17.3-34.8)	27.8 (19.1-40.4)
4-day	5.53 (5.01-6.26)	6.32 (5.72-7.17)	7.92 (7.14-9.02)	9.53 (8.52-10.9)	12.2 (10.6-15.3)	14.5 (12.2-18.5)	17.2 (13.8-22.8)	20.2 (15.3-27.9)	24.6 (17.7-35.4)	28.3 (19.6-41.1)
7-day	6.66 (6.06-7.50)	7.37 (6.70-8.32)	8.86 (8.02-10.0)	10.4 (9.34-11.9)	13.0 (11.4-16.2)	15.3 (13.0-19.4)	18.0 (14.5-23.7)	21.0 (16.0-28.9)	25.5 (18.5-36.5)	29.3 (20.3-42.3)
10-day	7.58 (6.92-8.51)	8.24 (7.51-9.27)	9.66 (8.76-10.9)	11.2 (10.0-12.7)	13.7 (12.0-16.9)	16.0 (13.5-20.1)	18.6 (15.0-24.4)	21.6 (16.5-29.5)	26.1 (18.9-37.1)	29.8 (20.8-42.8)
20-day	9.84 (9.02-11.0)	10.5 (9.60-11.7)	11.8 (10.8-13.3)	13.3 (12.0-15.0)	15.6 (13.8-19.1)	17.8 (15.2-22.2)	20.3 (16.5-26.2)	23.1 (17.7-31.2)	27.2 (19.9-38.4)	30.7 (21.5-43.8)
30-day	11.5 (10.6-12.8)	12.4 (11.4-13.8)	14.0 (12.8-15.7)	15.6 (14.1-17.5)	18.0 (15.8-21.6)	20.1 (17.1-24.7)	22.4 (18.2-28.7)	25.0 (19.2-33.4)	28.7 (21.0-40.1)	31.8 (22.4-45.1)
45-day	13.6 (12.6-15.1)	15.0 (13.8-16.6)	17.3 (15.9-19.3)	19.3 (17.5-21.6)	22.0 (19.2-25.9)	24.1 (20.4-29.1)	26.3 (21.3-33.0)	28.5 (21.9-37.5)	31.4 (23.0-43.3)	33.7 (23.8-47.7)
60-day	15.4 (14.2-17.0)	17.4 (16.1-19.2)	20.5 (18.9-22.8)	23.0 (20.9-25.7)	26.1 (22.6-30.2)	28.3 (23.9-33.7)	30.3 (24.5-37.6)	32.2 (24.6-41.8)	34.4 (25.1-46.8)	35.9 (25.4-50.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Figure 5-9. NOAA Atlas 14 Rainfall Time Series Table for St Lucie County

To accurately capture the nuances of the terrain's elevation and slope, a model was constructed utilizing digital elevation models (DEMs). These DEMs serve as the basis for mapping and understanding the area's physical characteristics. The elevation data within these models are based on the NAVD 88 datum. Figure 5-10 represents the outline of the two-dimensional DEM (Figure 5-11)

area and the boundary condition lines used in conjunction with the DEM as terrain inputs in the modeling environment. A 1-mile buffer is used to prevent artifacts in rainfall calculations at the edges of the County boundary.

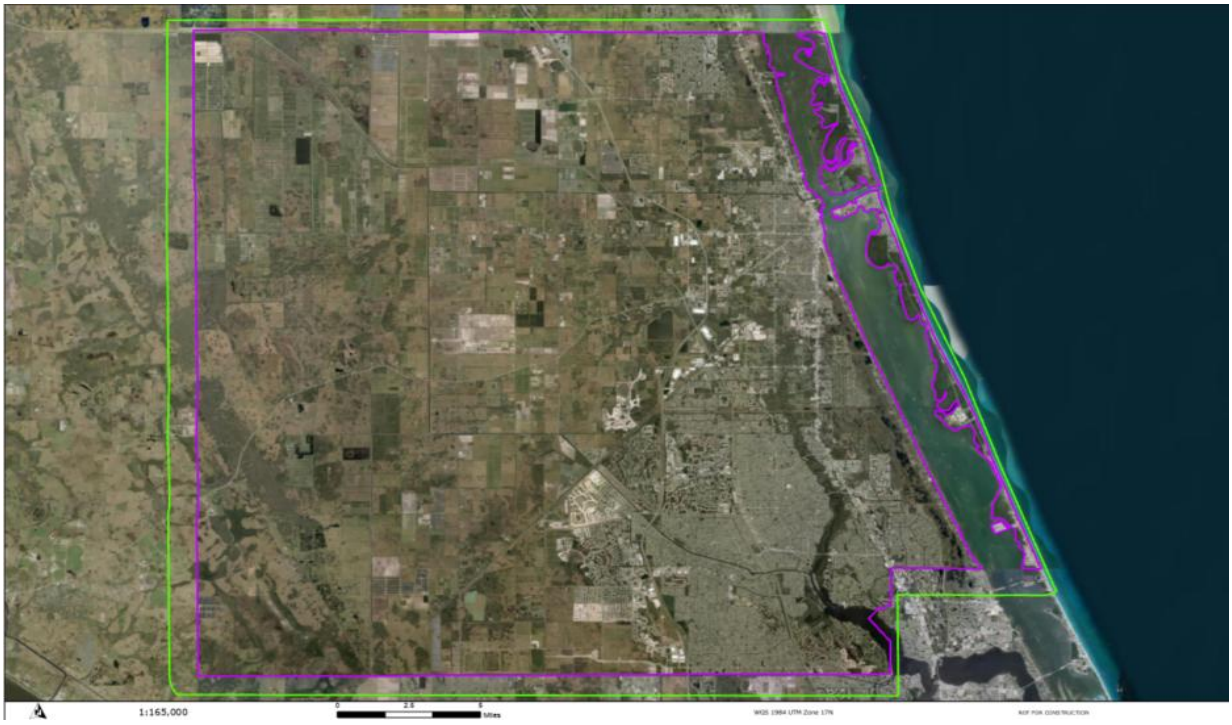


Figure 5-10. County Extent and Boundary Condition Lines for Northern, Southern, Eastern, and Western Boundaries

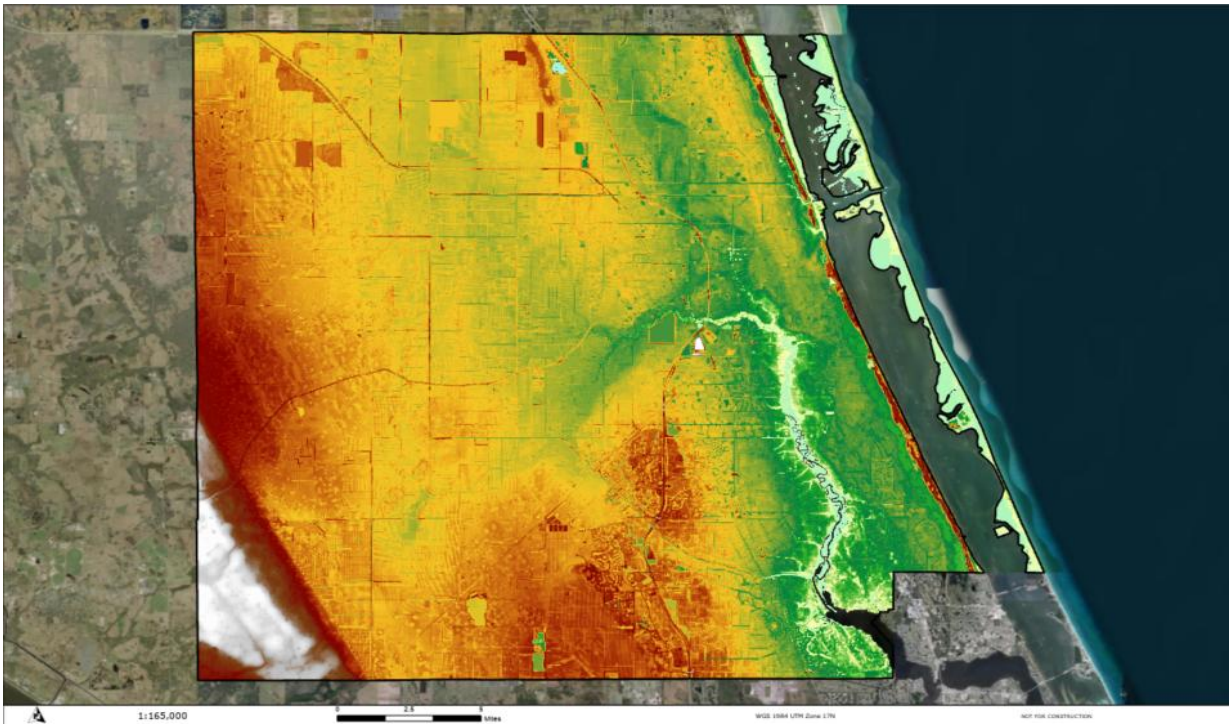


Figure 5-11. 2D Digital Elevation Model (DEM)

The NOAA Atlas 14 precipitation frequency grids were transformed into HEC-RAS-compatible grids using HEC-HMS. A "dummy" basin was set up with no assumptions related to water flow. Instead, the precipitation grids were modified by a hypothetical storm (i.e., 25-year 24-hour storm) using the Intensity/Precipitation (I/P) curves derived from the Florida Department of Transportation Drainage manual for 24-hour design storms. The design storms represent current (2024) rainfall patterns for 25- and 100-year return interval, 24-hour rainfall events (NOAA 2023). Future rainfall depths were computed using the current precipitation depths in Table 5-7 and deriving the intensity for the respective future conditions by using the SFWMD's SERDP change factors to arrive at the future-projected precipitation in Table 5-8, Figure 5-12, and Figure 5-13. These predict approximately 1.11 times more rain in 2040 than today (2024), 1.24 times more rain in 2070, and 1.37 times more rain in 2100. The
current and projected precipitation depths are then applied to the storm design criteria in Table 5-9 to arrive at a storm design that is suitable for varying present and future conditions. These storm designs are input with the precipitation frequency grids to obtain spatially varying rainfall depths county-wide that are HEC-RAS compatible.

Table 5-7. Precipitation in Inches for 24-Hour Storm Duration – Present Day

Year	Scenario	Precipitation (inches)
Present Day	25-Year	8.71
Present Day	100-Year	11.77

Table 5-8. Projected Precipitation in Inches for 24-Hour Storm Duration

Year	Scenario	Precipitation (inches)
2040	25-Year	9.66
2040	100-Year	13.30
2070	25-Year	10.01
2070	100-Year	14.24
2100	25-Year	10.19
2100	100-Year	15.42

Table 5-9. Rainfall Design Storm Criteria for Varying Storm Events

Design Storms			
T hours	I/P Total	25 yr Accumulation	100 yr Accumulation
0	0	0	0
1	0.01	0.0871	0.118
2	0.02	0.1744	0.235
3	0.03	0.261	0.353
4	0.03	0.261	0.353
5	0.03	0.261	0.353
6	0.04	0.348	0.471
7	0.04	0.348	0.471

Design Storms			
T hours	I/P Total	25 yr Accumulation	100 yr Accumulation
8	0.04	0.348	0.471
9	0.06	0.523	0.706
10	0.06	0.523	0.706
11	0.08	0.697	0.942
12	0.1	0.871	1.177
13	0.07	0.610	0.824
14	0.06	0.523	0.706
15	0.06	0.523	0.706
16	0.05	0.436	0.6589
17	0.04	0.348	0.471
18	0.04	0.348	0.471
19	0.04	0.348	0.471
20	0.03	0.261	0.353
21	0.03	0.261	0.353
22	0.02	0.1174	0.235
23	0.01	0.087	0.117
24	0	0	0

Source: FDOT n.d.

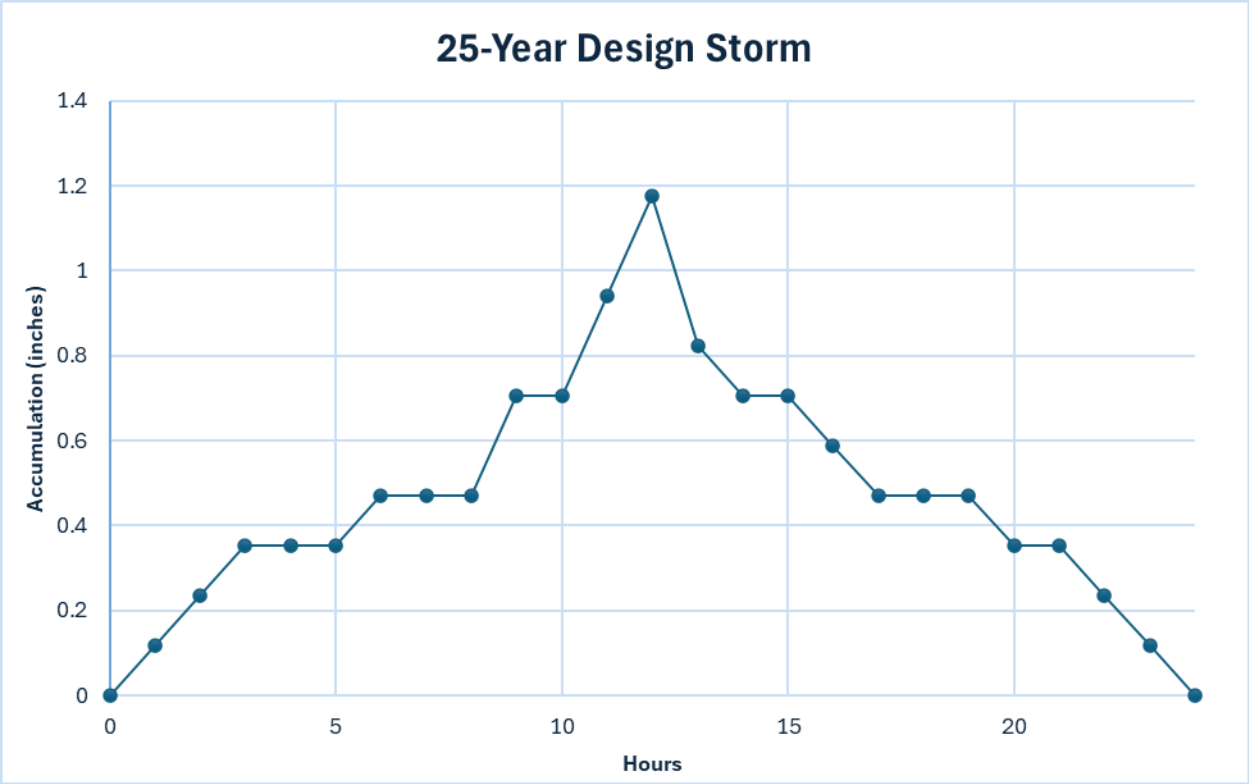


Figure 5-12. 25-Year Design Storm Criteria for St Lucie County

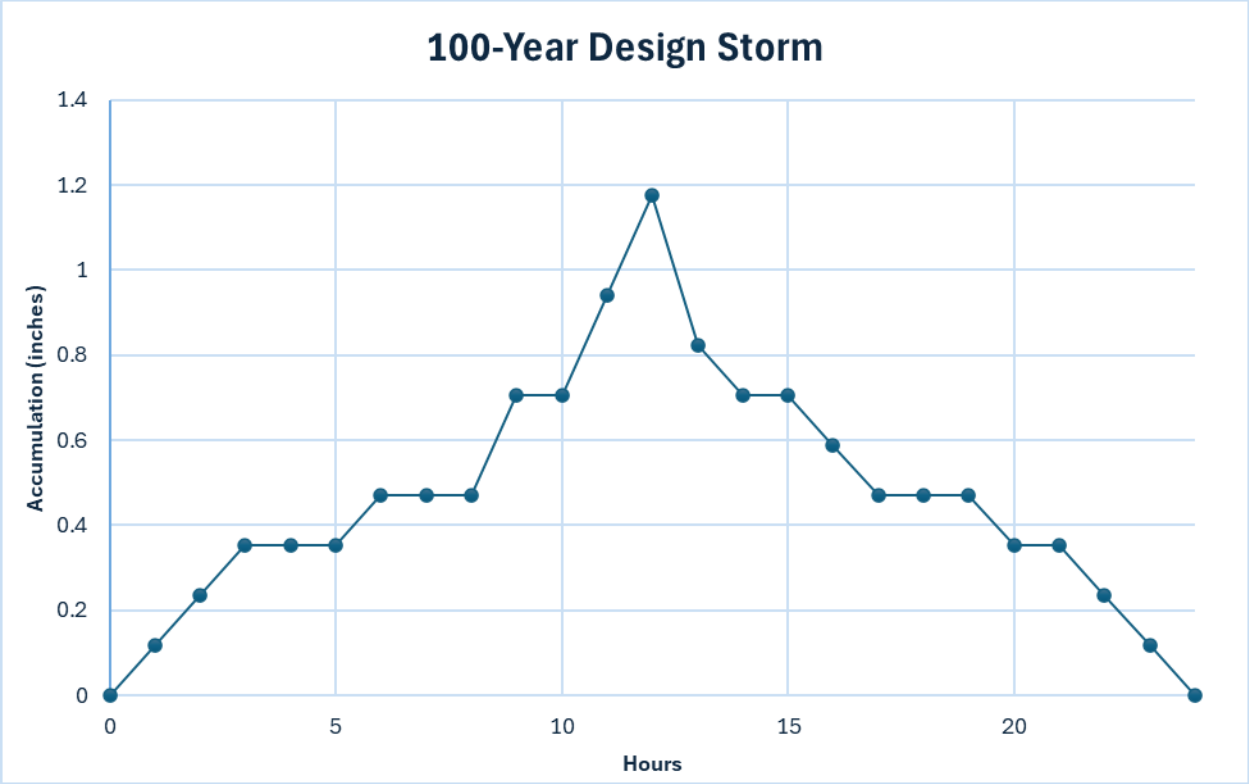


Figure 5-13. 100-Year Design Storm Criteria for St Lucie County

The infiltration method employed in this HEC-RAS model utilizes the Soil Conservation Service curve number method, designed to estimate direct runoff and infiltration rates from rainfall events. This approach is particularly suitable for varying soil conditions (Figure 5-14) and land use over a large area, offering a comprehensive understanding of how different terrains respond to precipitation.

