

M E M O R A N D U M

To: Howard Tipton, Town Manager
From: Charles Mopps, Assistant Public Works Director
Report date: March 22, 2023
Meeting date: April 3, 2023
Subject: Sea Level Rise & Resiliency Comprehensive Adaptation Plan

Recommended Action

Accept the Sea Level Rise & Resiliency Comprehensive Adaptation Plan

Background

The Town initially engaged APTIM Environmental and Infrastructure (APTIM) in 2018 to provide a practical, high-level overview of impacts from sea level rise and recurrent flooding, and then to develop recommendations for adaptation. The APTIM team developed a four-step approach to accomplish this effort:

1. Initial Assessment
2. Define Impacts
3. Adaptation Strategies
4. Implementation Plan.

The Initial Assessment to establish a practical baseline and projection period was completed in the Fall of 2018. Subsequently, the Town authorized APTIM to work on the Phase 2 data collection and analysis. That effort was completed in 2021 and an update provided to the Town Commission at their November 15, 2021, Regular Workshop Meeting.

The Town previously authorized APTIM to complete Phase 3 and Phase 4. APTIM has provided the results of their Phase 3 efforts at the Town Commission's June 20, 2022 Regular Workshop Meeting. Phase 3 included re-baselining to the State-required scenario years of 2040 and 2070, and also using the National Oceanic and Atmospheric Administration (NOAA) Intermediate Low and Intermediate High predicted curves.

The Phase 4 Comprehensive Adaptation Plan was presented to the Town Commission at the March 20, 2023 Regular Workshop Meeting which included:

- A depiction of the baseline projections.

- A collection of best practices, administrative actions and projects intended to prepare the Town of Longboat Key for changes in asset management and operational needs likely to manifest as sea level rises. The plan consists of six overarching objectives and twenty-five actions to be implemented in the next 5, 10, and 20 years. No major immediate actions need to be taken. The schedule is flexible. Some of the actions are new, while some overlap with existing programs and projects. The objectives include the following strategies:
 - Mitigate tidal flooding
 - Prepare for active stormwater management
 - Protect public assets and natural areas
 - Leverage redevelopment to implement adaptation
 - Engage community to build resilience
 - Continue to integrate resilience into the capital program.
- Capital Plan Recommendations. Although the Town has worked to protect critical assets to date, changes in future conditions will require effort for some stormwater, recreation, and community assets to remain operational. Estimates of the project costs by time horizon are provided. With this plan, the Town is now eligible for State funding for resilience projects and prepared with a list of priorities to address.

Next Steps

Use the Comprehensive Adaptation Plan to pursue grant funding opportunities, plan Capital Improvement Program projects with available project and matching grant funding, and adopt modifications to Town Code over time as needed.

Staff Recommendation

Accept the Sea Level Rise & Resiliency Comprehensive Adaptation Plan

Attachments

Sea Level Rise and Recurring Flooding Resilience Plan



TOWN OF LONGBOAT KEY **SEA LEVEL RISE AND RECURRING FLOODING RESILIENCE PLAN**

PREPARED FOR

Town of Longboat Key
600 General Harris Street
Longboat Key, FL 33428



JANUARY 2023

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Sea Level Rise and Recurring Flooding Resilience Plan Capital Improvements

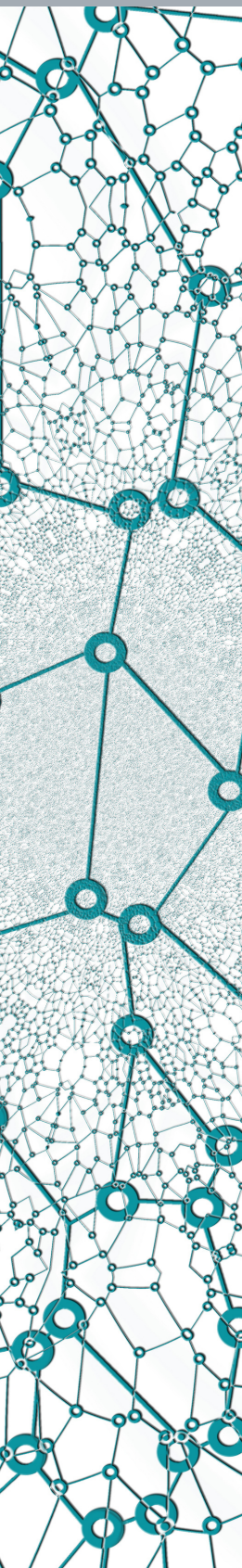
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EXECUTIVE SUMMARY

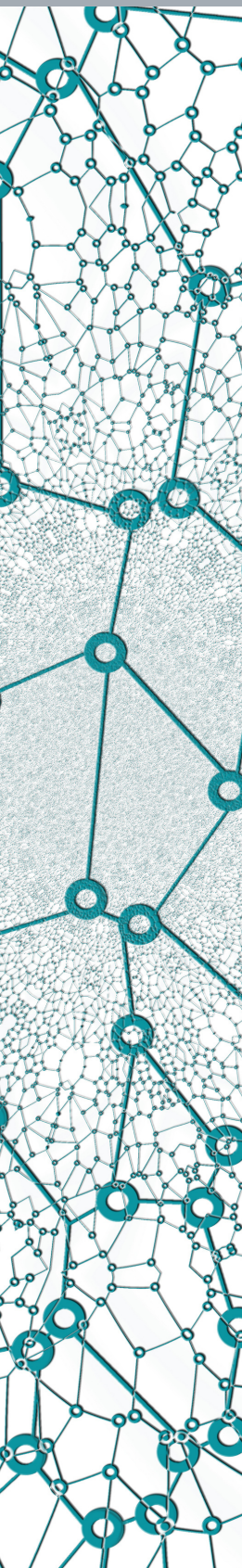


Through consistent investment in public assets and infrastructure, the Town of Longboat Key has taken a deliberate approach to strengthening the resilience of its community for decades. Specific Town efforts include improvements to critical infrastructure such as the Fire Station, Police Station, and Public Works Complex. Longboat Key has also enacted a Flood Control Ordinance (Chapter 154 of the Town Code, effective March 17th, 2014), participates in National Flood Insurance Program (NFIP)'s Community Rating System (CRS), and established building codes and local ordinances that enforce the BFE (Base Flood Elevation) +1' standard since 2006. Additionally, the Town has a Hurricane Plan that sets guidelines to mitigate against, prepare for, respond to, and recover from, the effects of a tropical storm event impacting the Town of Longboat Key.

Acknowledging the likelihood of continued sea level rise, more intense storms and increased risks from flooding, an **island-wide resilience plan and risk-based capital plan with priority projects for the next 5, 10 and 20 years** has been developed to support staff implementation of climate adaptation and flood mitigation.

The **Town of Longboat Key Sea Level Rise and Recurring Flooding Resilience Plan** consists of **25 strategic actions** for addressing the operational, infrastructure and environmental impacts of sea level rise and flooding. The Sea Level Rise and Recurring Flooding Resilience Plan is intended to be implemented by Town staff, community partners and residents collaboratively. The actions are focused on management of shorelines, stormwater and public assets, preparing for redevelopment, supporting community engagement and planning for future capital investments. The Sea Level Rise and Recurring Flooding Resilience Plan begins with a **snapshot of the relevant findings from the Town of Longboat Key Sea Level Rise and Recurring Storms Vulnerability Assessment (2018, 2022)** to support explanation of the critical nature of the actions. Then, a description of **each action is presented with lists of key focus areas and relevant stakeholders** to support implementation.