The Soil Conservation Service curve number method is based on empirical data, correlating soil type and land use to a curve number that represents the potential for runoff. This method simplifies the calculation of effective rainfall (precipitation that contributes to runoff) by considering the initial abstraction and potential maximum retention after runoff begins.

Manning's n roughness and percent impervious values were assigned to each USGS National Land Cover Database land cover category representing 2021 conditions (USGS 2023). Manning's n roughness ranges, coefficients that represents the resistance to flow in channels and floodplains, were taken from the HEC-RAS technical reference guide (USACE 2021).

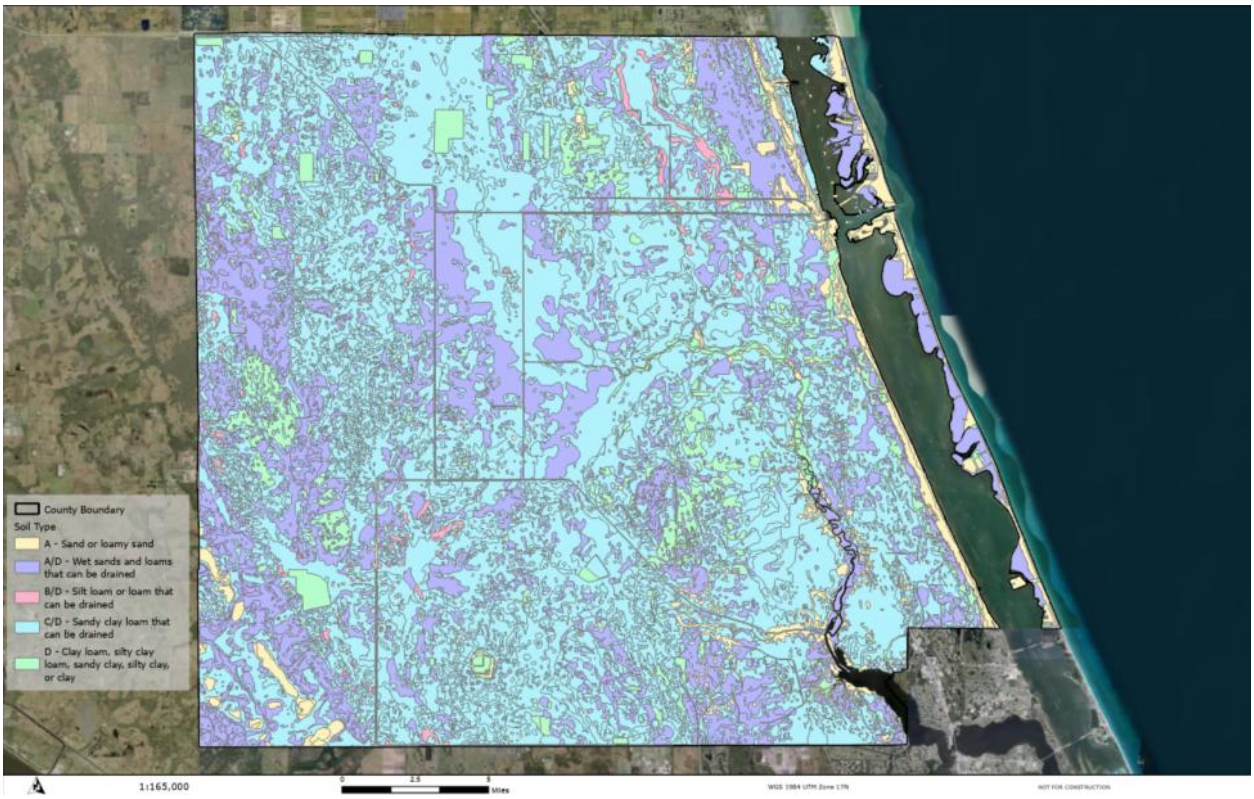


Figure 5-14. St Lucie County Soil Types

Table 5-10 shows the land cover categories (Figure 5-15), Manning's n roughness (Table 5-10), percent impervious, and area within the modeled two-dimensional flow area.

Table 5-10. Land Cover Category Manning's n Roughness and Percent Impervious

ID	Name	Manning's n Range[1/]	Manning's n	Impervious %
11	Open Water	0.025-0.05	0.038	100
21	Developed, Open Space	0.03-0.05	0.04	8
22	Developed, Low Intensity	0.06-0.12	0.09	33
23	Developed, Medium Intensity	0.08-0.16	0.12	64
24	Developed, High Intensity	0.12-0.20	0.16	86
31	Barren Land Rock-Sand-Clay	0.023-0.03	0.27	0
41	Deciduous Forest	0.10-0.20	0.15	0
42	Evergreen Forest	0.08-0.16	0.12	0
43	Mixed Forest	0.08-0.20	0.14	0
52	Shrub-Scrub	0.07-0.16	0.12	0
71	Grassland - Herbaceous	0.025-0.05	0.038	0
81	Pasture-Hay	0.025-0.05	0.038	0
82	Cultivated Crops	0.02-0.05	0.038	0
90	Woody Wetlands	0.045-0.15	0.098	80
95	Emergent Herbaceous Wetlands	0.05-0.085	0.07	80

1/ Ranges are from USACE Creating Land Cover, Manning's n Values, and % Impervious Layers (USACE 2021)

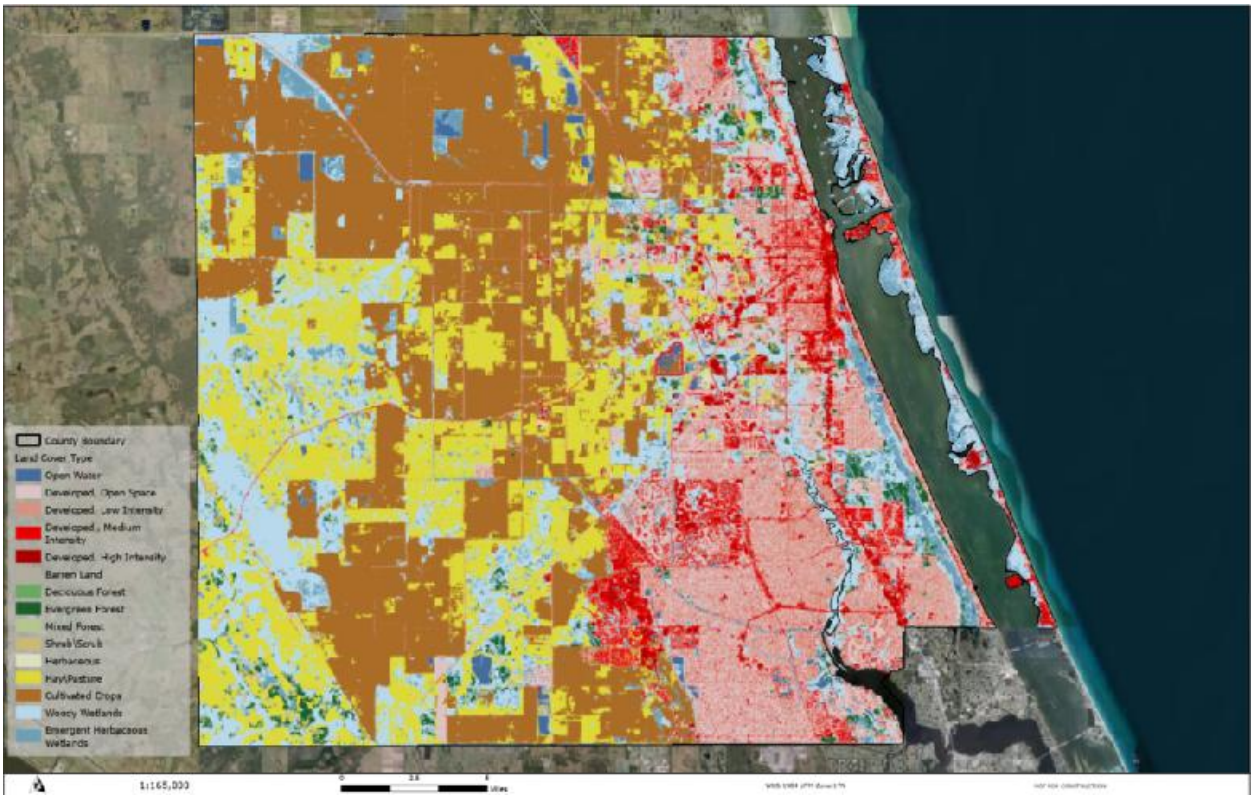


Figure 5-15. St Lucie County Land Cover

Table 5-11. Area of Land Cover Classifications

Soil Texture	Acres
A-Sands	21,937.58
A/D-Saturated Sands	109,942.54
B/D-Saturated Silts	9,152.62
C/D-Saturated Clays	252,598.87
D-Clays	164,192.0

The Gridded Soil Survey Geographic (gSSURGO) Database, provided by the U.S. Department of Agriculture-National Resource Conservation Service in 2023, provided the foundation for identifying both the soil texture and the Hydrologic Soil Groups (HSGs) of soils within the designated two-dimensional flow area. As illustrated in Figure 5-14, the gSSURGO soil map units reveal a diverse range of soil textures within the County.

A majority of the County's area is characterized by C/D, wet sands, and other saturated soils less than 24 inches from the water table (A/D, B/D), as detailed in

Table 5-11. Due to the shallow depth of their water table, A/D, B/D, and C/D soils have a limited ability to transmit water, as they generally exhibit a lower infiltration rate and a greater capacity to retain water, which results in a higher potential for runoff (NRCS 2023).

Including A/D Saturated Sand, several other soil textures are present and warrant consideration:

- **A-Sands:** This category includes extremely gravelly sand and fine sand. These soils are characterized by high infiltration rates and excellent drainage, making them ideal for rapid water infiltration and reducing surface runoff. However, they may have low water and nutrient-holding capacities, requiring frequent irrigation and fertilization to support plant growth. Fine sand, in particular, can be prone to quick drying and may need careful water management, especially in arid conditions.
- **A/D-Saturated Sands:** This texture consists of organic-rich muck mixed with significant amounts of gravel. These soils have moderate drainage and are often classified in HSG C or D due to their high organic content and lower infiltration rates. Gravelly muck can hold a substantial amount of water and nutrients, making it beneficial for plant growth, but it also has an increased potential for surface runoff.
- **B/D-Saturated Silts:** This texture consists of silt loam mixed with marl, a calcium carbonate-rich material. Marly silt loam offers moderate drainage and water-holding capacity, typically classified in HSG B or C. The presence of marl can enhance soil fertility but may also affect pH levels. These soils balance water infiltration and retention, making them suitable for areas needing both drainage and moisture conservation.
- **C/D-Saturated Clays:** These soils are classified as Group C when drained (unsaturated), and Group D when undrained (saturated). Drained soils in this group have slow infiltration rates and moderately high runoff potential. When undrained, they exhibit very high runoff potential due to their clayey texture and saturation.
- **D-Clays:** Group D soils have high runoff potential and very low infiltration rates when thoroughly wetted. These soils are typically composed of clayey textures with high swelling potential, a high permanent water table, or a claypan or clay layer at or near the surface.

These varied soil textures contribute to the hydrologic dynamics of the two-dimensional flow area. Understanding the distribution and characteristics of these soils helps in predicting water movement and managing flood risks effectively. The distinct properties of each soil type necessitate tailored approaches to land use planning, agricultural practices, and hydrologic modeling to optimize water absorption, minimize erosion, and manage runoff. The resulting rainfall depth grids are then adjusted by the SLR projection data based on NOAA's NIL and NIH projections for the respective time horizons.

Figure 5-16 through Figure 5-18 provide an overview showing which regions, infrastructure, and natural areas are at increased risk due to flooding because of extreme rainfall in the present day and under future conditions.

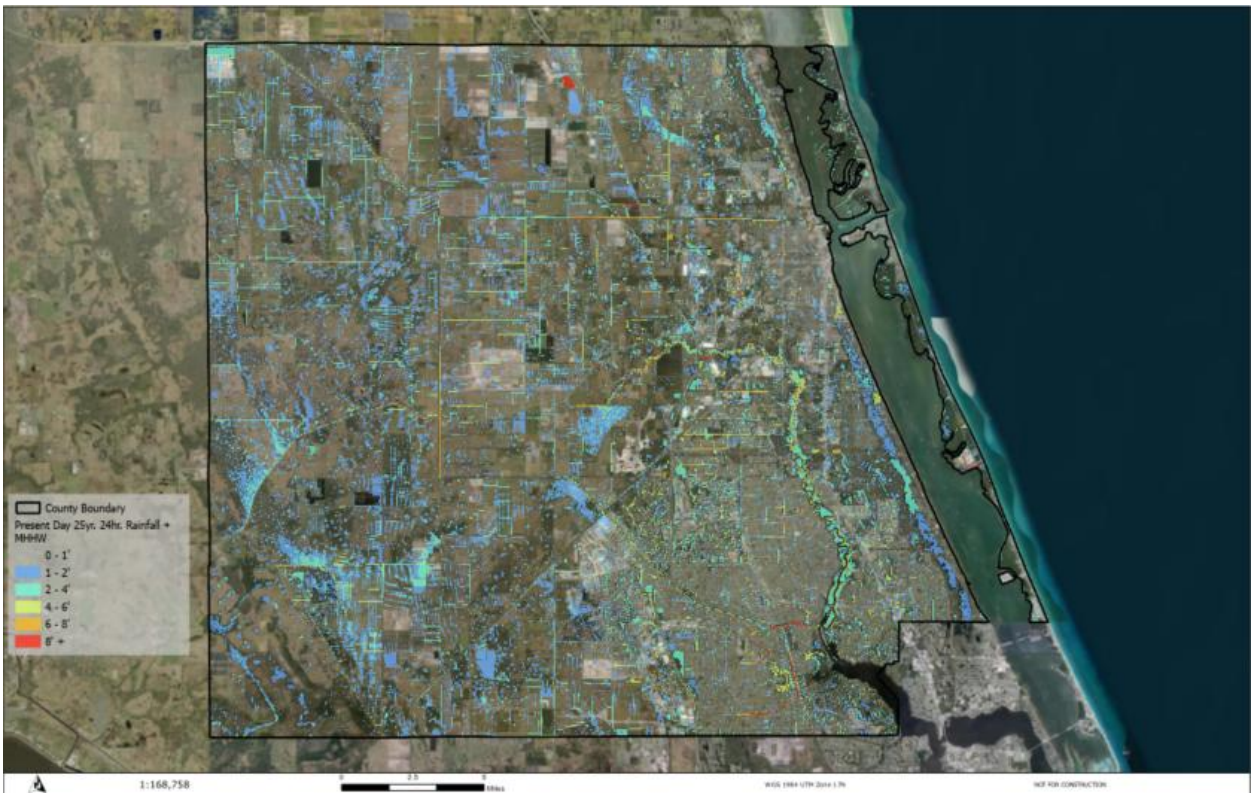


Figure 5-16. 25-Year 24 Hour Rainfall-Induced Flooding Depths – Present Day

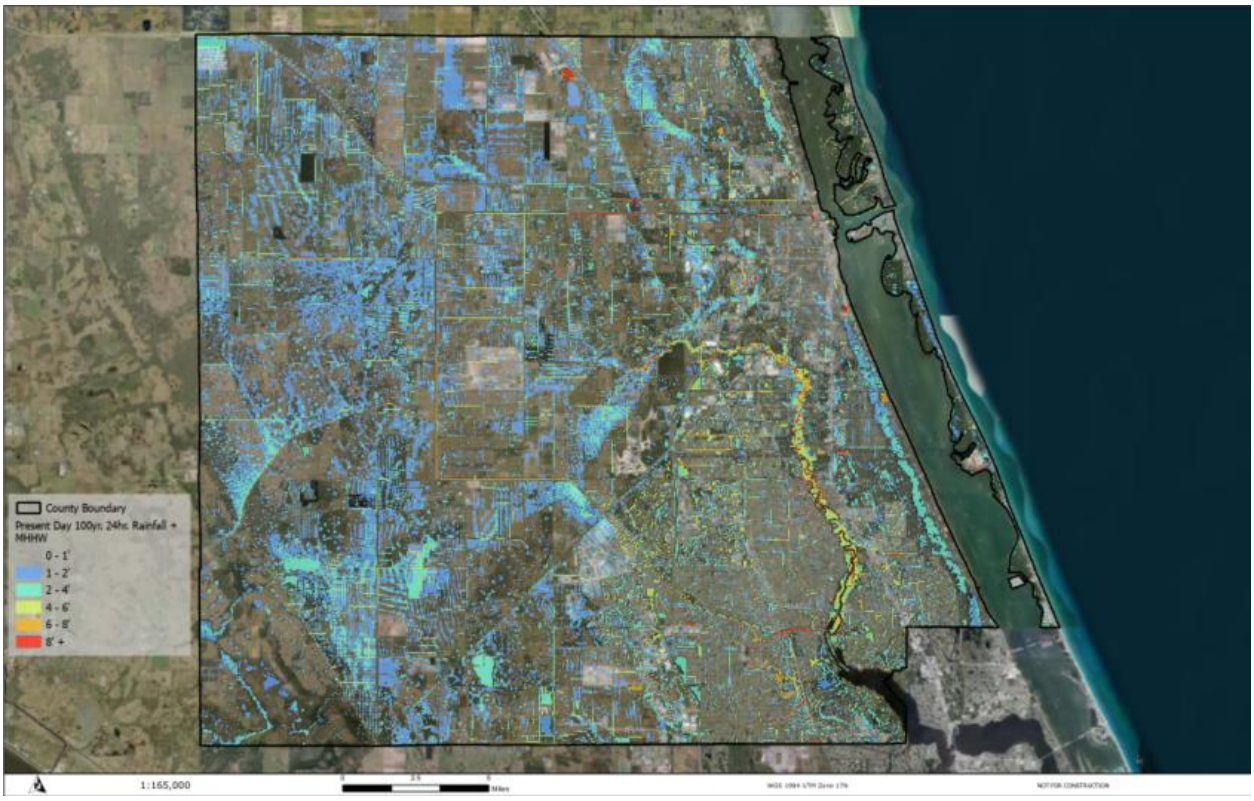


Figure 5-17. 100-Year 24 Hour Rainfall-Induced Flooding Depths - Present Day

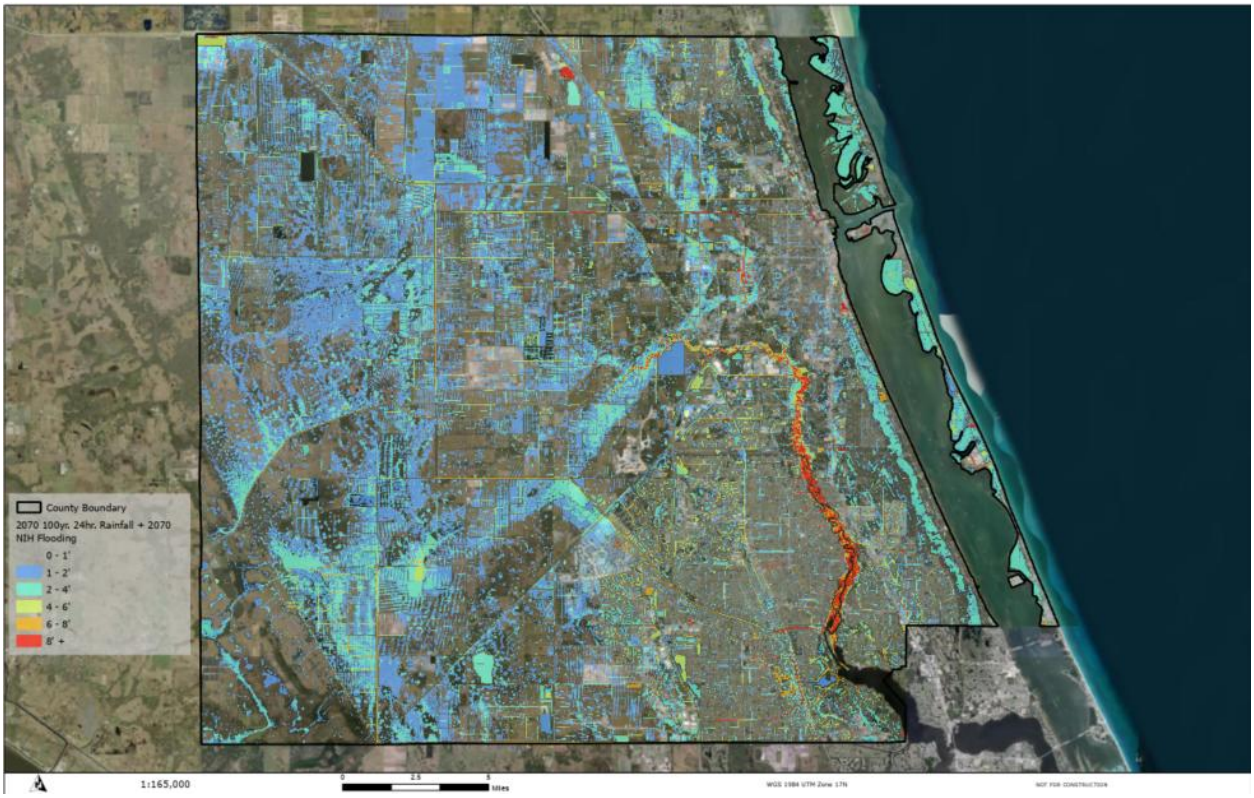


Figure 5-18. 100-Year 24 Hour Rainfall-Induced Flooding Depths – 2070 NIH

5.1.2.6 Exposure: Compound Modeling

The compound modeling within the RVA focuses on assessing the combined impacts of various flooding scenarios (see results within Table 5-12 and Figure 5-19). Modeling efforts combine sea level rise, high tide, storm surge, and rainfall-induced flooding. The methodology involves overlaying depth grids from each scenario to identify the aggregate flood heights. Exposure to compound flood modeling is designed to provide a comprehensive understanding of the potential cumulative impacts of different flooding events occurring simultaneously or quick succession, aiding in effective planning and mitigation strategies. This modeling does not simulate the hydrologic interactions between these events or the stormwater management system's effect on flooded conditions. In circumstances where this more precise information is required, complex engineering-based models should be considered.

SLR inundation modifies the "coastline" with a net landward movement of that tidal interface boundary. Stormwater drains may lose their functionality as sea level rises and be incapable of draining water that accumulates during rains storms. Storm surge impacts are large but temporary in nature, caused by the force of storm pushing water onto the terrain. The devastation caused by storm surge is typically a combination of extreme, transient flooding and the power of extreme water currents pushing the water inland. When two or more of these events coincide, which is occurring with increasing frequency, the results can be devastating.

Table 5-12. NOAA Intermediate Low and Intermediate High Projections Combined Flood Scenario Water Rise Impacts

Sea Level Rise Scenario	Surge Scenario	Rainfall Scenario	Combined Water Rise (ft)
Present Day	Category 3	25 Year 24 Hour	18.99 (All seem high!)
Present Day	Category 3	100 Year 24 Hour	19.70 (All seem inconsistent with Figure 5-19).
Present Day	Category 5	25 Year 24 Hour	26.59
Present Day	Category 5	100 Year 24 Hour	27.14
NIL 2040	Category 3	25 Year 24 Hour	21.26
NIL 2040	Category 3	100 Year 24 Hour	26.06
NIL 2040	Category 5	25 Year 24 Hour	26.63
NIL 2040	Category 5	100 Year 24 Hour	27.42
NIH 2040	Category 3	25 Year 24 Hour	21.98
NIH 2040	Category 3	100 Year 24 Hour	27.78
NIH 2040	Category 5	25 Year 24 Hour	27.35
NIH 2040	Category 5	100 Year 24 Hour	28.14
NIL 2070	Category 3	25 Year 24 Hour	21.97
NIL 2070	Category 3	100 Year 24 Hour	22.76
NIL 2070	Category 5	25 Year 24 Hour	27.24
NIL 2070	Category 5	100 Year 24 Hour	28.27
NIH 2070	Category 3	25 Year 24 Hour	23.97
NIH 2070	Category 3	100 Year 24 Hour	24.79
NIH 2070	Category 5	25 Year 24 Hour	29.27
NIH 2070	Category 5	100 Year 24 Hour	30.30
NIL 2100	Category 3	25 Year 24 Hour	22.53
NIL 2100	Category 3	100 Year 24 Hour	23.46
NIL 2100	Category 5	25 Year 24 Hour	27.79
NIL 2100	Category 5	100 Year 24 Hour	29.11
NIH 2100	Category 3	25 Year 24 Hour	26.76
NIH 2100	Category 3	100 Year 24 Hour	27.69
NIH 2100	Category 5	25 Year 24 Hour	32.02
NIH 2100	Category 5	100 Year 24 Hour	33.34

Figure 5-19. Present Day Sea Level Rise + Category 3 Storm Surge + 25-Year Rainfall Flooding Depths

5.2 Sensitivity Analysis

In this RVA, sensitivity refers to the degree to which a system or resource is or might be affected by hazards. In conjunction with the exposure analysis, a sensitivity analysis was performed on critical assets examining all flooding scenarios. The sensitivity analysis helps prioritize resilience adaptation efforts based on the level and way various flood scenarios affect critical assets within key geographic areas in SLC and Municipalities. The prioritization was accomplished using the following process (also depicted in Figure 5-20):

- **Conduct an assessment of risk** for critical assets located within the County and municipalities based on scores from flood risk (risk index), immediacy of impact (horizon index), average flooding depths (impact index), and significance of critical assets to disaster recovery efforts (asset criticality index).
- **Calculate a composite vulnerability score (CVS)** for each asset based on the risk assessment scoring.
- **Develop ranked list of** critical assets based on CVS scores.

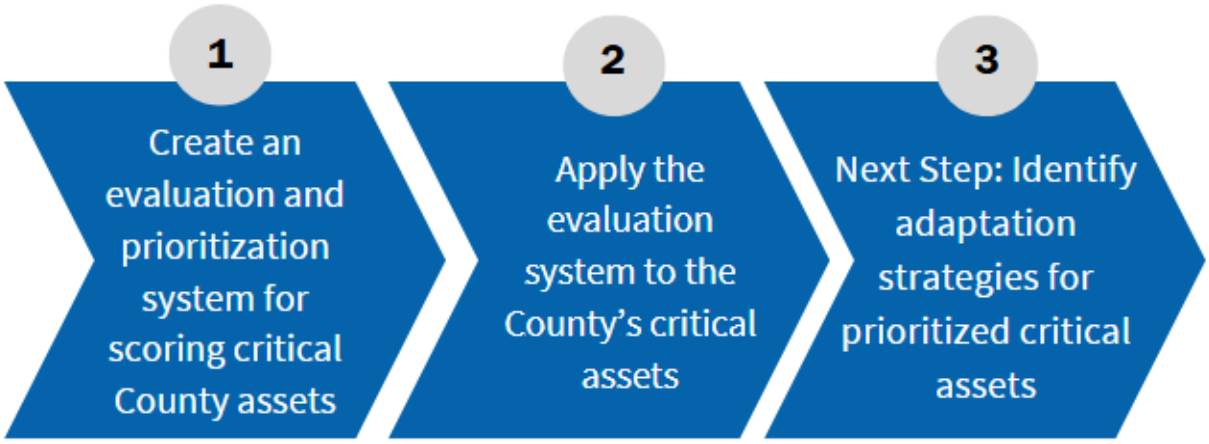


Figure 5-20. Three-Step Sensitivity Analysis Process

By assigning priorities to these assets, decision-makers can allocate resources effectively, focusing on the most vulnerable assets while also maintaining a holistic approach to enhancing overall community resilience against flooding and SLR. The Critical Asset Map Series, displays the results of the sensitivity analysis for the primary tier level of critical assets, are provided as **Appendix C**. Please note that certain asset data are classified as sensitive and may not be displayed on maps.

5.2.1 Risk Assessment

The first phase of the sensitivity analysis involved conducting a risk assessment. During this stage, an evaluation and ranking system was developed to assess the County and municipalities' critical assets. The risk assessment comprises the following four indexes:

- Horizon index (Section 5.2.1.1)
- Risk index (Section 5.2.2.2)
- Impact index (Section 5.2.1.3)
- Asset Criticality Index (Section 5.2.1.3)

Each index evaluates distinct aspects of risk and vulnerability and is assigned a specific weight for evaluation and scoring. These indexes collectively contribute to a final metric known as the Composite Vulnerability Score (CVS) (Section 5.2.1.5), which provides a comprehensive measure of flood-related risk by integrating these four weighted components.

5.2.1.1 Horizon Index

The planning horizons for this RVA are categorized into three temporal categories: near-term (approximately zero to 15 years), mid-term (approximately 15 to 45 years), and long-term (approximately 45 to 75 years). The Horizon Index is utilized to reflect these temporal segments, with a multiplier system that underscores the critical nature of impacts, as illustrated in Table 5-13.

Table 5-13. Horizon Index Metrics

Risk Level	Time Horizon	Flooding Exposure Year	Weight
High	Near Term	Present Day	0.45
	Near Term	2040	0.30
Moderate	Mid Term	2070	0.20
Low	Long Term	2100	0.05
		Total	**1.00**

Understanding the expected timeframe when flooding is anticipated to become problematic is pivotal for making informed decisions regarding near-term and long-term planning, adaptation measures, and risk management. This information aids in prioritizing investments in infrastructure, ensuring that resources are allocated efficiently and effectively to address the most pressing challenges.

Additionally, this temporal segmentation serves as a guide for formulating policy responses to flood hazards By having a clear understanding of the timeline for potential impacts, policymakers can develop and implement strategies that enhance the resilience of communities and ecosystems. This approach ensures that both immediate and long-term actions are aligned with the overarching goal of sustainable water resource management and resilience adaptation.

Ultimately, this structured planning horizon allows for a proactive and strategic response to the evolving challenges, fostering a resilient and adaptive framework for future generations.

5.2.1.2 Risk Index

SLC and the municipalities assets were evaluated and ranked based on their Flood Risk Index scores, employing a tiered system to identify assets facing the highest risks (Table 5-14). This index considers all aspects of flooding by assessing various flood scenarios and assigning a weight to each one.

The assessment methodology takes into account the frequency and severity of different flooding events. The combination of rainfall and SLR, deemed the most likely scenario to cause widespread impacts, was given the highest weight in the scoring system. This is followed by SLR alone and the combination of rainfall, SLR, and storm surge.

By using a weighted approach, the Risk Index provides a nuanced understanding of the vulnerabilities faced by SLC and municipal critical assets. This enables more effective prioritization of adaptation measures, resource allocation, and long-term planning to mitigate the impacts of flooding and enhance overall resilience.

Table 5-14. Risk Index Metrics

Risk Level	Flooding Hazard	Weight
High	Rainfall and Sea Level Rise	0.45
	Rainfall	0.30
Moderate	Sea Level Rise	0.15
Low	Rainfall, Sea Level Rise, and Storm Surge (Compound Flooding)	0.10
	Total	**1.00**

5.2.1.3 Impact Index

The Impact Index provides as assessment of flood depth impacts on the County's and municipalities' critical assets (Table 5-15). This index ensures an equitable approach to flood risk assessment by prioritizing assets most at risk of flood damage.

This approach helps identify and prioritize intervention areas where significant flood depths pose a higher risk to critical assets. The Impact Index creates a weighted sum that helps identify and prioritize intervention areas where there are significant flood depths. This tool is particularly useful for policy makers and planners to direct resources and efforts to improve the resilience and support of communities that are most at risk.

Table 5-15. Impact Index Metrics

Risk Level	Average Flooding Depth (feet)	Weight
High	>3	0.50
Moderate	2-3	0.35
Low	1-<2	0.15
	Total	**1.00**

5.2.1.4 Asset Criticality Index

The Asset Criticality Index considers the necessity and role of the different critical asset categories during and immediately after a storm event. Assets deemed vital to remain operational during crisis events were given the highest weight in the scoring system. This is followed by assets critical to immediate post-disaster recovery, then those critical to short- and long-term recovery efforts, and finally, public/private assets of special consideration during short- and long-term recovery (see Table 4-1 for additional detail).

1. **Primary**: Vital assets to remain operational during crisis events.
2. **Secondary**: Vital assets that are critical to immediate post-disaster recovery.
3. **Tertiary**: Critical to short- and long-term recovery efforts.
4. **Quaternary**: Special consideration - public/private assets of special consideration during short- and long-term recovery.

By using a weighted approach (Table 5-16), the Asset Criticality Index provides a nuanced understanding of the importance of SLC and municipal critical assets. This enables more effective prioritization of adaptation measures, resource allocation, and long-term planning to enhance overall resilience and ensure continuity during and after crisis events.

Table 5-16. Asset Criticality Index Metrics

Risk Level	Critical Asset Tier	Weight
High	Primary	0.45
	Secondary	0.35
Moderate	Tertiary	0.15
Low	Quaternary	0.05

Risk Level	Critical Asset Tier	Weight
	Total	1.00

5.2.1.5 Composite Vulnerability Score

Each of the components described above assesses different aspects of risk and vulnerability and is assigned a specific weight to determine the CVS.

1. **Horizon Index:** This metric measures the potential future impact of flooding, considering the planning horizon or the timeframe within which the impacts are expected. The Horizon Index score is given a weight of 0.4 of the overall CVS ranking. This weight reflects the importance of long-term flood risk projections in overall risk assessment but focusing on the immediacy of near-term impacts.
2. **Risk Index:** This metric evaluates the current exposure to flood risks, including the frequency of asset exposure to each potential flooding event. The Flood Index score has a weight of 0.15 of the overall CVS ranking, suggesting that immediate flood risks are also a significant factor in the overall assessment but less so than long-term projections.
3. **Impact Index:** This metric assesses the impact of potential flooding events by considering the depth of flooding. The Impact Index score has a weight of 0.15 of the overall CVS ranking, recognizing the heightened risk posed by significant levels of flooding, particularly to the community's most vulnerable areas.
4. **Asset Criticality Index:** This metric considers asset importance during and immediately after crisis events. Vital operational assets during crises get the highest weight, followed by those critical to immediate recovery, then short- and long-term recovery, and finally, special consideration assets. The Asset Criticality Index score has a weight of 0.3 of the overall CVS ranking, helping to prioritize adaptation, resource allocation, and resilience planning.