EXECUTIVE SUMMARY



The planning horizons incorporated in the Sea Level Rise and Recurring Flooding Resilience Plan include current conditions, 2040, and 2070. To prevent the implications of 2040 and 2070 predictions, actions should be taken well before years 2040 and 2070. For this reason, implementation timeframes are outlined and recommended to accommodate future flooding and mitigate future impacts before they occur. Recommended implementation timelines to accommodate these planning horizons are as follows: current conditions [near term (0-5 years)], 2040 [mid-term (5-10 years)], and 2070 [long term (<20 years)]. The adaptation actions outlined within the planning horizons should be prioritized to accommodate disturbance and impactful flooding, as nuisance flooding may be an acceptable level for the community to consider in order to address more pressing impactful flooding priorities. To date, regional projections for sea level rise have been updated on a 5-year interval, thus, increasing the certainty of the near-term changes in water level elevations. The availability of this information allows for adaptive planning and policy that responds to changes in conditions.

The Town of Longboat Key Commission and staff may implement actions and projects sooner or later than suggested if the urgency of the specific risk changes. To further support implementation, the Sea Level Rise and Recurring Flooding Resilience Plan closes with a **schedule of resilience projects, preliminary costs and potential funding sources and a reminder of the return on investment anticipated for proactive investment in the community.** To implement the initial 5-year phase of the Sea Level Rise and Recurring Flooding Resilience Plan inclusive of the stormwater capital improvements for Sleepy Lagoon and Buttonwood, an estimated \$1.8M would be necessary annually. Projects in the plan may be eligible for federal and state grant funding to offset costs.

INTRODUCTION

Risk Associated with Sea Level Rise and Recurring Flooding

Sea levels and the climate are changing, resulting in noticeable impacts on Longboat Key. Nearly annual tidal flooding events have highlighted the vulnerability of low-lying shorelines and the impairment of the gravity-driven stormwater system that exists when sea levels are high. Additionally, an increased intensity and frequency of flood events can result in having saturated soil throughout the year, which decreases the soil infiltration capacity. The potential impacts associated with flooding vary from nuisance level, wet sidewalks or roads, to disruptive, delay of emergency response services blocked by flooded roads and finally to impactful, sewer outages due to damaged electrical equipment. Sea level rise exacerbates the impacts of storm surge and high tides by physically increasing the water depths of floods. As nuisance floods become more frequent or impactful floods cause more damage, risk to the affected areas and assets increases. Risk levels in the future depend upon the decisions and investments communities make to reduce risk and increase their resilience. In context, resilience is providing the opportunity for the community to recover quickly after large storms and adapt to sea level rise iteratively with minimal impacts.

Purpose and Intent of Resilience Plan

The Sea Level Rise Resilience Plan is a collection of policy amendments, administrative actions and projects intended to prepare the Town of Longboat Key for changes in asset management and operational needs likely to manifest as sea level rises. The actions are to be implemented by Town administration; however, the information throughout the Plan is valuable to community stakeholders that will need to adapt their own investments as sea level rises. The plan includes actions to implement over the next 5, 10 and 20 years. If the rate of sea level rise slows or accelerates, the timeframes for implementation can be adjusted based on risk tolerance.


INTRODUCTION (CONT.)

How was the Resilience Plan developed?

The actions in the plan were developed to address the vulnerabilities identified in the four phases of assessment of sea level rise and tidal flooding completed for the Town. As part of the initial assessment, residents shared interest in maintaining emergency response times and understanding the potential for flooding of homes, disruption of public utilities, likelihood of temporary displacement after flood events and the overall effects of storms and sea level rise on properties. In the second phase of the assessment, asset elevations were surveyed to create an inventory and identify potentially vulnerable seawalls, critical infrastructure and community interest properties. Next, sea level rise and storm surge flood scenarios were mapped on top of the asset inventory. A list of challenges by neighborhood was developed along with a list of adaptation strategies intended to address the noted challenges. Additionally, a risk value was assigned to each asset and property based on the anticipated frequency of flooding and estimated consequence of simulated flood depth. The assets that were determined to be at risk were sorted by urgency (potential to occur this year), risk value, criticality of the asset to the surrounding area and the number of residents potentially impacted if the asset was not operational. Collectively, the information compiled from the four phases of assessment was used to develop the actions included in the Resilience Plan. Additionally, the prioritized list of vulnerabilities was used to schedule the actions included in the Resilience Plan. The projects included in the proposed capital plan were derived from the risk assessment and relevant concurrent work ongoing by the Town and its consultants to analyze stormwater systems in Sleepy Lagoon and Buttonwood,

When should the Resilience Plan be updated?

The Resilience Plan is intended to be re-evaluated with changes in sea level rise projections anticipated to be updated every 5 years via grant funding. The plan priorities should also be revisited after major storm impacts.

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**SEA LEVEL RISE AND
RECURRING FLOODING
VULNERABILITY
ASSESSMENT REVIEW**

ASSESSMENT REVIEW

The Town of Longboat Key Sea Level Rise and Recurring Storms Vulnerability Assessment helped to paint a picture of local vulnerabilities by location and severity and inform recommendations for adaptation strategies, both short and long term.

The vulnerability and risk assessment incorporated tidal flooding, storm surge, and sea level rise scenarios under current conditions and for the years 2040 and 2070 (see page 4). Grant funding was awarded by the state of Florida for the assessment. The assessment methodology applied was consistent with state guidance. Completion of the assessment is a state requirement for future implementation or construction funding for resilience projects.

The assessment consisted of four phases of effort focused on:

- Collecting elevation data of critical infrastructure,
- Conducting a vulnerability and risk assessment of the community assets and critical infrastructure under fact-based hazard scenarios,
- Developing adaptation strategies to address the priority vulnerabilities,
- Planning implementation

Data collected in the initial phase assisted staff in immediately addressing critical vulnerabilities.

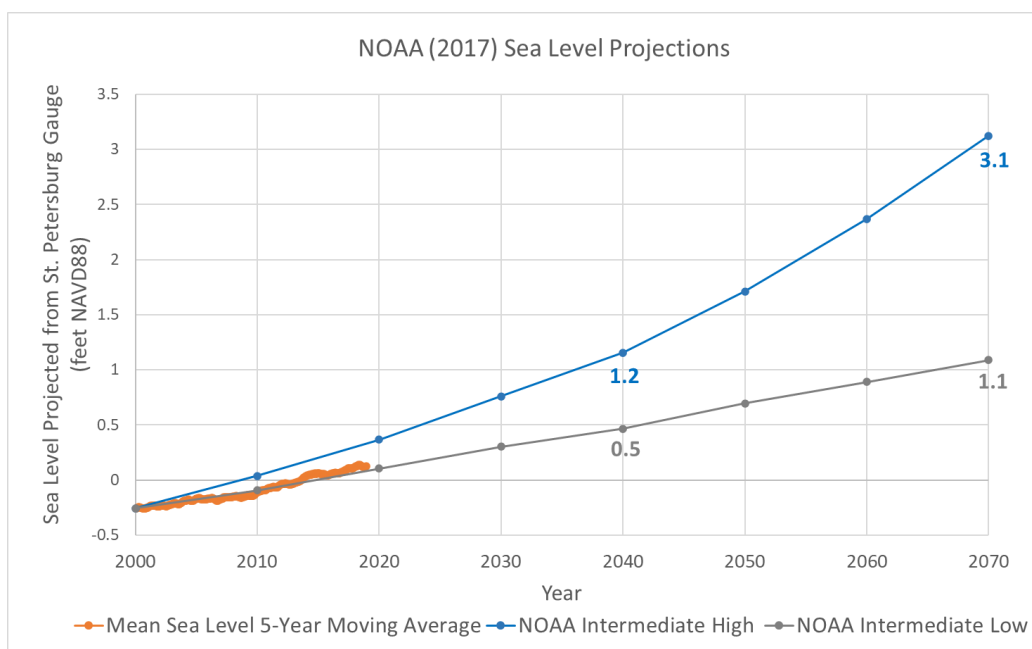
In the risk assessment, flood exposure extent and depth for 10 scenarios were spatially overlaid with critical asset geospatial data for the Town of Longboat Key. Critical asset risks were then determined based on the likelihood of occurrence of flooding and the potential flood depths.

The assessment highlighted the potential for sea level rise adaptation to partially mitigate storm surge impacts that could occur in any year along with the following findings:

- At least 78 individual Town-owned assets (consisting mostly of stormwater inlets and outfalls), low elevation dunes, and at least one mile of road may be at risk to flooding by 2040,
- Seven neighborhoods and ten roads have some risk under current conditions,
- Vulnerable bayfront shorelines in the Village, Sleepy Lagoon and along 4400 to 5300 Gulf of Mexico Drive will likely contribute to future flood risk if not adapted,
- Most of the privately owned properties at risk have structures that were built before the base flood elevation or flood insurance standards were set,
- While operational challenges for the Town may increase, addressing the majority of the vulnerabilities would be the responsibility of private owners.

SEA LEVEL RISE SCENARIOS FUEL FUTURE FLOODING

In the coming years and decades, sea level is forecasted to continue to rise, and likely at higher rates than have been experienced from the 1940s to the 2010s. Tide gauge data from the St. Petersburg NOAA tide gauge was utilized to explore the associated impacts of sea level rise scenarios and to better inform future flood adaptation for Longboat Key. Data from this tide gauge represents the closest long-term record of an interior tide gauge and thus represents sea level changes experienced on the back bay side of Longboat Key (Sarasota Bay). Development of the NOAA scenarios starts with estimates of the probability of global mean sea level change and underlying contributing processes, conditional upon greenhouse-gas emissions pathways. To address the different conditions, NOAA utilizes the US Army Corps of Engineers (USACE) form of mean sea level rise projections which are anchored to a specific date, and yield estimates for specific time horizons. The figure below represents the projected relative sea level change under various scenarios including NOAA Intermediate-High and Intermediate-Low, as well as the 5-year moving average of mean sea level measured in St. Petersburg between 2000 and 2018.



Sea level rise scenarios for planning horizons 2040 and 2070 based on the NOAA Intermediate Low and Intermediate High projections were utilized to inform near and long-term adaptation strategies within this report. These projections are consistent with the most recent state requirements for resiliency grant funding eligibility. Note the datums of mean sea level and feet NAVD88 in this chart may differ from tidal or elevation datums referenced elsewhere. Based on the Intermediate Low projections, 13% of Longboat Key will be inundated by 2040, and 41% by 2070.

FLOOD SCENARIOS BY TIPPING POINT

This figure represents the spatial distribution of flood depths under four critical scenarios which include NOAA 2070 Intermediate High sea level rise projection, 10 Year Surge 2040, 25 Year Surge 2040, and a 100 Year Storm. Flooding depths vary across scenarios and timeframes ranging from a depth of <1 foot (nuisance flooding), and a depth of 1-2.5 feet (disturbance), to a depth greater than 2.5 feet (impact), with greater depths corresponding to increasing impacts.

Note that the vulnerability to storm surge is much greater than sea level rise. Primary flood path is from the bayfront not the oceanfront. The future compound flooding resulting from storm surge and sea level rise is impactful and expansive not just disruptive to a few areas.

NOAA 2070
Intermediate
High

10 Year
Return Interval
Storm Surge 2040

25 Year
Return Interval
Storm Surge 2040

100 Year
Return
Interval
Storm
Surge and
Rainfall

Water Depth (ft)



CRITICAL ASSET VULNERABILITY

Under existing conditions, 20% of private seawalls may be vulnerable to highest high tides. Significant seawall and infrastructure inundation occurs in the Village, Sleepy Lagoon and along 4400 to 5300 Gulf of Mexico Drive.

Portions of the evacuation route (Gulf of Mexico Drive) are at an elevation of 2-4 feet, leaving them more susceptible to flooding and hindering accessibility.

Town buildings are at or above the 100 year base flood elevation and are not at risk.

Approximately 14 miles of roads island wide (12.4 miles public and 1.6 miles private) are anticipated to flood during high tides in 2040. Vulnerability of single access road to Hideaway may become critical to address by 2040.

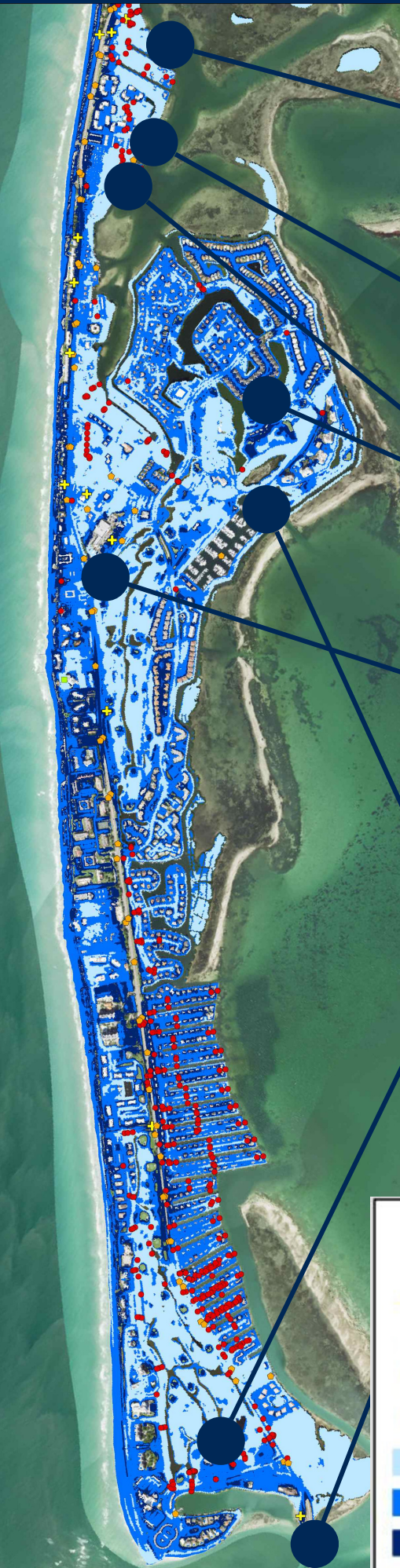
By 2040, 2% of properties are expected to experience flooding due to sea level rise (95% with a flood depth <1 ft).