The resulting CVS score offers a holistic measure of flood-related risk by combining these weighted components. It can guide decision-making in urban planning, emergency preparedness, resource allocation, and other critical areas of public policy and infrastructure development. The CVS is an essential tool in the toolkit, allowing various risk factors to be overlaid and identify where they converge to create heightened risk profiles. It is not just a measure but a strategic guide to direct efforts effectively. By factoring in both the likelihood and potential severity of flood events, as well as the criticality of various assets, the CVS serves as a robust tool for prioritizing actions and investments to mitigate flood risks.

5.2.2 Critical Asset Prioritization

The third step within the sensitivity analysis is to apply the evaluation system described above to analyze and prioritize critical assets in the County for adaptation measures (Table 5-17). The assets prioritized were limited to those deemed to be of high and moderate priority by the Project Team (see Table 5-18). This methodology is outlined in Figure 5-21.

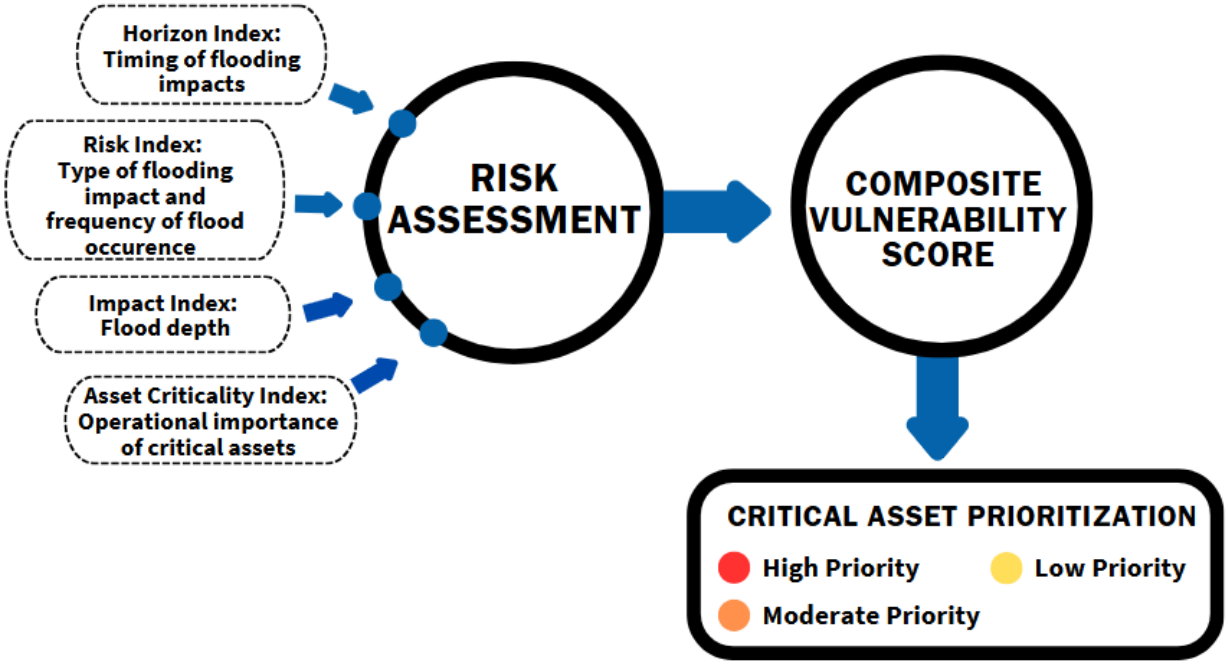


Figure 5-21. Critical Asset Prioritization Methodology

Employing the index described above, the analysis assigned a priority of 1 through 5 ranking based on the indexed score. Assets that fell below the top 50% of scores were assigned a 0. Table 5-17 provides the index thresholds used to assign the priorities.

Table 5-17. Composite Risk Assessment Scores and Prioritization

Risk Assessment Score Threshold	Assigned Priority
Top 5% Highest Values	1 (High)
5-10%	2 (High)
10-15%	3 (Moderate)
15-25%	4 (Moderate)
25-50%	5 (Low)
Below 50%/Median Value - Not Prioritized	0 (not prioritized)

Table 5-18. Sensitivity Analysis Scoring Methodology

Risk Assessment				Composite Vulnerability Score	Critical Asset Prioritization
Horizon Index (weight 0.4)	Asset Criticality Index(weight 0.3)	Impact Index (weight 0.15)	Risk Index (weight 0.15)		
High Risk – Near Term (Present day and 2040 Exposure)	**High Risk** – Primary and Secondary level critical assets	**High Risk** – Average flood depth >3 feet	**High Risk** – Rainfall and SLR Combo; and Rainfall only	**High** – Top 10% of highest risk assessment values	**High** – Priority 1 & 2
Moderate Risk – Mid Term (2070 Exposure)	**Moderate Risk** – Tertiary level critical assets	**Moderate Risk** – Average flood depth 2-3 feet	**Moderate Risk** – SLR only	**Moderate** – ranked in top 25% but not top 10% of risk assessment values	**Moderate** – Priority 3 & 4
Low Risk – Long Term (2100 Exposure)	**Low Risk –**Quaternary level critical assets	**Low Risk** – Average flood depth 1-<2 feet	**Low Risk –** Compound flooding	**Low** – ranked in top 50% but not top 25% of risk assessment values	**Low** – Priority 5

The Sensitivity Analysis Scoring approach is based on a methodology developed by Clearview Geographic LLC (CVG 2024) and Erin L. Deady PA.

6.0 SUMMARY AND ANALYSIS OF RESULTS

Adhering to the FDEP Vulnerability Assessment Checklist, this evaluation incorporates tailored data pertaining to the County and its critical assets. The focus of this Resilient Florida VA analysis is to identify flood-prone areas that contain a concentration of critical or regionally significant assets, focusing on the impacts of flooding scenarios outlined in Section 380.093, F.S. [2023]. This report focuses on days of tidal flooding, sea level rise, precipitation, and storm surge as causes of flooding impacts. In the year 2070 using the NOAA Intermediate High projection, SLR drives the majority of flood impacts, with much of the intracoastal barrier island and northern intracoastal shoreline of the county expected to experience over 150 days per year of tidal flooding (Figure 6-1). In contrast, the western portion of the County experiences rainfall-induced flooding that is concentrated in low-lying areas as shown in Figure 6-2.

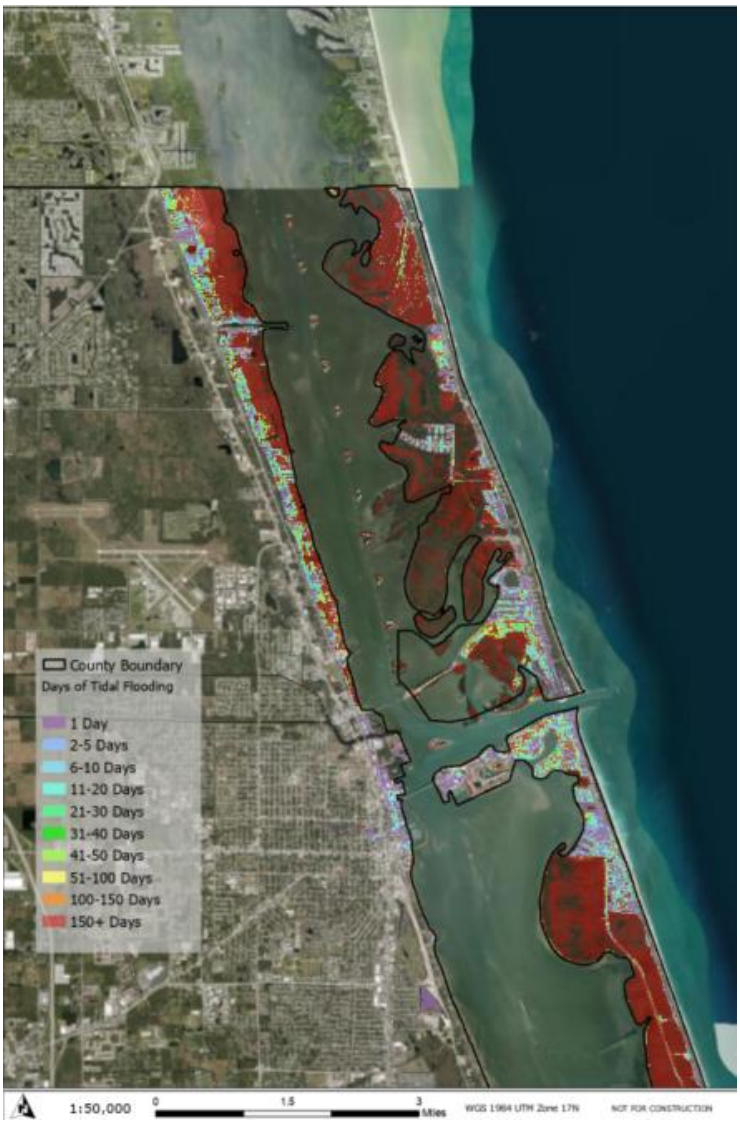


Figure 6-1. NIH 2070 - Days of Tidal Flooding

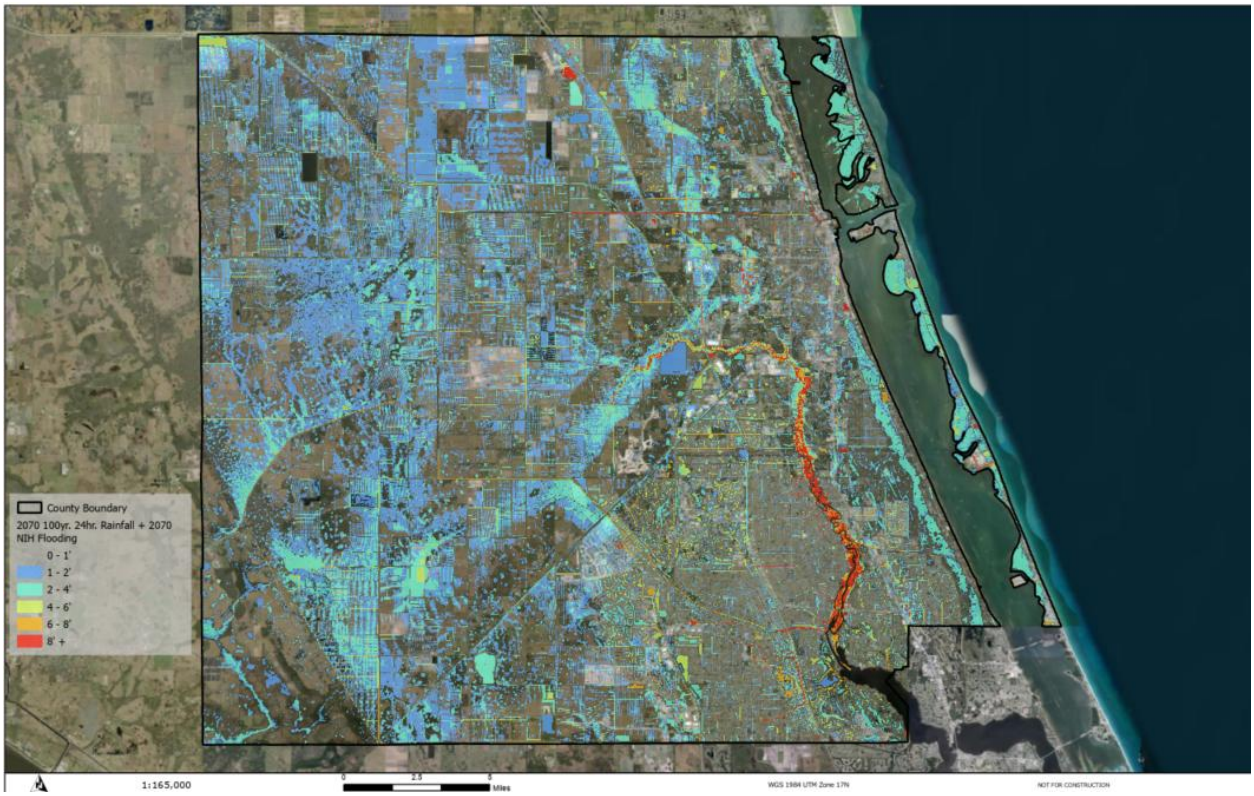


Figure 6-2. 2070 100 Year 24 Hr. Rainfall Flooding + NIH 2070 SLR

Storm surge presents a serious threat to the coastal and intracoastal parts of the County, even under the present day conditions (Figure 6-3). The northern portion of the County above the Fort Pierce inlet of these regions will experience 4 to 6 feet of storm surge flooding from a Category 3 storm as early as 2040, though areas south of the inlet are more protected with the barrier island experiencing most of the inundation. By 2070, inundation from the same category storm rises to 6 to 8 feet or more in the northern intracoastal regions, with the southern coastal areas experiencing a rise of 4 to 8 feet.

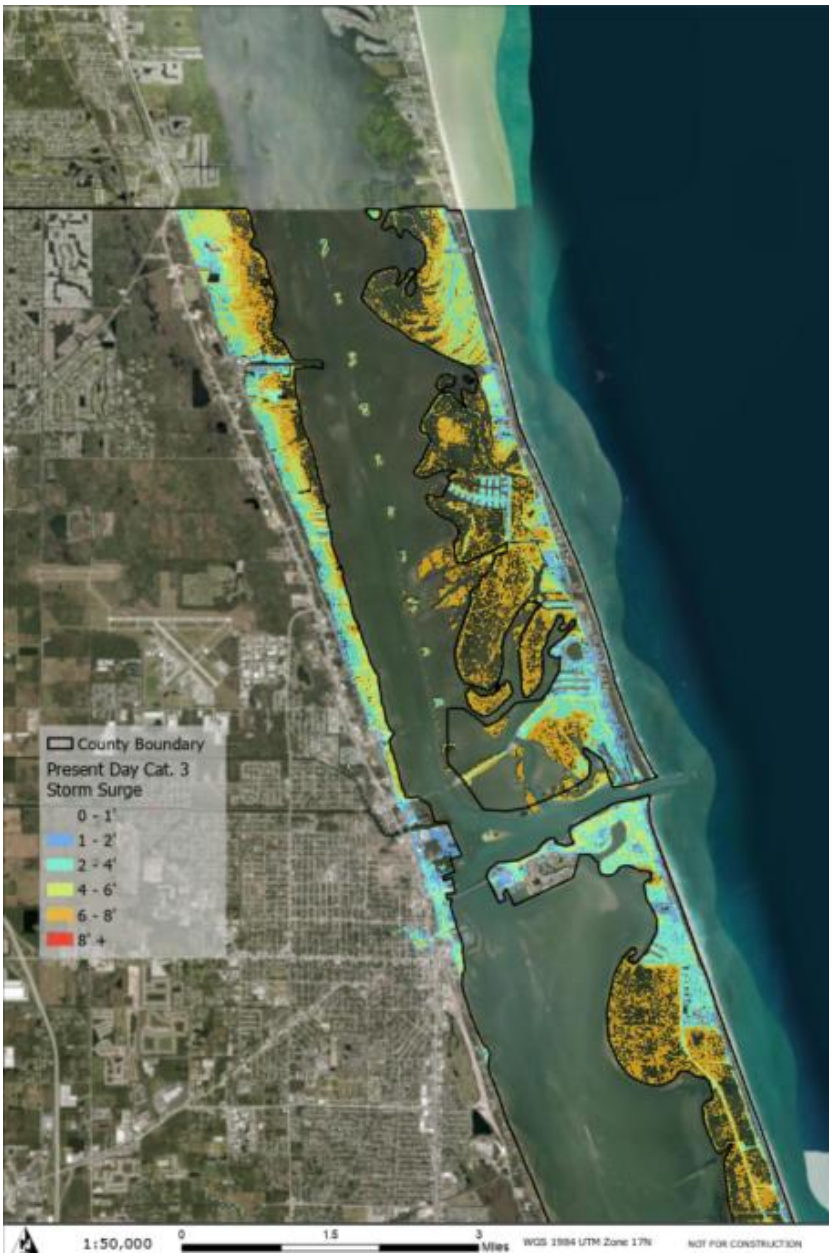


Figure 6-3. Present Day Category 3 Storm Surge

Rainfall presents a widespread but much milder impact than high tide and storm surge flooding, even when layered on top of SLR. Pockets of rain collect in lower lying areas and near water or wetlands across the County, as seen in Figure 6-4.