By 2070, this percentage increases to 30% (70% with a flood depth <1 ft).

Legend

- + Critical Community and Emergency Facilities
- Critical Infrastructure
- Natural, Cultural, and Historical Resource
- Transportation and Evacuation Routes
- NOAA 2070 Intermediate High
- 10 Year Surge 2040
- 25 Year Surge 2040





Key town assets vulnerable to sea level rise flooding by 2040 include:

- one lift station (flood depth 1-2.5 ft)
- 48 stormwater inlets (47 with flood depth <1 ft, one with depth 1-2.5 ft)
- 21 stormwater outfalls (11 with flood depth <1ft, 10 with flood depth 1-2.5ft).

Concentrations of pre-FIRM buildings are located within 2039-2525 Gulf of Mexico Drive and Twin Shores Gulfshore

More than 30% of private building footprints are lower than the predicted high tide in 2040.

36% of green space (parks, wetlands, nature preserves, and open space) and 13% of stormwater inlets and outlets will be vulnerable to sea level rise by 2040.

Nuisance flooding of select roads may be caused by backflow of water into existing stormwater pipes without valves during high tides and surge.

A commercial gas station, two financial institutions, and two marinas are at risk of flooding and service disruption during extreme storms.

Portions of the evacuation routes off island are vulnerable to sea level rise and recurring flooding.

Legend

- + Critical Community and Emergency Facilities
- Critical Infrastructure
- Natural, Cultural, and Historical Resource
- ★ Transportation and Evacuation Routes
- NOAA 2070 Intermediate High
- 10 Year Surge 2040
- 25 Year Surge 2040



**SEA LEVEL RISE AND
RECURRING FLOODING
RESILIENCE PLAN**

SEA LEVEL RISE AND RECURRING FLOODING RESILIENCE PLAN ORIENTATION

The Sea Level Rise and Recurring Flooding Resilience Plan is intended to be simple and clear in order to aid implementation. The plan centers on two overarching strategies: **1) Maintain operations and quality of Town owned assets, 2) Communicate future risks to stakeholders to support resilience planning and investment in adaptation through policy and outreach.** The **25 actions** in the plan are organized by **6 objectives** (listed below). A page of context is provided for each objective and action. The timeframe of when implementation of the actions is suggested is noted at the top of each action page. The actions are intended to be implemented by the Town administration with support from stakeholders as noted at the bottom of each page. The priority areas for implementation of each action are listed and were determined from the results of the **Sea Level Rise and Recurring Flooding Vulnerability Assessment**. It is important to note that while segments of the Gulf of Mexico drive (GMD) are listed as priority areas, GMD is also known as SR 789 by the state and the Town will largely lean on FDOT to accomplish strategies around GMD. Lastly, actions may be scheduled depending upon risk tolerance. For example, the Town may desire to address impactful flooding as a priority over nuisance flooding predictions and organize the capital program and grant requests accordingly. A list of critical elevations is provided below to assist in understanding potential risks.

Objectives

- 1** Mitigate Tidal Flooding
- 2** Prepare for Active Stormwater Management
- 3** Protect Public Assets and Natural Areas
- 4** Leverage Redevelopment to Implement Adaptation
- 5** Engage Community to Build Resilience
- 6** Integrate Resilience in the Capital Program

Elevations

Water Levels and Infrastructure (feet NAVD)



- >9** Base Flood Elevation +1
- >8** Post- 1983 Building Floor
- 6.5** 10 Year Surge 2040
- 5.4** 10 Year Surge Today
- 3.5** Tidal Flooding 2040
- 2.5** Pre-1983 Building Floor
- 2.2** Highest High Today
- >1.5** Local Roads and Seawalls
- 1.4** 2040 High Tide

ACTIONS BY IMPLEMENTATION TIMEFRAME

Near Term (0-5 Years)	
Action 1	Install and Maintain Tide Valves
Action 2	Amend seawall Regulation to address Tidal Flooding
Action 6	Monitor Infiltration and Continue Active Utility System Preservation Programs
Action 7	Amend Stormwater Management Strategy
Action 15	Evaluate Opportunities to Integrate Green Infrastructure
Action 16	Adopt Policy Map Showing Sea Level Rise Projections
Action 17	Continue to Support Resilience Standards In Policies
Action 18	Consider Adaptation Needs in Evaluation of Redevelopment Impacts
Action 20	Maintain or Improve Community Rating System Grade
Action 21	Conduct Community Outreach
Action 22	Continue Intergovernmental and Stakeholder Coordination
Action 23	Encourage Floodproofing of Electrical Charging Stations and Battery Storage Equipment as Applicable
Action 24	Prioritizing Resilience Projects After Storm as Applicable
Action 25	Schedule Proposed Projects Based on Urgency, Funding Availability and Potential for Bundling

Mid Term (5-10 Years)	
Action 8	Floodproof Vulnerable Electrical Equipment at Lift Stations
Action 9	Increase Resilience of Dune Systems as Part of Regular Beach Management Plan Updates
Action 10	Coordinate to Maintain Evacuation Routes
Action 11	Maintain Condition of and Access on Roads in Areas Experiencing Tidal Flooding and Seepage
Action 12	Maintain Beach Access Points
Action 13	Increase Water Quality Monitoring Near Septic Systems at Jewfish Key
Action 14	Plan for Mangrove Adaptation
Action 19	Encourage Private Adaptation
Long Term (<20 Years)	
Action 3	Elevate Bayfront Roads and Install Pump Stations
Action 4	Evaluate Performance of Dry Retention Areas, Wet Detention Areas and French Drains
Action 5	Plan for Future Stormwater Management Operations

How do Implementation Timelines Relate to Planning Horizons?

Near term represents planning horizon for **urgent priorities** and existing risks that should be addressed in next 5 years.

Mid term implementation timeline affords time to address future risks anticipated by the **planning horizon of 2040**. Policies initiated in near term are assumed to be fully implemented.

Long term planning horizon affords time to address future risks anticipated by the **planning horizon of 2070**. Critical infrastructure installed today will need to be replaced at end of 50 year life cycle.

Objective 1: Mitigate Tidal Flooding

Actions #1-2

Issue:

- In 2022, Longboat Key was predicted to experience 5 days of tidal flooding. Flooding occurs when seas rise over low-lying shorelines and seawalls. Currently, floodwaters partially affect about 4.4 miles of road, impeding drainage temporarily at nearly all stormwater outlets and expose underground infrastructure to saltwater. The majority of these impacts are caused by nuisance flooding and are concentrated along the northern bayfront roads.
- By 2040, Longboat Key is predicted to experience up to 78 days of tidal flooding, annually. As many as 177 structures may experience a combination of nuisance and impactful flooding if not elevated or without shoreline protection.
- By 2070, land areas below 2.3 feet NAVD in elevation may become permanently inundated or wet. Some areas further inland will experience daily tidal flooding.