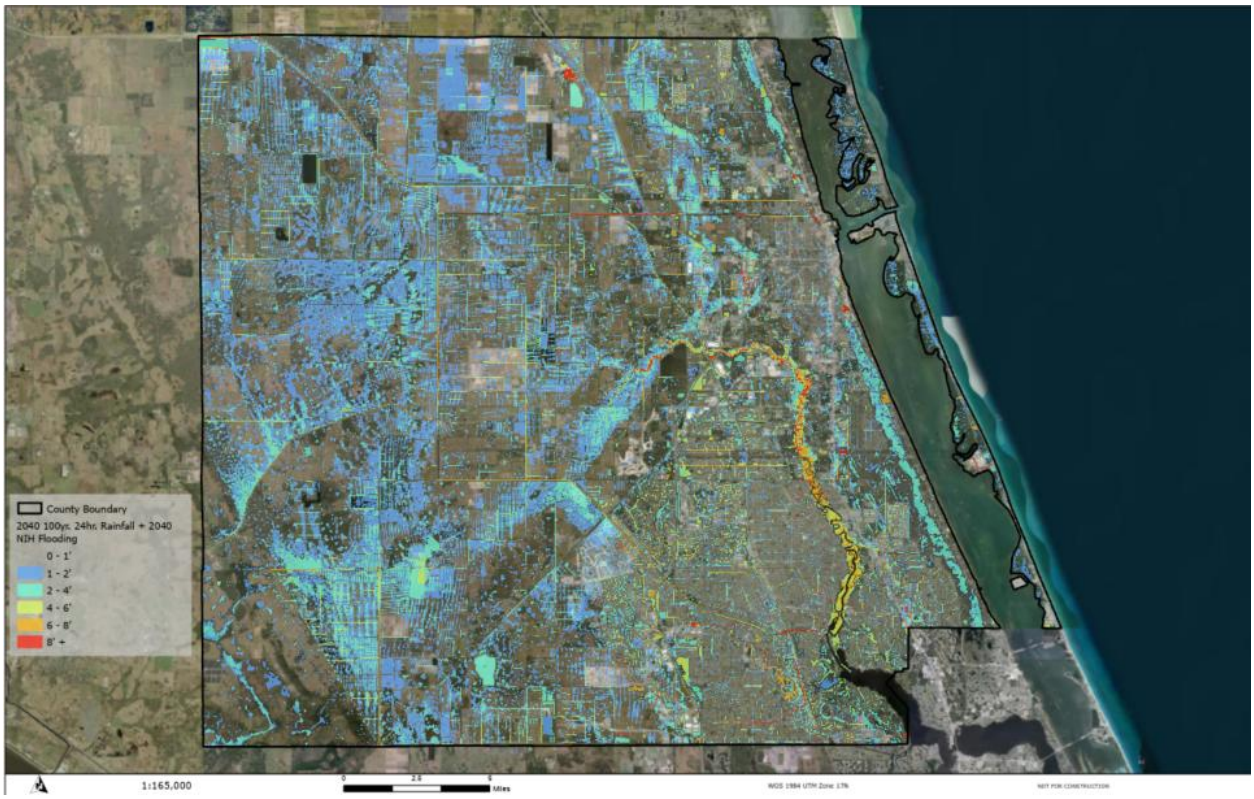


Figure 6-4. 100-Year 24 Hour Rainfall + 2040 NIH SLR

The conditions do not always occur in isolation. Flooding is expected to worsen as two or more of these conditions coincide as might be expected during a hurricane but could also happen during high tide flooding any time of the year.

Within the analysis, 3,014 assets owned or maintained by the County and municipalities were classified as critical assets. Of these, 1,503 at-risk critical assets were prioritized for adaptation considerations throughout the County. The asset types include emergency facilities, healthcare facilities, community support buildings, water infrastructure, schools, historic structures, and similar resources. Table 6-1 displays the number of prioritized critical assets within each critical asset tier.

Table 6-1. Critical Asset Prioritization Level by Asset Tier

Critical Asset Priority Level	Primary	Secondary	Tertiary	Quaternary
Priority 1 (High)	107	29	60	5
Priority 2 (High)	21	63	11	6
Priority 3 (Moderate)	56	74	22	8
Priority 4 (Moderate)	112	153	24	12
Priority 5 (low)	248	377	81	42
Priority 0 – not prioritized (Low)	724	475	117	187

6.1 Flooding Implications

Absent any adaptation measures, SLC and the municipalities will experience the impact of SLR as its coastline recedes over time. Water levels in canals will rise, overflowing banks and threatening the integrity of seawalls. Saltwater intrusion will compromise the integrity of roads and underground utilities and turn freshwater ponds brackish. Twice a day, as the high tide returns, these impacts will be amplified with flooding encompassing an increasing percentage of the land. Even if storm surge heights do not increase, they will ride in on higher water levels and reach further and further inland. The analyses performed for this RVA update provides SLC and the municipalities with information about potential future challenges to aid in development of adaptations to reduce risks to residents, businesses and the environment.

SLR and HTF are both related to flooding and its impact on coastal and low-lying areas. They are interrelated and build on each other:

- **Sea Level Rise** is a gradual increase in the average level of oceans water. It can intensify coastal erosion; increase the risk of coastal flooding; result in saltwater intrusion; and lead to the loss of habitat for plants, animals, and even humans.
- **High Tide Flooding**, sometimes referred to as "nuisance flooding" or "sunny day flooding," occurs when, absent storms or rainfall, tides reach 2 feet above the current MHHW (a FDEP threshold) and may begin to flood onto streets or other areas that are historically dry. While often associated with natural high-tide events, HTF is becoming more frequent with SLR and provides a glimpse into the future when these water levels will be increasingly common, disrupting daily life by flooding roads, overwhelming drainage systems, and damaging property.

Table 6-2 focuses on two key elements of tidal flooding analysis (flood indicators): 1) SLR/HTF, which is an inundation scenario capturing the extent of levels tied to the average of the highest of the high tides (MHHW), and 2) Days of Tidal Flooding, which incorporates a duration component. Land inundation represents the physical area (in acres) that will be submerged by each type of flood impact. Viewing the two indicators together, Table 6-2 provides a snapshot of the tide range that will impact the landscape of SLC and the municipalities under the 2040, 2070, and 2100 planning horizons.

Table 6-2. Future Land Inundation from Flood Indicators

Projection (Year)	NIL SLR + HTF (acres / percentage)	NIH SLR + HTF (acres / percentage)
2040	5568.63 / 1.51%	8261.30 / 2.24%
2070	7690.55 / 2.09%	11280.84 / 3.06%
2100	9206.17 / 2.50%	14996.21 / 4.07%

6.2 Critical Assets Prioritized by Asset Class

By identifying various at-risk critical assets, each with unique inherent risks, appropriate adaptation strategies can be developed for assets in five critical domains as defined by statute: 1) transportation infrastructure; 2) critical infrastructure; 3) critical community and emergency facilities; 4) the preservation of natural, cultural, and historic resources; and 5) regionally significant assets.

Numerous adaptation strategies can be evaluated for the prioritized critical assets including, but not limited to, the following:

- Physical modification
- Green and Nature Based Solutions
- Planning, Management, and Policy
- Community Education, Programs, and Readiness

6.2.1 Transportation Assets and Evacuation Routes

The transportation systems in SLC and the municipalities serve many purposes: connecting neighborhoods and business centers, serving as evacuation routes, moving economically important goods and services, providing main routes to hospitals, and allowing efficient movement for emergency vehicles. Included in this category are airports, bridges, evacuation routes, and similar transportation infrastructure. The critical transportation assets that are affected by most flood scenarios evaluated in the exposure analysis, including SLR, HTF, storm surge, and compound flooding. Table 6-3 showcases a range of noteworthy transportation assets in this category.

Table 6-3. Transportation Assets within St. Lucie County

Asset Type	Asset Name	Address
Aviation Facility	Treasure Coast International Airport	3000 Curtis King Blvd, Fort Pierce, FL 34946
Boat Ramps	Boat Ramp	Multiple
Evacuation Route	Delaware/Okeechobee Road – State Road 70	-
Evacuation Route	State Road 68	-
Evacuation Route	State Road 60	-
Evacuation Route	US Highway 1	-
Evacuation Route	A1A	-
Evacuation Route	Dixie Highway	-
Port	Port of Fort Pierce	1000 Harbor St, Fort Pierce, FL 34950

6.2.2 Critical Infrastructure

This category includes public assets, networks, and essential systems that were identified within the RVA. These are assets that are critical to maintain County and municipal functionality. Included in this category are lift stations, water and wastewater treatment facilities, pump stations, electric production and supply facilities, microwave service towers, cellular towers, and similar assets. The critical infrastructure assets are affected by most flood scenarios evaluated in the exposure analysis including SLR, HTF, storm surge, and compound flooding, while rainfall had a minimal effect. Table 6-4 showcases a range of noteworthy infrastructure assets in this category.

Table 6-4. Critical Infrastructure within St. Lucie County

Asset Type	Asset Name	Address
Water Treatment Plant	Fort Pierce Water Treatment Facility	715 S 25th St, Fort Pierce, FL 34947

Asset Type	Asset Name	Address
Wastewater Treatment Plant	Fort Pierce Wastewater Treatment Facility	403 Seaway Dr, Fort Pierce, FL 34949
Water Infrastructure	Pump Stations, Water Control Valves, Catch Basins, Outfalls, Drainage Wells, Injection Wells	Multiple
Communication	Microwave Service Towers, Transmission Towers, and Cellular Towers	Multiple
Water, Wastewater, Stormwater Management	St Lucie West Services District	450 SW Utility Dr, Port St Lucie, FL 34986
Power/Water/Wastewater	FPUA Administration Building	206 S 6th St, Fort Pierce, FL 34950

6.2.3 Critical Community and Emergency Facilities

This category includes educational and community centers, emergency operation centers, relief centers, fire stations, hospitals, law enforcement facilities, local government facilities, affordable public housing, and similar facilities. In all cases, the loss of service from these assets would be catastrophic to the community, and all such facilities were identified and prioritized. Assets in this category most frequently experience flooding impacts from extreme rain events; however, storm surge was also shown to impact some assets. Table 6-5 showcases a range of noteworthy critical community and emergency assets in SLC and Municipalities.

Table 6-5. St Lucie County Critical Community and Emergency Facilities

Asset Type	Asset Name	Address
Local Law Enforcement	Fort Pierce Police Department	920 S US Highway 1, Fort Pierce, FL 34950
Local Law Enforcement	Port St Lucie Police Department	121 SW Port St Lucie Blvd S, Port St Lucie, FL 34984
Local Law Enforcement	St Lucie County Sheriff Office	4700 Midway Rd, Fort Pierce, FL 34981
College	Indian River State College Massey Campus	3209 Virginia Avenue, Fort Pierce, FL 34950
Hospital	Lawnwood Medical Center	1700 S 23rd St, Fort Pierce, FL 34950
Hospital	HCA Florida St Lucie Hospital	1800 Tiffany Ave, Port St Lucie, FL 34952
Hospital	Cleveland Clinic Tradition Hospital	10000 SW Innovation Way, Port St Lucie, FL 34987
Community Center	Riverwalk Center	600 Indian River Drive, Fort Pierce, FL 34950
Community Center	Port St Lucie Community Center	2195 Airoso Blvd, Port St Lucie, FL 34984
Government Facility	St Lucie County Administration Building	2300 Virginia Ave, Fort Pierce, FL 34982
Government Facility	City of Fort Pierce Administration Building	100 N US Hwy 1, Fort Pierce, FL 34950
Government Facility	City of Port St Lucie Administration Building	121 SW Port St Lucie Blvd, Port St Lucie, FL 34984
Government Facility	Town of St Lucie Village Town Hall	2841 N. Old Dixie Hwy, Fort Pierce, FL 34946
Government Facility	St Lucie County Emergency Operations Center	15305 W. Midway Rd, Fort Pierce, FL 34945
Government Facility	St Lucie County School Board	9461 Brandywine Ln, Port St Lucie, FL 34986

6.2.4 Natural, Cultural, and Historic Resources

This category includes assets such as conservation lands, parks, shorelines, surface waters, wetlands, and historical and cultural assets. These resources enhance the quality of life and provide a sense of place for those who call St. Lucie County home. SLC and Municipalities' natural resources play a vital role in its identity, characterized by its diverse ecosystems and landscapes. These resources reflect the

County's natural heritage, contributing to the County's aesthetic appeal and serving vital ecological functions. They provide habitat for wildlife species, from nesting sea turtles to migratory birds. Additionally, these ecosystems can act as natural buffers, offering mitigation against flood hazards such as flooding. Moreover, natural areas the County offer abundant recreational opportunities for residents and visitors alike. As stewards of these invaluable resources, SLC and the municipalities are committed to preserving and protecting this natural heritage for future generations to enjoy.

6.2.4.1 Natural Resources

The natural resources of SLC and the municipalities contribute to community aesthetics, serve vital ecological functions, and support abundant commercial and recreational activities. They provide habitat for wildlife species from nesting sea turtles, manatees, alligators, gopher tortoises, and eastern indigo snakes to bats, wading birds, and migratory birds. Additionally, the inland and coastal ecosystems act as natural buffers, offer stormwater protection during extreme rain events, helping mitigate hazards. The County and municipalities are committed to preserving, protecting, and restoring these natural areas and systems for the benefit of current and future generations.

Categories of natural resources throughout the County include:

- Conservation lands, preserves, and greenways
- Local parks, recreation areas, and community green spaces:
- Waterways, creeks and canals
- Wetlands
- Ranch lands and Cypress hammocks
- Beaches
- Marine habitat (lagoons, mangroves, tidal flats, and marshes)
- Coastal surface waters
- Nearshore benthic habitat (seagrass beds and hardbottom habitat)

Figure 6-5 provides a more detailed view of these various land cover types throughout SLC and Table 6-6 summarizes the acreage of the most notable land cover areas. Of the nearly 400,000 acres of land cover (including state-owned intercoastal waters), over 20 percent, or approximately 90,000 acres, are built-up urban, utilities, or transportation areas (i.e., Class 1000 and 8000). By comparison, nearly 7 percent of land is deemed conservation area, as shown in Table 6-7, which summarizes conservation lands throughout the County by lead management agency. These conservation areas provide essential ecosystem services including natural processes for managing nutrient flows and buffering against flooding and storm surge inundation.

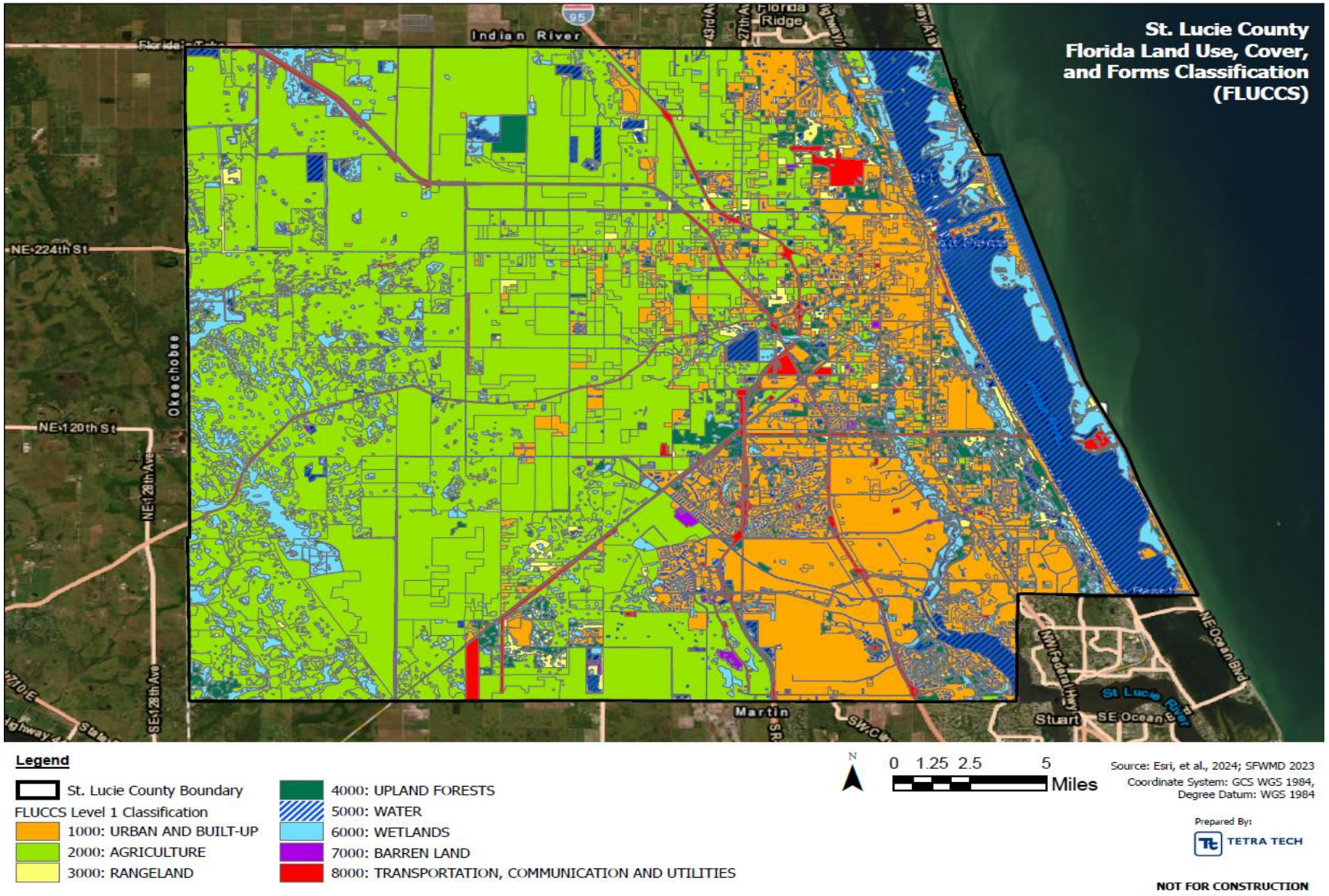


Figure 6-5. Figure 65: Map of Natural Resources (Florida Land Use, Cover, and Forms Classification)

Table 6-6. Land Use Land Cover Summary within St. Lucie County

Class	Class Description / Category	Acres
1000	Urban And Built-Up	79,440
2000	Agriculture	205,404
3000	Rangeland	7,405
4000	Upland Forests	16,198
5000	Water	36,977
6000	Wetlands	35,097
7000	Barren Land	2,638
8000	Transportation, Communication, and Utilities	10,479
	Total	**393,637**

Level 3 FLUCCS categories larger than 5,000 acres are itemized and rounded.