Strategy:

- Keep the impactful floodwaters out of common areas.
- Provide public with standard for resilient shorelines that can be implemented over time in advance of 2040 projected water levels.
- The Town continues to prioritize focus on impactful flooding over time, with a secondary focus on nuisance flooding or level-of-service exception areas.



High tide flooding at the intersection of Broadway St and Bayside Drive

ACTION 1: INSTALL AND MAINTAIN TIDE VALVES

TIMEFRAME

Near Term (0-5 Years)

DESCRIPTION

The installation of tidal valves is necessary for the prevention and management of inland inundation caused by tidal flooding. The implementation of tide valves on drainage pipe outlets that discharge to the bay will prevent the backflow of seawater into the discharge pipe during times of high tide while still allowing stormwater out during rainfall events during low tide. The Town of Longboat Key maintains 41 pipe outfalls averaging 100 feet in length from seawalls. The installation of tide valves would benefit public areas as well as private residences, depending on the location of the outlets.

The Town has already installed tide valves in select locations. To ensure proper operations, these valves should be inspected during flood conditions to assess performance and plan maintenance as necessary. This technology is known for requiring iterative refinement in installation and maintenance for optimal performance.

It is important to note that the Town uses due care when installing tidal valves, as some areas are so low, the pressure differential does not make them function as well as desired. This results in them holding too much rainwater for too long which results in 'flood' issues anyway. The Town has applied them as areas dictate a need and ability to function.

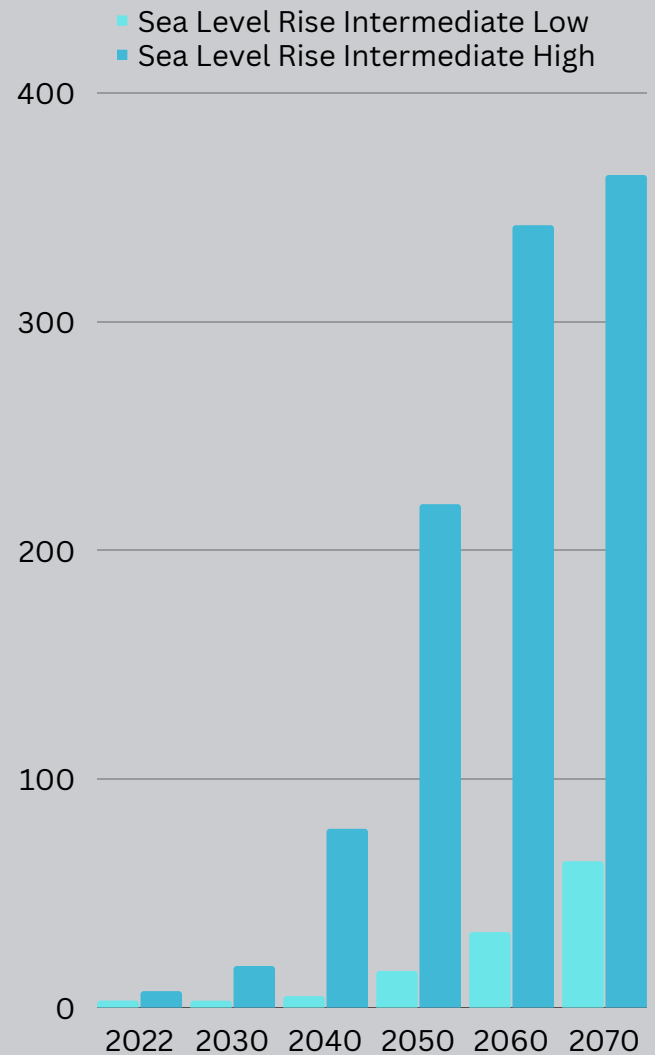
PRIORITY AREAS

- | | |
|--|-----------------|
| 1.Sleepy Lagoon | 5.Buttonwood |
| 2.The Village | 6.Hideaway |
| 3.Emerald Harbor | 7.4400-5300 GMD |
| 4.Spanish Main (Private Outlets,
Not for Town to Implement) | |

STAKEHOLDERS

- Town- Implementation
- Residents- Receive Benefits
- Private Owners- Educate and Encourage Private Installation
- Home Owners Associations- Coordination if connected to Town outlet

Number of Tidal Flooding Days



Backflow may occur during tidal flooding events which are increasing in frequency with sea level rise

ACTION 2: AMEND SEAWALL REGULATION TO ADDRESS TIDAL FLOODING

TIMEFRAME

Near Term (0-5 Years) and Long Term (<20 Years)

DESCRIPTION

In the near term, this action includes the implementation of regulation that would help prevent overtopping of seawalls during higher-than-normal tides and small storm events. If seawalls are lower than high tide levels, "flood trespassing" into public drainage systems and onto roads may occur. The proposed amendment to regulation includes establishing a new minimum seawall elevation greater than 3.5 feet NAVD and amending the existing maximum seawall elevation to 6 feet NAVD.

Additional policy, Town Code amendments and best practice recommendations include:

- Adding the following item on the permit review checklist: Verify that on-site drainage will still function with new barrier in place. To avoid flooding, sites with buildings or backyards lower than top of new barrier should plan for accommodation of rainfall runoff in a drainage system,
- Altering distance from wetland dictated in Code of Ordinances, Title 15 to support living shorelines. Evaluate need to support landward migration of wetlands with sea level rise or installation of tidal flood barriers as protection for living shorelines. Amend to increase difference in elevation between top of cap and ground to allow incremental adaptation.
- The prevention of "flood trespassing" by enforcing public nuisance policy and avoidance,
- Requiring gaps between adjacent seawalls to be closed at time of replacement as permitting and redevelopment occur.
- In the long term, encouraging impermeable shoreline berms, higher seawalls or other flood protection will be necessary

PRIORITY AREAS

Islandwide

STAKEHOLDERS

- Town- Regulation Implementation
- Residents- Construction Implementation
- Sarasota County and Manatee County for consistent permitting review as needed



Bayfront
Seawalls

Seawalls

Objective 2: Prepare for Active Stormwater Management in Low Lying Neighborhoods

Actions #3-7

Issue:

- Until overtopping of shorelines is prevented by achieving Objective 1, tidal flooding will add water to the drainage system above its design capacity and floodwaters will stand in the community longer than intended. Standing water may create mosquito habitat, water quality concerns and impede normal operations of roads and drainage systems. The depth of standing water will further increase when rain occurs if there is no room to store the stormwater or the outlets are not discharging at high tide.
- After Objective 1 is achieved and shorelines provide front line tidal flood protection, seawater will still move through the porous ground and up to the surface, known as seepage. Seepage can lead to corrosion of metal infrastructure, soil erosion, asphalt degradation and flooding.

Strategy

- Prepare to move floodwaters out mechanically in 2-3 neighborhoods by 2040
- Upgrade infrastructure lacking capacity for increased water volumes
- Continue monitoring neighborhoods and update projections



Standing water in a low-lying neighborhood due to drainage systems surpassing storage capacity

ACTION 3: ELEVATE BAYFRONT ROADS AND INSTALL PUMP STATIONS

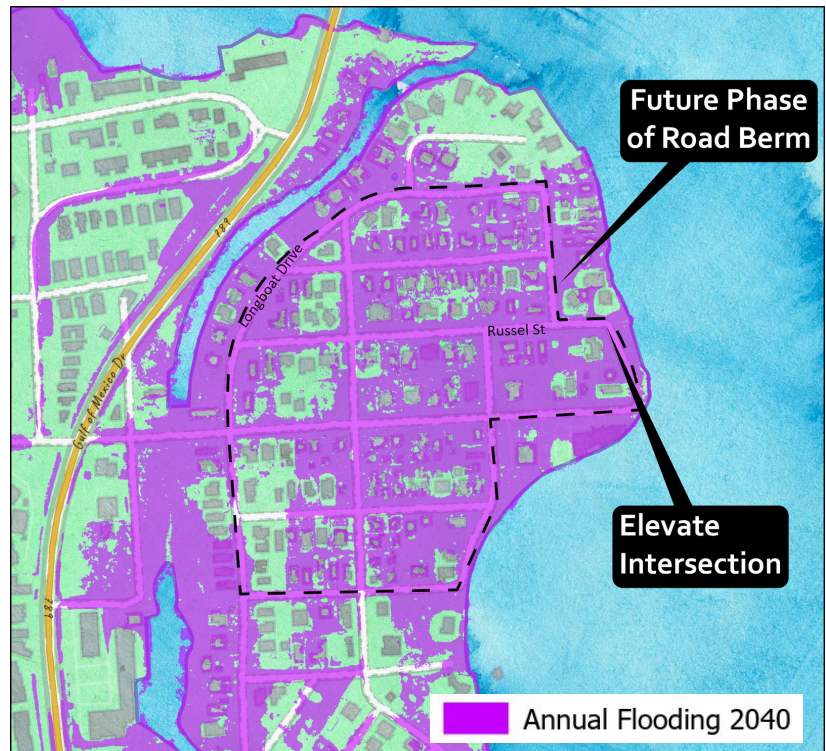
TIMEFRAME

Long Term (<20 Years)

DESCRIPTION

In the Village, more than a mile of road is at an elevation vulnerable to flooding today and 3 miles will be vulnerable by 2040. Tidal flooding and/ or seepage will inundate roads and low-lying properties in this area. Increasing the elevation of all of the roads in the neighborhood may not be feasible or practical. Elevating the near bayfront roads to form a road berm around the neighborhood and then actively pumping ponded water out through discharge outlets as needed may reduce the cost of adaptation and provide the property owners more time to adapt individually by controlling flooding in the area.

This adaptation strategy may be implemented in phases as vulnerabilities in certain areas become urgent. For example, the eastern intersection of Longboat Drive and Russel St is likely to be impassable during high tides in 2040. This section of road may be elevated or pumped to maintain the local access route. When near term projections indicate impactful flooding along other road sections, the installation of the neighborhood-scale road berm may be implemented, connecting to the initial phase of the project.



Proposed locations for road elevation and road berm installation to mitigate tidal flooding

PRIORITY AREAS

Elevate intersection of Longboat Dr/ Russel St to mitigate impassable street at 2040 high tide

STAKEHOLDERS

- Town- Implementation
- Florida Department of Environmental Protection- modification of National Pollutant Discharge Elimination (NPDES) permit
- Sarasota County and Manatee County for NPDES reports

ACTION 4: EVALUATE PERFORMANCE OF DRY RETENTION AREAS, WET DETENTION SYSTEMS AND FRENCH DRAINS

TIMEFRAME

Long Term (<20 Years)

DESCRIPTION

Town maintains 10 dry retention areas, 4 wet detention systems and 216 linear feet of French drains. Sea level rise, groundwater table rise (seepage) and tidal flooding may add water to stormwater systems designed for rainfall only and affect performance. Dry retention areas are designed to capture runoff and release it into ground (via percolation), retaining water only during storm events. If dry retention basins are located in vulnerable areas, the basins may hold water continuously and not have capacity for current rainfall runoff or the anticipated increase in future rainfall. Similarly, wet retention systems and french drain systems may have reduced storage capacity. If flooding is observed near these systems, a re-evaluation of the design and current conditions may indicate adaptation may be necessary. Adaptation options may include an increase in size of the feature, lining of the containment area with an impermeable barrier or the addition of a pump to discharge water. At present, discharge of water underground through site-scale injection wells is not permissible, however The City of Key West is integrating injection wells into their resilience plan. If successful, coordination with the Southwest Florida Water Management District may prove useful to increase the adaptation options for Longboat Key.



Wet detention systems located at Longboat Key Club and Harbourside Gold Course

POTENTIAL FOCUS AREAS

Islandwide

STAKEHOLDERS

- Florida Department of Environmental Protection if modifying National Pollutant Discharge Elimination (NPDES) permit
- Sarasota County and Manatee County for NPDES annual reporting
- Florida Department of Environmental Protection if connects to state road drainage and permit modification required

ACTION 5:

PLAN FOR FUTURE STORMWATER MANAGEMENT OPERATIONS

TIMEFRAME

Long Term (<20 Years)

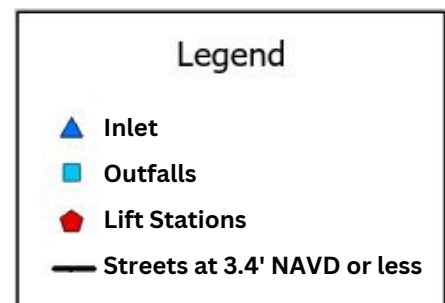
DESCRIPTION

As environmental conditions change, the Town may need to transition from passive (gravity driven) stormwater management to active (mechanically driven) stormwater management in the Village, Sleepy Lagoon, and similar elevation neighborhoods. This is primarily a Village strategy, as previously identified in several Village drainage studies in 2016 and 2018. Tides and sea level rise cause the groundwater table to rise up and reduce the soil space available to absorb rainfall. Drainage is further reduced when tides are higher than discharge outlets. These conditions may result in flooding in low lying areas without water being moved and pumped faster than its collection rate. **Note stormwater pumps will not be effective without preventing flood trespassing over shorelines and elevating some roads.** Active management has higher capital, maintenance and energy costs than passive management. An option to consider for implementation may include a stormwater management assessment fee and designated staff for operations and maintenance.

The Town of Longboat Key maintains 247 stormwater inlets and 1,700 conveyance swales or ditches. Approximately, 13% of the stormwater infrastructure will be vulnerable to reduced effectiveness by 2040.

PRIORITY AREAS

- Collection points at
 - Poinsetta/ Longboat Dr N,
 - Longboat Dr E/ Fox St,
 - Bayside Dr,
 - Lois/ Broadway/ Bayside,
 - Bayside/ Linley and
- Add pump stations at discharge outlets.