Table 6-7. Acres of Conservation Lands in St Lucie County by Lead Management Agency

Lead Managing Agency	Acres
Local	11,050.17
State	17,815.53
Federal	79.45
Private	23.7
Total SLC and Municipal Conservation Lands	28,968.85
Total SLC Area	440,320
Percent of IRC Area that is Conservation Lands	6.58%

Data as of January 2024
Source: Florida Natural Areas Inventory 2024

The habitats within SLC and the municipalities support biological diversity, including many federally threatened and endangered species. Table 6-8 lists the 26 threatened and endangered species believed or known to occur in the County.

Table 6-8. Federal Listed Threatened and Endangered Species for St Lucie County

Common Name	Scientific Name	Status
American crocodile	*Crocodylus acutus*	Threatened
Audubon's crested caracara	*Polyborus plancus audubonii*	Threatened
Carter's mustard	*Warea carteri*	Endangered
Crested caracara	*Caracara plancus audubonii*	Threatened
Eastern Black rail	*Laterallus jamaicensis* ssp. *jamaicensis*	Threatened
Eastern diamondback rattlesnake	*Crotalus adamanteus*	Under Review
Eastern indigo snake	*Drymarchon couperi*	Threatened
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	Endangered
Florida panther	*Puma (=Felis) concolor coryi*	Endangered
Florida scrub-jay	*Aphelocoma coerulescens*	Threatened
Fragrant prickly-apple	*Cereus eriophorus var. fragrans*	Endangered

Common Name	Scientific Name	Status
Green sea turtle	*Chelonia mydas*	Threatened
Gulf sturgeon	*Acipenser oxyrinchus (=oxyrhynchus) desotoi*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Lakela's mint	*Dicerandra immaculata*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened
Monarch butterfly	*Danaus plexippus*	Proposed Threatened
Piping plover	*Charadrius melodus*	Threatened
Puma (=mountain lion)	*Puma (=Felis) concolor* (all subsp. except *coryi*)	Similarity of Appearance (Threatened)
Red-cockaded woodpecker	*Leuconotopicus borealis*	Threatened
Rufa red knot	*Calidris canutus rufa*	Threatened
Southeastern beach mouse	*Peromyscus polionotus niveiventris*	Threatened
Tiny polygala	*Polygala smallii*	Endangered
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered
West Indian manatee	*Trichechus manatus*	Threatened
Wood stork	*Mycteria americana*	Threatened

Source: USFWS 2025

Nearly 30,000 acres of land within the County are designated as conservations lands, accounting for 6.6 percent of the overall County landscape (Table 6-6). These conservation lands protect diverse habitats including prairie, hammock, pine flatwoods, tributaries, rivers, estuaries, wetlands, savannas, and scrub habitat.

In 1994, SLC, PSL, FP and SLV worked together on a ballot initiative to protect Environmentally Significant Lands (ESL) throughout the County. SLC citizens overwhelmingly passed this $20 million bond referendum, resulting in the acquisition of dozens of preserves, totaling more than 11,000 acres (Table 6-9). In addition to preserves, other conservation lands include parks, green spaces, beaches, and beach access areas (Table 6-10 and Figure 6-6).

Table 6-9. St Lucie County Environmentally Significant Lands (ESL)

Asset Name	Maintenance Agency	Acreage	Address (if applicable)
Ancient Oaks Preserve/ Weldon B. Lewis Park	St Lucie County	38	4650 Oleander Ave, Fort Pierce, FL 34982
Bluefield Ranch Preserve	St Lucie County	3,285	30501 Bluefield Rd, Port St Lucie, FL 34987
Captain Hammond's Hammock Preserve	St Lucie County	18	N/A
Citrus Hammock Preserve	St Lucie County	64	6511 Citrus Ave, Fort Pierce, FL 34982
D.J. Wilcox Preserve	St Lucie County	50	300 Michigan St, Fort Pierce, FL 34946
Indrio Savannahs Preserve	St Lucie County	297	5275 Tozour Rd, Fort Pierce, FL 34951
Indrio Scrub Preserve	St Lucie County	13	5187 Old Dixie Hwy, Fort Pierce, FL 34946
John Brooks Park	St Lucie County	226	3300 South Ocean Dr, Fort Pierce, FL 34949
Lake Indrio Preserve	St Lucie County	250	5501 N US Hwy 1., Fort Pierce, FL 34946
George LeStrange Preserve	St Lucie County	94	4911 Ralls Rd, Fort Pierce, FL 34981

Asset Name	Maintenance Agency	Acreage	Address (if applicable)
Gordy Road Preserve	St Lucie County	44	3650 Gordy Rd, Fort Pierce, FL 34945
Ocean Bay Preserve	St Lucie County	53	6851 South Ocean Dr, Jensen Beach, FL 34957
Oxbow Eco-Center & Preserve	St Lucie County	225	5400 NE St James Dr Port St Lucie, FL 34983
Petravice Family Preserve	St Lucie County	35	5445 Palmetto Ave, Fort Pierce, FL 34982
Pinelands Preserve	St Lucie County	750	7601 VPI Grove Rd, Port St Lucie, FL 3498 7
Richard E. Becker Preserve	St Lucie County	13	3398 Selvitz Rd, Fort Pierce, FL 34981
Sheraton Scrub Preserve	St Lucie County	56	2222 North 41st St, Fort Pierce, FL 34946.
Spruce Bluff Preserve	St Lucie County	97	611 SE Dar Ln, Port St Lucie, FL 34984
Donald B. Moore Preserve	St Lucie County	78	305 Torpey Rd, Fort Pierce, FL 34946
Steven J. Fousek Preserve	St Lucie County	494	Includes Hackberry Hammock, Paleo Hammock, and Teague Hammock
Sweetwater Hammock Preserve	St Lucie County	64	4100 South 25th St, Fort Pierce, FL 34981
Ten Mile Creek Preserve	St Lucie County	8	3401 Gordy Rd, Fort Pierce, FL 34945
Walton Scrub	St Lucie County	33	10809 South Indian River Dr, Fort Pierce, FL 34981

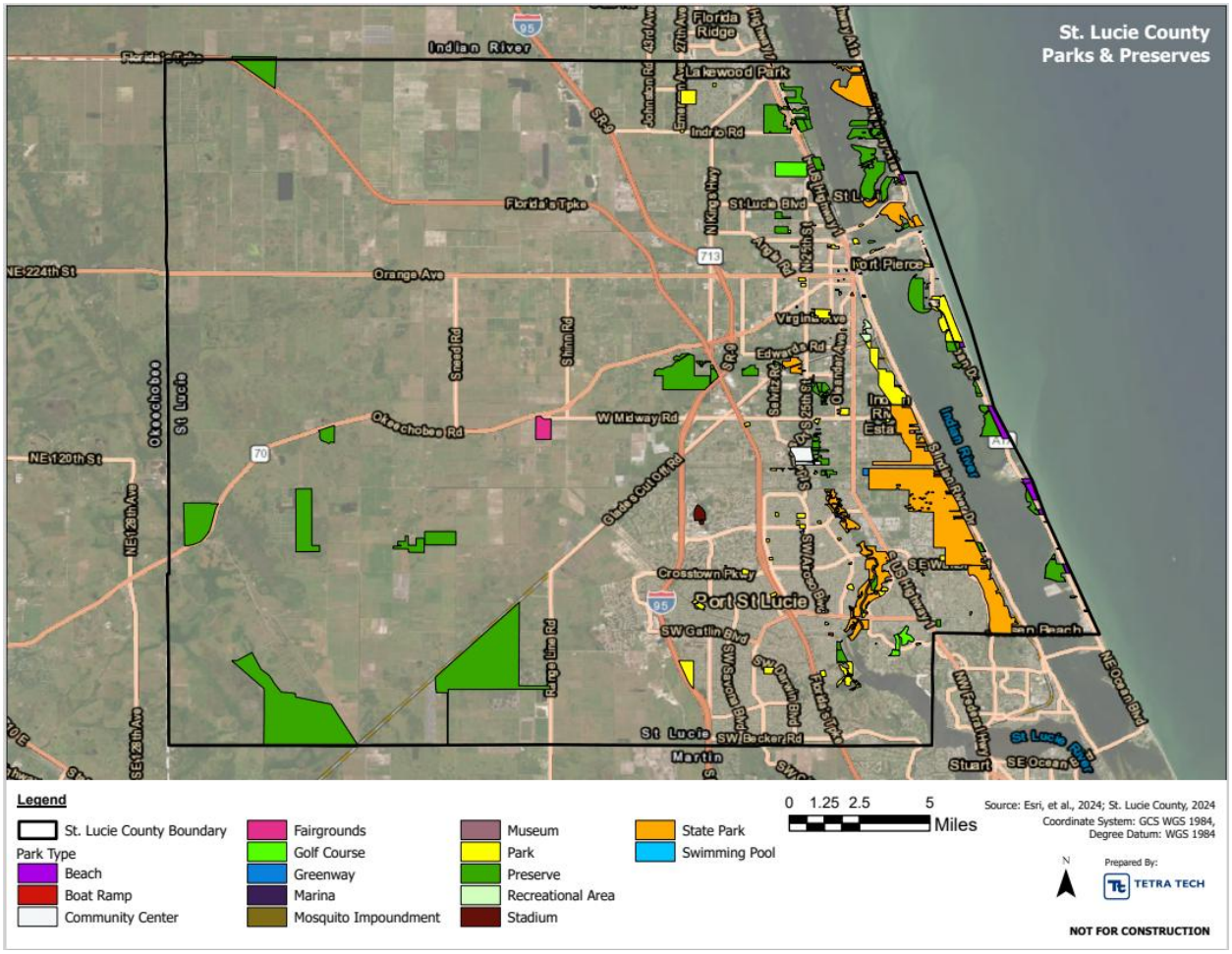


Figure 6-6. Map of Parks, Preserves, Open Spaces, Community Centers, and Museums within St. Lucie County

Table 6-10. Parks and Green Spaces, and Beaches and Beach Access Areas within St. Lucie County

Asset Name	Municipality	Address
Parks and Green Spaces		
Apache Park	City of Port St Lucie	1449 SW Apache Ave, Port St Lucie, 34953
Botanical Gardens	City of Port St Lucie	2410 S.E. Westmoreland Blvd, Port St Lucie, 34952
C-24 Canal Park	City of Port St Lucie	500 SE Oakridge Drive, Port St Lucie, FL 34984
Charles E. Ray Park	City of Port St Lucie	5626 NW Manville Dr, Port St Lucie, 34983
Clover Park	St Lucie County	31 Piazza Dr, Port St Lucie, FL 34986
Coconut Crossing Park	City of Fort Pierce	Surfside Dr and Coconut Dr, Fort Pierce, FL 34947
Doat Street Park	City of Port St Lucie	425 S.E. Doat St, Port St Lucie, 34983
Elks Lodge #2658 Friendship Park	City of Port St Lucie	2264 S.E. West Blackwell Dr, Port St Lucie, 34952
Elks Park	St Lucie County	2501 Delaware Ave, Fort Pierce, FL 34947
Fairwinds Golf Course	St Lucie County	4400 Fairwinds Dr, Fort Pierce, FL 34946
Fenn Park	City of Fort Pierce	N. 23rd St and Ave K, Fort Pierce, FL 34947
Fred Cook Park	City of Port St Lucie	400 S.E. Glenwood Ave, Port St Lucie, 34984
Gazebo Park	City of Fort Pierce	N. Indian River Dr and Ave A Fort Pierce, FL 34947
Girl Scout Friendship Park	City of Port St Lucie	315 N.W. Heather St, Port St Lucie, 34983
Glidden Park (Garden Center)	City of Fort Pierce	S. 10th St and Georgia Ave, Fort Pierce, FL 34947
Goodwin Park	City of Fort Pierce	Florida Ave and S. 10th St, Fort Pierce, FL 34947
Gordy Road Recreation Area	St Lucie County	3650 Gordy Rd, Fort Pierce, FL 34945
Gulf Stream Park	City of Port St Lucie	210 N.E. Ardsley Dr, Port St Lucie, 34983
Harborview Park	City of Port St Lucie	624 S.E. Harborview Dr, Port St Lucie, 34983
Heathcote Botanical Garden	City of Fort Pierce	210 Savannah Rd, Fort Pierce, FL 34947
Horatio Grisby Park	St Lucie County	1506 Ave M, Fort Pierce, FL 34950
Ian T. Zook Park	City of Port St Lucie	4648 NW Manville Dr, Port St Lucie, 34983
Ilous Ellis Park	City of Fort Pierce	1311 Ave M, Fort Pierce, FL 14950
Jaycee Park	City of Port St Lucie	1301 S.W. Bayshore Blvd, Port St Lucie, 34983
Jaycee Park	City of Fort Pierce	S. Ocean Dr and Melaleuca Dr Fort Pierce, FL 34947
Jessica Clinton Park	City of Port St Lucie	3200 S.E. Southbend Blvd, Port St Lucie, 34984
John B. Park Sports Complex	St Lucie County	1302 Virginia Ave, Fort Pierce, FL 34982
Kimberly Bergalis Memorial Park	City of Fort Pierce	S. Ocean Dr and Melaleuca Dr Fort Pierce, FL 34947
Kiwanis Park	City of Port St Lucie	1320 S.E. Floresta Dr, Port St Lucie 34983
Lakewood Park Neighborhood Park	St Lucie County	6102 Kings Hwy, Fort Pierce, FL 34951
Lakewood Park Regional Park	St Lucie County	5990 Emerson Ave, Fort Pierce, FL 34951
Lakewood Tennis Center	St Lucie County	1302 Virginia Ave, Fort Pierce, FL 34982
Lincoln Park Recreation Area	St Lucie County	1306 Ave M, Fort Pierce, FL 34950
Loyalty Park	City of Port St Lucie	2805 S.E. Morningside Blvd, Port St Lucie, 34952
Lyngate Park and Dog Park	City of Port St Lucie	1301 S.E. Lyngate Dr, Port St Lucie, 34952
Maravilla Park / Dog Park	City of Fort Pierce	Oleander Ave and Maple Ave, Fort Pierce, FL 34947
Marina Square	City of Fort Pierce	Melody Ln, Fort Pierce, FL 34947
Mariposa Preserve	City of Port St Lucie	2280 SE Mariposa Ave, Port St Lucie, FL 34952
Mary Ann Cernuto Park Plaza	City of Port St Lucie	2060 S.E. Grand Dr, Port St Lucie, 34952
McCarty Ranch Preserve	City of Port St Lucie	12525 Range Line Road, Port St Lucie, FL 34987
McChesney Park & Dog Park	City of Port St Lucie	1585 S.W. Cashmere Blvd, Port St Lucie, 34986

Asset Name	Municipality	Address
Midport Lake Park	City of Port St Lucie	2010 S.E. Veterans Memorial Pkwy, Port St Lucie, 34952
MLK Jr. Dreamland Park	City of Fort Pierce	S. 25th St and Atlantic Ave, Fort Pierce, FL 34947
Moore's Creek Linear Park / N. 10th St Park	City of Fort Pierce	N. 10th St and Ave C, Fort Pierce, FL 34947
O.L. Peacock Sr. Park & Lake	City of Port St Lucie	1950 S.W. Dreyfuss Blvd, Port St Lucie, 34953
Oak Hammock Park	City of Port St Lucie	1982 S.W. Villanova Rd, Port St Lucie, 34953
Old Fort Park	City of Fort Pierce	800 S. Indian River Dr Fort Pierce, FL 34947
Paradise Park	St Lucie County	2020 Juanita Ave, Fort Pierce, FL 34946
Pinewood Park	City of Fort Pierce	S. U.S. Hwy 1 and Sunrise Blvd, Fort Pierce, FL 34947
Pioneer Park	City of Port St Lucie	2454 SE Westmoreland Blvd, Port St Lucie, 34952
Pioneer Park	City of Fort Pierce	N. 29th St and Ave M, Fort Pierce, FL 34947
Ravenswood Pool	St Lucie County	400 Ravenswood Ln, Fort Pierce, FL 34983
Ravenswood Racquetball Courts	City of Port St Lucie	400 SW Ravenswood Ln, Port St Lucie, 34983
River Park	St Lucie Village	2000 River Park Dr, Fort Pierce, FL 34982
River Place Park	City of Port St Lucie	690 N.W. Bayou Country Ln, Port St Lucie, 34953
Riverland Paseo Park	City of Port St Lucie	12151 SW Community Blvd, Port St Lucie, 34987
Rotary Park	City of Port St Lucie	2101 S.E. Tiffany Ave, Port St Lucie, 34952
Rotary Park	City of Fort Pierce	S. 23rd St and Virginia Ave, Fort Pierce, FL 34947
Roy and Janice McGriff Park	St Lucie County	2508 Juanita Ave, Fort Pierce, FL 34946
Sample Oaks Park	City of Fort Pierce	S. 8th St and Boston Ave, Fort Pierce, FL 34947
Samuel D. Bennett Park (Boys Scouts' Park)	City of Fort Pierce	S. 10th St and Boston Ave, Fort Pierce, FL 34947
Sandhill Crane Park	City of Port St Lucie	2355 S.E. Scenic Park Dr, Port St Lucie, 34952
Sandpiper Bay Park	City of Port St Lucie	1878 SE Westmoreland Blvd, Port St Lucie, 34952
Savannas Recreation Area	St Lucie County	1400 E. Midway Rd, Fort Pierce, FL 34982
South Causeway Park	City of Fort Pierce	S. A1A and South Bridge Fort Pierce, FL 34947
Sportsman's Park	City of Port St Lucie	201 N.W. Prima Vista Blvd, Port St Lucie, 34983
Sportsman's Park West	City of Port St Lucie	220 N.W. Irving St, Port St Lucie, 34983
St Lucie County Fairgrounds	St Lucie County	15601 W. Midway Rd, Fort Pierce, FL 34945
St Lucie County Skate Park	St Lucie County	2100 Virginia Ave, Fort Pierce, FL 34950
St Lucie Village Heritage Park	St Lucie County	305 Torpey Rd, Fort Pierce, FL 34946
St Lucie Village Park	St Lucie Village	2200 E. Midway Rd, Fort Pierce, FL 34982
Swan Park	City of Port St Lucie	700 S.W. Carmelite St, Port St Lucie, 34983
The Boardwalk at The Port District	City of Port St Lucie	2200 SE Veterans Memorial Pkwy, Port St Lucie, 34952
Tom Hooper Park	City of Port St Lucie	2340 S.E. Rivergate Pkwy, Port St Lucie, 34952
Turtle Run Park	City of Port St Lucie	1945 S.W. Cameo Blvd, Port St Lucie, 34953
U.S. Submarine Veterans Park	City of Port St Lucie	801 SE Atlantus Ave, Port St Lucie, 34983
Veterans Memorial Park	City of Port St Lucie	2100 S.E. Veterans Memorial Pkwy, Port St Lucie, 34952
Veterans Memorial Park	City of Fort Pierce	N. Indian River Dr and Seaway Dr Fort Pierce, FL 34947
Veterans Park at Rivergate	City of Port St Lucie	2200 SE Veterans Memorial Pkwy, Port St Lucie, 34952
Whispering Pines Park Racket and Paddle Center	City of Port St Lucie	800 SW Darwin Blvd, Port St Lucie, 34953
Whitmore Park	City of Port St Lucie	474 S.E. Whitmore Dr, Port St Lucie, 34984
Wilderness Park	City of Port St Lucie	2701 SE Westmoreland Blvd, Port St Lucie, 34952

Asset Name	Municipality	Address
Winterlakes Park	City of Port St Lucie	5241 N.W. Jannebo St, Port St Lucie, 34986
Woodland Trails Park & Dog Park	City of Port St Lucie	1485 SW Calmar Ave, Port St Lucie, 34953
Woodstork Trail Park	City of Port St Lucie	1957 S.E. Hillmoor Dr, Port St Lucie, 34952
Beaches and Beach Access		
Avalon Avenue Beach Access Site	City of Fort Pierce	S. A1A and Avalon Ave, Fort Pierce, FL 34947
Blind Creek Beachside North and South	St Lucie County	5460 South Ocean Dr, Fort Pierce, FL34949
Blue Heron Beach	St Lucie County	2101 Blue Heron Blvd, Fort Pierce, FL 34949
Dollman Park Beachside	St Lucie County	9200 South Ocean Dr, Fort Pierce, FL 34957
Frederick Douglass Memorial Park	St Lucie County	3600 South Ocean Dr, Fort Pierce, FL 34949
Gulfstream Beach Access	City of Fort Pierce	S. A1A and Gulfstream Ave, Fort Pierce, FL 34947
Herman's Bay Beach	St Lucie County	7880 South Ocean Dr, Fort Pierce, FL 34957
John Brooks Park Beachside	St Lucie County	3300 South Ocean Dr, Fort Pierce, FL 34949
Middle Cove Beach	St Lucie County	4600 South Ocean Dr, Fort Pierce, FL 34949
Normandy Beach	St Lucie County	8550 South Ocean Dr, Jensen Beach, FL 34957
Ocean Bay Beachside	St Lucie County	7600 South Ocean Dr, Jensen Beach, FL 34957
Pepper Park Beachside	St Lucie County	3302 North SR A1A, Fort Pierce, FL 34949
Porpoise Beach Access	City of Fort Pierce	S A1A and Porpoise Ave Fort Pierce, FL 34947
South Beach Park	City of Fort Pierce	S. A1A and Crestview Dr Fort Pierce, FL 34947
South Jetty Park	City of Fort Pierce	Seaway Drive and S. A1A Fort Pierce, FL 34947
Surfside Park	City of Fort Pierce	S. A1A and Melaleuca Dr Fort Pierce, FL 34947
Walton Rocks Beach / Dog Park	St Lucie County	6700 South Ocean Dr, Jensen Beach, FL 34957
Waveland Beach	St Lucie County	10350 South Ocean Dr, Jensen Beach, FL 34957

The County also benefits from other important coastal natural areas such as mangrove habitat, wetlands and salt marshes, seagrass beds, oyster reefs, and offshore hardbottom habitat. While these other areas may not be under direct management of the County or municipalities, they should factor into ecosystem scale planning efforts to provide the greatest adaptation and resiliency benefits from natural resource projects. The large areas of seagrass beds, unconsolidated rubble, oyster habitat, and offshore hardbottom habitat provide invaluable ecosystem services, including vital habitat for marine species, fisheries, recreation, and enhanced coastal resiliency and storm surge mitigation.

Natural Resource Adaptations & Stormwater Management

The County and municipalities collaborate with the South Florida Water Management District, on various flood protection and flood management strategies to mitigate flooding risks and manage water resources effectively. Key approaches include:

- **Comprehensive Planning:** Both entities engage in comprehensive planning efforts that include floodplain management, land use planning, and infrastructure development to minimize flood risks.
- **Stormwater Management:** The County implements stormwater management systems that include retention and detention ponds, swales, and drainage systems designed to manage runoff and reduce flooding during heavy rainfall events.

- **Water Control Structures:** The SFWMD operates a network of water control structures, such as canals and levees, to regulate water levels in natural and artificial waterways, helping to manage floodwaters and protect communities.
- **Monitoring and Forecasting:** The SFWMD utilizes advanced monitoring systems and forecasting tools to track rainfall, water levels, and potential flood conditions, allowing for timely responses to emerging flood threats.
- **Public Education and Outreach:** The County and municipalities in collaboration with the South Florida Water Management District engage in public education campaigns to inform residents about flood risks, preparedness measures, and the importance of maintaining natural drainage systems.
- **Restoration Projects:** Initiatives to restore natural ecosystems, such as wetlands and floodplains, are implemented to enhance their capacity to absorb excess water and reduce flood impacts.
- **Collaboration with Agencies:** St Lucie County works with the SFWMD and other local, state, and federal agencies to coordinate flood management efforts, share resources, and develop regional strategies.

These strategies aim to enhance flood resilience, protect infrastructure, and safeguard the community from the impacts of flooding while promoting sustainable water management practices. Table 6-11 provides project examples that can serve as a starting point for the natural resource component of the County's future adaptation planning efforts. While some project durations may be short (1 to 3 years), project planning, design, and funding processes typically extend the project lifecycle to 3 years or more.

Table 6-11. Example Natural Resource Adaptation Strategies for St Lucie County

Project Name	Project Description	Location Description	Benefits	Timeline
Living Shoreline	Collaborate with the State to consider projects that protect the County parks and provide submerged habitat in State waters (e.g., creation of offshore hardbottom habitat / oyster reef / seagrass areas)	Coastal areas within the County	• Supports habitat and greater resiliency of sensitive coastline areas • Protect parks, infrastructure and associated recreation opportunities	Medium (5-8 years)
Living Shorelines / Beach Restoration	Erosion District to incorporate nature-based solutions in beach nourishment and restoration projects (e.g., dune nourishment, dune plantings, natural wave attenuation structures, reef balls)	South County Renourishment and Fort Pierce Shore Protection	• Implementation of alternative designs to provide more sustainable coastal habitat offering greater resiliency • Habitat and biodiversity benefits • Recreational benefits	Immediate, Medium, and Long Term
Oyster Restoration	Restoration and monitoring of priority oyster reefs	Fort Pierce Inlet Area (for example, other sites TBD)	• Restoring oyster reefs is important because oysters filter water to improve water clarity, provide habitat, and act as breakwaters to stabilize shorelines and reduce erosion.	Immediate to Medium Term (<10 years)

Project Name	Project Description	Location Description	Benefits	Timeline
Wetland Restoration	Restoring and enhancing wetlands	Agricultural lands within the county	• Improve water quality • Provide habitat • Increase flood storage capacity	Immediate, Medium, and Long Term
Seagrass Restoration	Restoration and monitoring of priority seagrass beds	Conduct preliminary visual ID and scoping to identify areas of key habitat	• Localized benefits in terms of species recovery and fishery enhancement • Storm surge protection • Nutrient management	Immediate to Medium Term (<10 years)
Artificial Reefs	Expansion of the County Artificial Reef Program	Offshore of St Lucie County	• Localized benefits of habitat enhancement and biodiversity • Secondary recreational benefits (fishing, diving)	Immediate to Medium Term (<10 years)
Stormwater Management Improvements	Upgrading and expanding stormwater management systems and creating green infrastructure (bioswales and permeable pavement)	Drainage areas or stormwater management sites	• Better handle increased rainfall and flooding	Immediate, Medium, and Long Term
Invasive Species Removal and Management	Removal of Australian pine, Brazilian pepper trees, and other invasive species, and replacement with mangroves, upland native shrubs, and grasses	Countywide	• Water quality benefits and mitigation of algal blooms • Habitat recovery and species enhancement • Carbon sequestration secondary benefits	Immediate to Medium Term (<10 years)
Urban Forestry Programs	Expanding tree canopy coverage in urban areas	Community parks or other green infrastructure areas	• Reduce heat island effects • Improve air quality • Enhance stormwater absorption	Immediate, Medium, and Long Term
Community Education and Engagement	Initiate outreach programs	N/A	• Educate residents about potential impacts • Promote sustainable practices such as water conservation and native landscaping	Immediate, Medium, and Long Term
Critical Habitat Acquisition	Protect critical habitat through multiple land acquisitions funded with the assistance of Florida Communities Trust, SFWMD, Save our Rivers, and Conservation and Recreational Lands	Critical habitat throughout the County	• Habitat protection • Recreational opportunities	Immediate, Medium, and Long Term

Environmental Land Acquisition and Restoration

The St Lucie County Environmental Lands initiative was launched in 1994 following the approval of a $20 million local bond program. Its goal is to conserve, safeguard, and rehabilitate ecosystems in their natural condition while allowing for appropriate public access. Land acquisitions are supported by partnerships with the Florida Communities Trust, SFWMD, Save Our Rivers, and Conservation and Recreational Lands.

The availability of large funding sources targeting habitat acquisition, protection, enhancement, and restoration should be integral to County and municipal resiliency and adaptation planning and

investment strategy. These programs provide significant funding needed to achieve ecosystem-scale nature-based solutions that can be used to achieve long-term conservation and adaptation goals. Examples include:

- **Florida Forever Program:** This state program provides funding for the acquisition and restoration of conservation lands, including wetlands, forests, and wildlife habitats. Since its inception in July 2001, the state has purchased more than 907,412 acres of land worth approximately $3.3 billion.
- **National Fish and Wildlife Foundation National Coastal Resiliency Fund:** Annual program (established in 2018) that invests in nature-based solutions that protect coastal communities while enhancing habitats for fish and wildlife. The 2024 program awarded $139 million nationally and leveraged another $141 million in matching funds.
- **National Oceanic and Atmospheric Administration Transformational Habitat and Coastal Resilience Grants:** The 2025 program will provide $100 million for projects that will have a transformative impact for coastal communities and tribes, including to help protect coastal communities and ecosystems from the impacts of shifting weather patterns, intensifying storms, and extreme heat and rainfall.
- **Land and Water Conservation Fund:** A federal program established in 1964 that supports the acquisition and development of public outdoor recreation areas and facilities, including habitat protection and restoration projects. The fund is primarily financed through revenues from offshore oil and gas leasing, ensuring that the public has access to outdoor spaces and recreational activities.
- **National Coastal Wetlands Conservation Grant Program:** Administered by the USFWS, this program provides funding (up to $1 million annually for coastal states) for projects that restore and enhance coastal wetlands. The program is funded by revenues collected from excise taxes on sport fishing equipment, electric motors, import duties on fishing tackle, yachts and pleasure craft, a portion of the gasoline tax attributable to motorboats and small engines, and interest on the fund, under the authority of the Dingell-Johnson Sport Fish Restoration Act of 1950.
- **Environmental Protection Agency Grants:** The EPA offers various grant programs that can support habitat restoration and protection projects, particularly those addressing water quality and ecosystem health.
- **USFWS Grants:** Various grant programs from the USFWS, such as the Coastal Program and the Partners for Fish and Wildlife Program, can provide funding for habitat restoration and conservation efforts.
- **Community Development Block Grant Program:** This federal program provides funding to local governments for community development projects, which can include habitat restoration and enhancement initiatives.
- **The Nature Conservancy and Other Nonprofit Organizations:** Various nonprofit organizations, including The Nature Conservancy, offer grants and funding opportunities for habitat protection and restoration projects.

- **Private Foundations and Philanthropic Organizations:** Many private foundations provide funding for environmental conservation and restoration projects, including habitat acquisition and enhancement efforts.

By leveraging these funding sources, SLC and the municipalities can enhance its resiliency and adaptation planning efforts, ensuring the protection and restoration of vital habitats in the face of changing conditions locally.

6.2.4.2 Cultural and Historic Resources

St Lucie County is rich in cultural and historical assets that reflect its diverse heritage and community. These cultural and historical assets play a vital role in preserving the community's heritage, fostering a sense of identity, and promoting tourism. These assets include museums, historical landmarks, cultural centers, and heritage sites (Table 6-12).

This RVA included 60 archeological sites and also analyzed 47 historic structures and two historic bridges. There are no eligible or listed historic cemeteries within SLC. Additionally, there are 16 resources listed on the National Register of Historic Places. The listings, including the Fort Pierce Old Post Office and the Sunrise Theatre, highlight the importance of these sites in the broader context of national heritage. These landmarks attract tourists and contribute to the local economy, emphasizing the need for their protection. Flooding poses a threat to many of the County's historic and cultural structures. The critical cultural and historical assets are vulnerable to various flood scenarios evaluated in the exposure analysis, including SLR, HTF, storm surge, and compound flooding. These assets are important for maintaining the cultural fabric and historical continuity of the County and municipalities. Table 6-12 highlights a range of significant cultural and historical assets.

Table 6-12. St Lucie County Historic and Cultural Assets

Asset Name	Municipality	Address (if applicable)	Year Built (if applicable)
Historic Structures			
Ft Pierce Post Office	Fort Pierce	500 Orange Ave	1935
Casa Caprona/Markent Apartments	Unincorporated SLC	2605 St. Lucie Blvd	1926
Hammond, Captain House	Unincorporated SLC	5775 S Citrus Ave	1901
St Lucie High School	Fort Pierce	1200 Delaware Ave	1914
Cresthaven	Fort Pierce	239 S Indian River Dr	1909
Shadetree Studio	Saint Lucie Village	2900 Old Dixie Hwy	1950
Fairmont Manor	Unincorporated SLC	5707 S Indian River Dr	1896
3755 Mccarty Road	Unincorporated SLC	3755 Mccarty RD	c1929
Fort Pierce Farms School	Unincorporated SLC	8850 Indrio Rd	1915
Ringdahl, Gustav House	Unincorporated SLC	1203 W 1st ST	c1898
Jorgensen, Nels C House	Unincorporated SLC	5006 Citrus Ave	1925
Covenant Tabernacle Church	Unincorporated SLC	1104 W Midway Rd	1914
White City Mercantile Building	Unincorporated SLC	1000 W Midway Rd	1900
Christensen House	Unincorporated SLC	511 W Midway Rd	1895
Miller, Capt John House	Unincorporated SLC	12387 S Indian River Dr	1885
Ankeny, R V House	Unincorporated SLC	8205 S Indian River Dr	1904
Russell House	Unincorporated SLC	8103 S Indian River Dr	1900