STAKEHOLDERS

- Florida Department of Environmental Protection if modifying National Pollutant Discharge Elimination (NPDES) permit
- Sarasota County and Manatee County for NPDES annual reporting
- Florida Department of Environmental Protection if connects to state road drainage
- State of Florida and Southwest Florida Water Management District for funding

ACTION 6: MONITOR INFILTRATION AND CONTINUE ACTIVE UTILITY SYSTEM PRESERVATION PROGRAMS

TIMEFRAME

Near Term (0-5 Years)

DESCRIPTION

Infiltration into wastewater pipes may occur when groundwater seeps into cracks, joints or damaged manholes. In Fort Lauderdale, sea level rise has already contributed to the wastewater treatment system's capacity being exceeded resulting in sewage releases into the environment. The active maintenance and replacement of compromised conveyance systems is necessary to ensure proper function.

Additionally, when repetitive or permanent saltwater inundation occurs in vulnerable areas, reinforcing steel in concrete, metals in utility equipment and structures are subject to corrosion which would contribute to advanced deterioration of assets.

Implications and indicators of infiltration and saltwater inundation are recommended to be included in sewer system evaluation studies (SSES) and inspections. Pipe inspections or real time monitoring may provide additional information for management. This is already in progress with the Town's utility system preservation capital programs.

PRIORITY AREAS

Islandwide

STAKEHOLDERS

Town- Implementation

Florida Department of Transportation- if maintenance of utilities necessary in right of way.



Cracks adjacent to manholes may contribute to infiltration of saltwater into utility conveyance systems in areas of regular tidal flooding.



Example of road deterioration in area vulnerable to seepage during high tides (Hollywood, Florida).

ACTION 7: AMEND STORMWATER MANAGEMENT STRATEGY

TIMEFRAME

Near Term (0-5 Years)

DESCRIPTION

Existing policies in the comprehensive plan and code of ordinances support strategic management of stormwater islandwide. The existing stormwater management strategy includes controlling flooding and providing environmental benefits, evaluating deficiencies and prescribing standards to maintain desired level of service. Level of service is the benchmark for evaluating a system or the goals for performance of the stormwater assets. For example, the level of service for the Town storm drainage system is to have the capacity to efficiently drain rainfall runoff from a storm that lasts 24 hours and is of such magnitude that it only occurs every 25 years. As sea level rises, storm drainage systems will have additional floodwaters to convey. Additionally, natural drainage through soil infiltration will be reduced. If storm drainage systems are at or over capacity for the existing level of service, the systems in areas vulnerable to flooding in the future will not drain floodwaters as desired.

The following additional best practices are recommended to be continued to prepare for and manage future conditions:

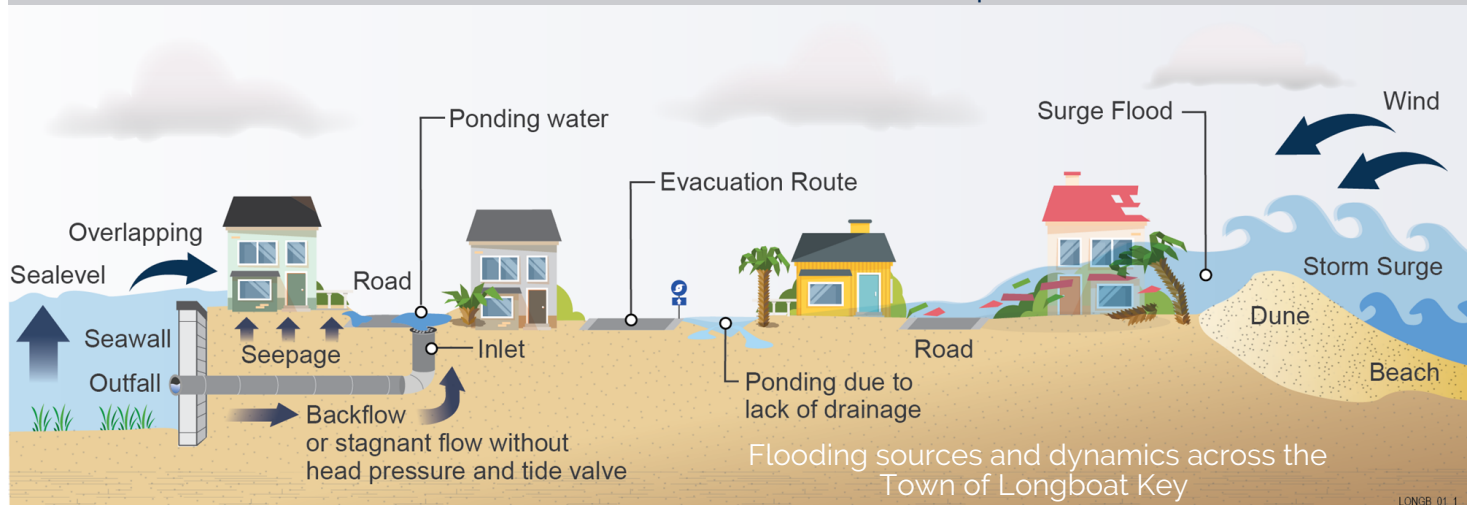
- To satisfy the existing level of service criteria under rising sea levels, it is recommended to retrofit outfalls with tidal valves and support investment in assets in need of adaptation.
- Acknowledge in areas where tidal flooding is passively managed, the level of service may need to be temporarily relaxed.
- Reflect current and projected tailwater conditions in all future stormwater design work.
- Add reference to 2040 & 2070 Intermediate High SLR inundation maps to support adaptation planning for drainage.
- Critical elevation data (eg: rim and invert elevations) should be captured for all stormwater assets each time the asset is accessed/surveyed and maintained in GIS to support future operations.

PRIORITY AREAS

Islandwide

STAKEHOLDERS

Town- Implementation





Bayfront Park

Objective 3: Protect Public Assets and Natural Areas

Actions #8-14

Issue:

- Flooding can damage wiring and electrical systems of utility infrastructure if water levels exceed the elevation of the components.
- Storm surge will travel through the lowest elevation areas of the shoreline, landward, resulting in flooding and erosion of the back beach area. When surge is focused in narrow channels between dunes, higher current speeds can increase severity of impacts to the dunes and structures.
- Seagrass and mangrove natural areas may migrate or deteriorate as water levels, temperature conditions, sediment supply and water quality changes over time. Both provide wave, flood and erosion protection to Longboat Key.

Strategy:

- Monitor condition of Town assets
- Implement maintenance projects as needed to maintain resilient systems
- Monitor changes in aquatic and mangrove areas responding to climate effects
- Plan to adapt over time

ACTION 8: FLOODPROOF VULNERABLE ELECTRICAL EQUIPMENT AT LIFT STATIONS

TIMEFRAME

Mid Term (5-10 years)

DESCRIPTION

The lift station panel elevation data collected during Phase 2 of the assessment revealed that the majority of lift station electrical panels are below the 100 year return interval storm Base Flood Elevation (BFE) leaving them vulnerable to electrical shorts during severe flood events. If the electrical equipment at lift stations in the Town of Longboat Key is flooded, this could lead to station failure, which would result in the collection of wastewater in the lift station wet well and backup into the collection system. This could result in sewer backups into homes or cause wastewater to overflow from the lift station to the adjacent areas, affecting residents, business owners, and visitors alike.