Asset Name	Municipality	Address (if applicable)	Year Built (if applicable)
7901 S Indian River Drive	Unincorporated SLC	7901 S Indian River Dr	1910
5703 S Indian River Drive	Unincorporated SLC	5703 S Indian River Dr	1915
Gardner House, St. Lucie Hist	Fort Pierce	414 Seaway Dr	1907
Rasmussen, Romer House	Fort Pierce	1400 E Midway Rd	1894
Riverhill	Unincorporated SLC	4625 S Indian River Dr	1903
Reed Residence	Fort Pierce	604 Beach Ct	1928
Old Fort Pierce City Hall	Fort Pierce	315 A Ave	c1925
Hurston, Zora Neal House	Fort Pierce	1734 Ave L	1957
St. Anastasia Catholic School, Old	Fort Pierce	910 Orange Ave	1914
Arcade Building	Fort Pierce	101 Us 1 Hwy N	1926
Sunrise Theater	Fort Pierce	117 S 2nd ST	c1923
Britt House	Unincorporated SLC	4511 S Indian River Dr	1908
Card, N E House	Unincorporated SLC	3915-17 S Indian River Dr	1914
Taylor, Horton House 1	Fort Pierce	607 S Indian River Dr	1901
Tyler, Frank House	Fort Pierce	519 2nd ST S	c1924
803 Indian River Dr	Fort Pierce	803 S Indian River Dr	1915
Banyon Belle Manor	Fort Pierce	1001 S Indian River Dr	1905
1009 S Indian River Dr	Fort Pierce	1009 S Indian River Dr	1925
Lesher, Stephen House	Fort Pierce	2501 S Indian River Dr	1920
Sagy's House	Unincorporated SLC	4343 N Us Highway 1 Hwy	1925
Immokolee	Unincorporated SLC	8431 Immokolee Rd	1931
Carlton-Vest House	Fort Pierce	2507 S Indian River Dr	1920
Casa Del Rio	Fort Pierce	2513 S Indian River Dr	1920
2796 North Us Hwy 1	Unincorporated SLC	2796 N Us 1 Hwy	1946
Phelps, Babe House	Fort Pierce	2521 S Indian River Dr	1935
Frere, Jules House	Fort Pierce	2404 Sunrise Blvd	1931
East Coast Packers	Fort Pierce	2103 Old Dixie Hwy	c1948
Red Barn Produce	Unincorporated SLC	2001 N Kings Hwy	1939
Garage	Unincorporated SLC	5006 Citrus Ave	c1925
National Register of Historic Structures			
Fort Pierce Site	Fort Pierce	South Indian River Dr.	-
Fort Pierce Old Post Office	Fort Pierce	500 Orange Ave.	-
St. Lucie High School	Fort Pierce	1100 Delaware Ave.	-
Cresthaven	Fort Pierce	239 S. Indian River Dr.	-
Fort Pierce City Hall, Old	Fort Pierce	315 Avenue A	-
Hurston, Zora Neale, House	Fort Pierce	1734 School Ct.	-
St. Anastasia Catholic School, Old	Fort Pierce	910 Orange Ave.	-
Arcade Building	Fort Pierce	101 US 1, N	-
Sunrise Theatre	Fort Pierce	117 S. 2nd St.	-
Frere, Jules, House	Fort Pierce	2404 Sunrise Blvd.	-
Moores Creek Bridge	Fort Pierce	N. 2nd St. between Aves. B and C	-
St. Lucie Village Historic District	St. Lucie Village, Unincorporated SLC	2505--3305 N. Indian River Dr.	-
URCA DE LIMA (shipwreck)	Unincorporated SLC	200 yds offshore Jack Island Park, N of Ft. Pierce Inlet	-
Casa Caprona	Unincorporated SLC	2605 St. Lucie Blvd.	-
Hammond, Captain, House	Unincorporated SLC	5775 Citrus Ave.	-
Immokolee	Unincorporated SLC	8431 Immokolee Rd.	-

The St. Lucie Village Historic District is a historic district is located within a residential neighborhood. The district runs along North Indian River Drive. Out of the 50 structures lining Indian River Drive, 35 are of historical interest with the contributing structures of unique architecture. On December 1, 1989, the historic district was added to the National Register of Historic Places for its architectural and historical significance. The 14 structures listed within the district are provided in Table 6-13. These structures are historic homes that are privately owned. In addition, the marker for Fort Capron is also located within the Historic District. Fort Capron was a military fortification located in St. Lucie Village which was established during the Second Seminole War in the 1830s.

Table 6-13. St. Lucie Village Historic Structures

Asset Name	Address	Year Built
Quay House	2515 N Indian River Dr	1894
St Lucie Club	2601 N Indian River Dr	1902
Peed House	2805 N Indian River Dr	1904
Padrick House	2817 N Indian River Dr	1875
Harrington House	2821 N Indian River Dr	1922
Terry House	2825 N Indian River Dr	1922
Hoskins House	2929 N Indian River Dr	1911
Glatz House	2933 N Indian River Dr	1912
Greist House	3101 N Indian River Dr	1905
Allen House	3109 N Indian River Dr	1911
Stetson House	3305 N Indian River Dr	1910
H. Chamberlin House/Bryan House	473 Chamberlin Blvd	1926
Howard House	451 Chamberlin Blvd	1926
Lounibos House	3001 N Indian River Dr	1900

6.3 Regionally Significant Assets

Regionally significant assets are crucial facilities that serve a broad geographic area, extending beyond individual communities and not typically owned or maintained by the County or municipalities. These assets cater to the needs of various communities across different geopolitical boundaries and include water resource facilities, regional medical centers, emergency operation centers, regional utilities, power plants, major transportation hubs, airports, and seaports. Recognizing and safeguarding these assets enhances regional resilience and response capabilities.

Statutorily, these assets include Commercial and Strategic Intermodal System ports, spaceports, waterways, railroad crossings, railroads, rail terminals, rail bridges, bus terminals, evacuation routes, electric power plants, electric power transmission lines, dams, and drainage systems managed by water management districts. Additionally, essential facilities such as stormwater ponds, wastewater treatment plants, public water supply tanks, public water supply facilities (excluding federal ones), emergency medical services centers, emergency operations centers, general population risk shelters, and special needs risk shelters are crucial for meeting the infrastructure and safety needs of multiple regions. Figure 6-7 and Table 6-14 showcase a range of noteworthy regionally significant assets in SLC.

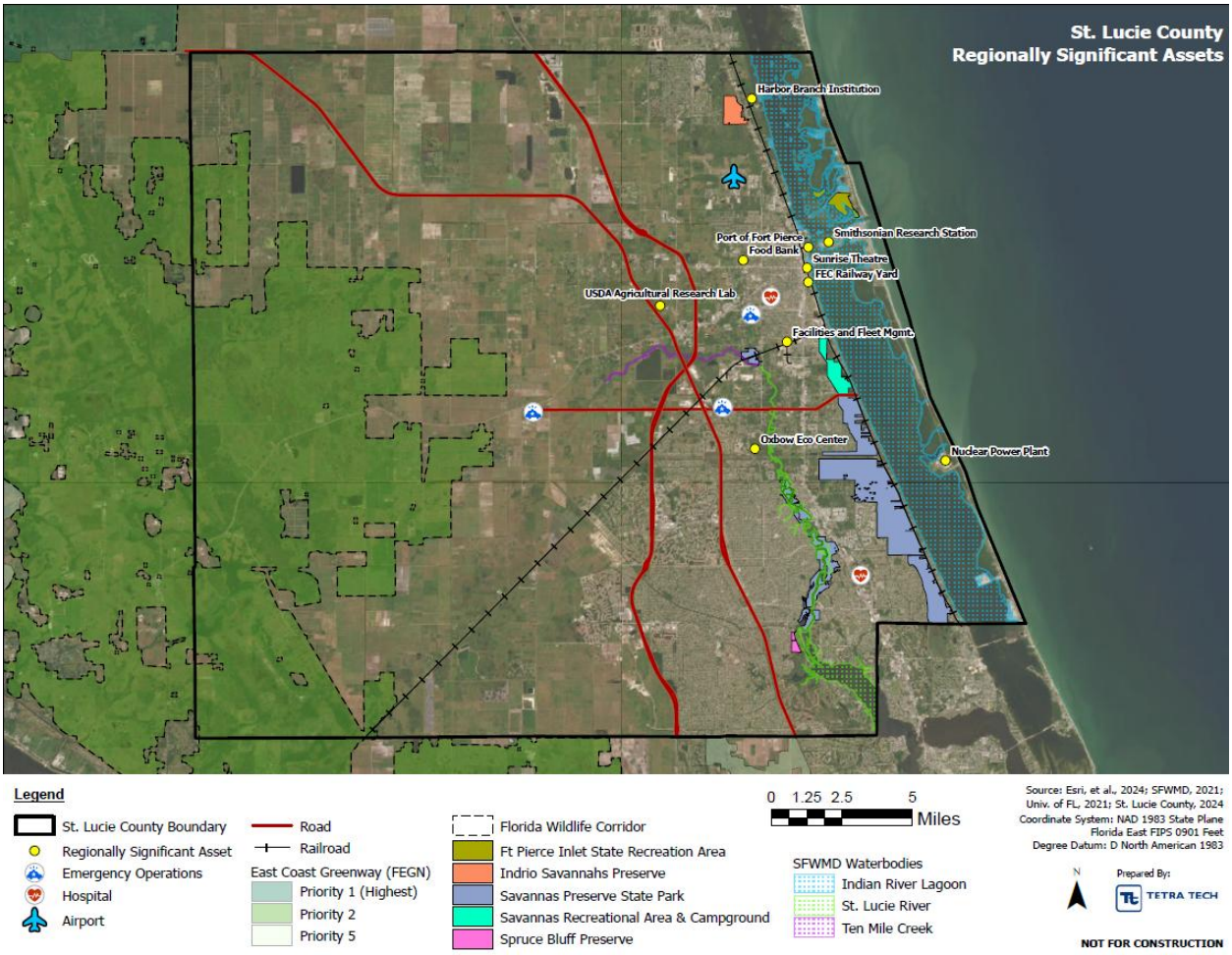


Figure 6-7. Regionally Significant Assets within St. Lucie County

Table 6-14. Regionally Significant Assets within St Lucie County

Asset Type	Asset Name	Address (if applicable)
Critical Infrastructure	St Lucie Nuclear Power Plant	6501 S Ocean Dr, Jensen Beach, FL 34957
Critical Community and Emergency Facility	St Lucie County Emergency Operations Center	15305 W Midway Rd, Fort Pierce, FL 34945
Critical Community and Emergency Facility	St Lucie County Facilities and Fleet Management	3158 Will Fee Rd, Fort Pierce, FL 34982
Critical Community and Emergency Facility	St Lucie County Sheriff's Office	4700 W Midway Rd, Fort Pierce, FL 34981
Critical Community and Emergency Facility	Emergency Broadcast Radio station at Indian River State College	3209 Virginia Ave, Fort Pierce, FL 34981
Critical Community and Emergency Facility	HCA Florida Lawnwood Hospital	1700 S 23rd St, Fort Pierce, FL 34950
Critical Community and Emergency Facility	HCA Florida St Lucie Hospital	1800 SE Tiffany Ave, Port Saint Lucie, FL 34952

Asset Type	Asset Name	Address (if applicable)
Critical Community and Emergency Facility	Treasure Coast Food Bank	401 Angle Rd, Fort Pierce, FL 34947
Critical Community and Emergency Facility	Indian River State College	3209 Virginia Ave, Fort Pierce, FL 34981
Critical Community and Emergency Facility	Harbor Branch Institution / FAU	5600 US 1 North, Fort Pierce, FL 34946
Natural Asset	USDA Agricultural Research Lab	2001 S Rock Rd, Fort Pierce, FL 34945
Natural Asset	Indian River Lagoon	-
Natural Asset	St Lucie River / 10-Mile Creek	-
Natural Asset	Florida Wildlife Corridor	-
Natural Asset	East Coast Greenway	-
Natural Asset	Savannas Preserve State Park	2541 SE Walton Rd, Port Saint Lucie, FL 34952
Natural Asset	Savannas Recreational Area	1400 E Midway Rd, Fort Pierce, FL 34982
Natural Asset	Indrio Savannas Preserve	5275 Tozour Rd, Fort Pierce, FL 34946
Natural Asset	Atlantic Ridge	-
Natural Asset	Fort Pierce Inlet State Park	905 Shorewinds Dr, Hutchinson Island, FL 34949
Natural Asset	Oxbow Eco Center	5400 NE Saint James Dr, Port Saint Lucie, FL 34983
Natural, Cultural, Historical Asset	Smithsonian Research Station	701 Seaway Dr, Fort Pierce, FL 34949
Natural, Cultural, Historical Asset	Spruce Bluff Preserve	611 SE Dar Ln, Port Saint Lucie, FL 34984
Cultural/Historical Asset	Sunrise Theatre	117 S 2nd St, Fort Pierce, FL 34950
Transportation Asset	Treasure Coast International Airport	3000 Curtis King Blvd Fort Pierce, FL 34946
Transportation Asset	Port of Fort Pierce	(near) 100 Port Avenue, Fort Pierce, FL 34950
Transportation Asset	Florida East Coast Rail Corridor	Railway Yard, 253 Florida Ave, Fort Pierce, FL 34950
Transportation Asset	I-95	-
Transportation Asset	Midway Rd	-
Transportation Asset	Fl Turnpike	-
Transportation Asset	SR 70	-
Transportation Asset	SR 68	-
Transportation Asset	A1A	-
Transportation Asset	US1	-

7.0 CONCLUSION

The overarching objectives of this RVA include the comprehensive acquisition of data and the evaluation of the timing and impact from flood-related hazards. Critical assets throughout the County and municipalities were identified and ranked for criticality and flooding inundation was mapped (**Appendix A**). Within these areas, modeling of multiple flooding scenarios was conducted, both individually and in combinations. These hazards include storm surge, tidal flooding, rainfall-induced flooding, and compound flooding. Present day and future hazard scenarios overlaid with County assets were mapped to determine risk. Characteristics were then identified to determine vulnerability levels to the flood hazards. Throughout the process, community engagement and education fostered an awareness and understanding of the relevant topics. SLC's RVA update revealed the County's and municipalities' potential susceptibility to the adverse impacts of flood-related hazards.

The assessment should be used to guide land use regulations, building codes, land development policies, and emergency response strategies, as well as potential asset adaptation projects. In the future, SLC and the municipalities may integrate these components into a broader resilience framework. The information provided by this assessment allows decision-makers to implement measures that reduce vulnerability and mitigate future harms in a staged manner. The RVA also aims to facilitate collaboration between communities surrounding the long-term goals of sustainable coastal management and environmental conservation. The project process, guided by data, best-available science and technology, community engagement, and expert input, lays the groundwork for a resilient County.

7.1 Next Steps

St. Lucie County also received grant funding from the Florida Department of Commerce Community Development Block Grant Mitigation Program, on behalf of the U.S. Department of Housing and Urban Development (HUD), to complete a RVA and Regional Resilience Plan (RRP). The CDBG RVA will align with Florida Statute Section 380.093(3) [2023] requirements for conducting vulnerability assessments but will also incorporate additional related risks in the evaluation process. The additional risks to be evaluated for the CDBG RVA include coastal erosion, drought, extreme heat, wildfires, and wind (extreme weather events).

The County and municipalities will use the results of the Resilient Florida RVA and the CDBG RVA to develop a County-wide Regional Resilience Plan. The RRP will serve as an implementation roadmap for adaptation and mitigation strategies. The RRP will provide a comprehensive framework for increasing the County and municipalities' capacity to adapt to potential impacts, prioritizing needs, and outlining strategy, land use and investment considerations based on the vulnerabilities identified in the RVAs. Specifically addressing threats highlighted in the RVAs, the RRP will set out a series of adaptation goals and actions. These initiatives will be developed with input from County and municipal leadership and staff in collaboration with community stakeholders, ensuring alignment with the needs and priorities of residents. Decision matrices will standardize future analysis and responses, facilitating efficient decision-making. The RRP will include a list of implementable projects, along with analyses of funding options and policy recommendations. These projects aim to enhance

the adaptive capacity of County and municipal assets, reducing exposure to costly disruptions and repairs while allowing the community to recover more swiftly from flood-related events. Together, the RVAs and RRP ensure a cohesive approach to long-term resilience planning.

The County also received grant funding from the Florida Department of Commerce Community Development Block Grant Mitigation Program, on behalf of the U.S. Department of Housing and Urban Development (HUD), to complete a RVA and Regional Resilience Plan (RRP). The HUD-funded RVA aligns with the Resilient Florida Grant Program's Section 380.093(3), F.S. requirements for conducting vulnerability assessments, but also incorporates additional related risks in the evaluation process. The additional risks to be evaluated beyond flood risk for HUD included coastal erosion, drought, extreme heat, wildfires, and wind (extreme weather events). The Resilient Florida RVA has built upon, and is complementary to, SLC's Florida Department of Commerce Community Development Block Grant Mitigation Program-funded RVA.

Together, both RVAs and the RRP will provide a roadmap for SLC and the municipalities to enhance its resilience through informed decision-making and community involvement. By addressing current and future challenges, these initiatives safeguard the County's regional quality of life, health, and assets against the impacts of unpredictable weather patterns and extreme weather events. Both RVAs will serve as the foundation for the RRP. The RRP will evaluate the County's needs and capacity to adapt and outline adaptation strategies and policy updates. It will provide County operations and County-wide community resilience targets, a strategy to achieve these targets, and a public engagement program that ensures social equity in evaluating, prioritizing, and implementing solutions. Each strategy will include key information such as estimated timelines, level of cost and effort required, and proposed lead agency or organization. The RRP will examine current and future conditions that impact the sustainability and resilience of SLC and the municipalities. Hazard mitigation efforts, emergency preparedness, land use planning, code and policy development, infrastructure investment, and public health policies and programs will be considered. Together, the work products will form the blueprint of the County's proactive planning to reduce or mitigate hazards countywide.

8.0 REFERENCES

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APPENDIX A: EXPOSURE ANALYSIS MAP SERIES

Please note: provided under separate cover.

APPENDIX B: PRIORITIZED PRIMARY CRITICAL ASSET MAP SERIES

APPENDIX C: REGIONAL VULNERABILITY ASSESSMENT WORKSHOP RESULTS (APRIL/MAY 2025)

APPENDIX D: REGIONAL VULNERABILITY ASSESSMENT PUBLIC WORKSHOP QUESTION RESULTS