For these reasons, it is necessary to floodproof the identified vulnerable electrical equipment at lift stations by raising the electrical panels to above anticipated flood levels.

This action may be applied incrementally in order to preserve maintainability and concurrently preserve island aesthetics. The Town currently has weather tight cabinets with rubber-gasket sealed doors and wire access points.

PRIORITY AREAS

Buttonwood and the Village

STAKEHOLDERS

Town of Longboat Key



ACTION 9: INCREASE RESILIENCE OF DUNE SYSTEM AS PART OF REGULAR BEACH MANAGEMENT PLAN UPDATES

TIMEFRAME

Mid Term (5-10 Years)

DESCRIPTION

The assessment of dune elevations helped to identify elevations for all dune systems within the Town of Longboat Key. More specifically, the assessment involved collecting and interpreting dune elevation data to create east west slices of the dune at 10-foot spacings. The maximum elevations of each dune slice (the crest) were identified and used to pinpoint the dunes with the lowest elevation. Many dunes with low crest elevations proved to provide a flow path to interior development, which can lead to increased inland inundation. Some also were comprised of bare sand areas or were adjacent to beach access pathways at lower elevation, which leaves the inland areas exposed to rising tides. For these reasons, it is important to increase elevations of low points in dunes to better fortify the shoreline's defense against flooding and protect inland infrastructure. Other ways to increase the resilience of dune systems in low areas include increasing berm crest widths or increasing placement fill densities (cubic yards per linear foot alongshore). For efficiency, dune restorations can be included incrementally as part of the next beach renourishment.

PRIORITY AREAS

Longbeach Village, private residences near 6851 and 6661 GMD, and Gulfside Road public access

STAKEHOLDERS

Florida Department of Environmental Protection for permitting and potential funding.



Locations of low elevation dunes

ACTION 10: COORDINATE TO MAINTAIN EVACUATION ROUTES

TIMEFRAME

Mid Term (5-10 Years)

POTENTIAL FOCUS AREAS

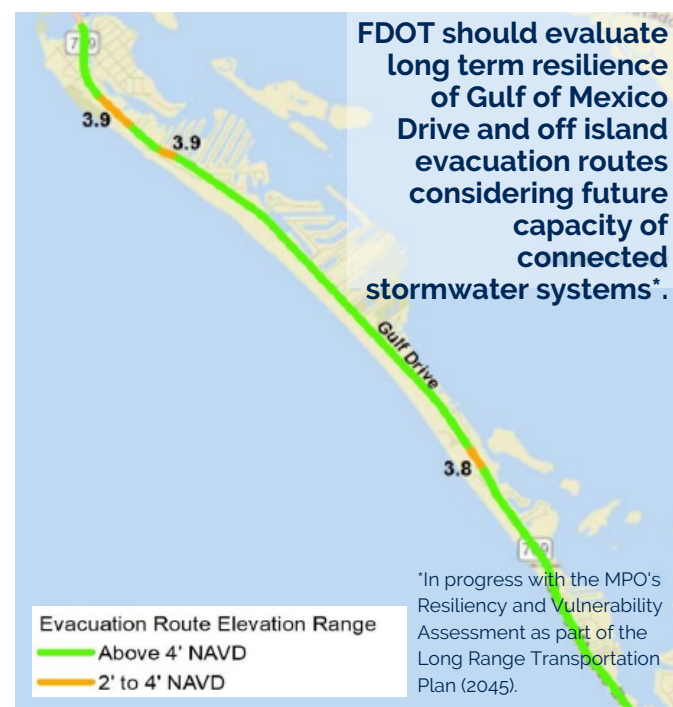
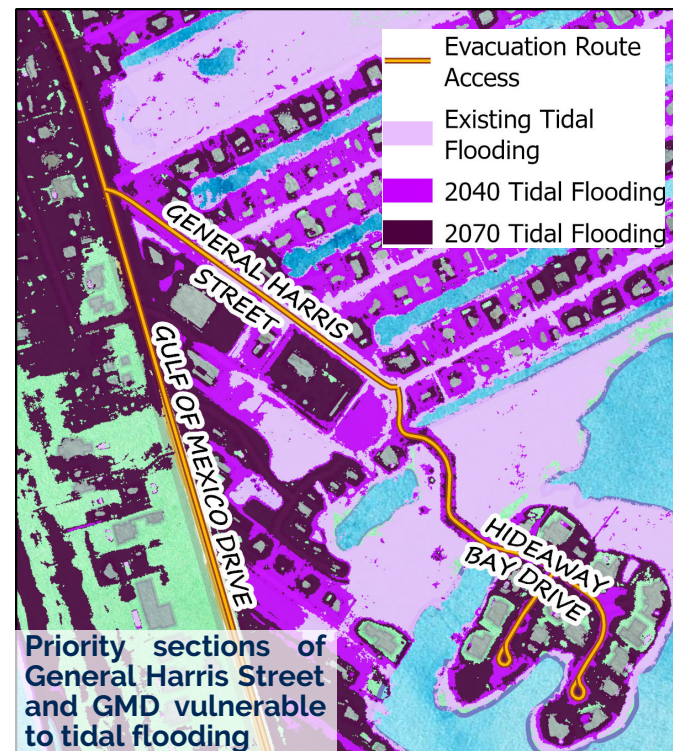
The Gulf of Mexico Drive (GMD) serves as the Town of Longboat Key's sole evacuation route. Any disturbance to or interruption of GMD's connectivity, accessibility, and operation could result in the inability of residents to evacuate during and after a storm or flood event. An evaluation of the road's elevation revealed that portions of the road are below 4 feet NAVD. At this elevation, GMD would be vulnerable to storm surge today and compound flooding of rainfall and tidal flooding by 2040. The Florida Department of Transportation is evaluating the resilience of corridors and planning for resilience projects as part of the long range transportation plan. Advocating for inclusion of GMD as part of the resilience studies may prove beneficial. Similarly, vulnerable road sections exist along the evacuation route off island. As part of maintenance, road elevations in these areas may be increased incrementally or as part of a larger repair project. The Sarasota Manatee Metropolitan Planning Organization (MPO) is also completing a vulnerability assessment of regional roadways. The MPO and regional stakeholders will be working with FDOT District 1 on GMD (SR 789) priorities.

PRIORITY AREAS

- 4715, 6400, 6700-6800 GMD
- General Harris (connecting Hideaway)

STAKEHOLDERS

Town of Longboat Key (Implementation)
Florida Department of Transportation
(Implementation for GMD)



ACTION 11:

MAINTAIN CONDITION OF AND ACCESS ON ROADS IN AREAS EXPERIENCING TIDAL FLOODING AND SEEPAGE

TIMEFRAME

Mid Term (5-10 Years)

DESCRIPTION

Ten percent of roads (4.4 miles) across the Town of Longboat Key may be temporarily flooded during the highest tides of the year, and this percentage is projected to increase exponentially by 2040. One mile of the 4.4 miles of roads impacted today consists of local neighborhood roads located within the Village and is projected to experience nuisance flooding. Significant road inundation can limit or prohibit accessibility, travel, and mobility within the Town. Maintaining the condition and operation of roads in areas experiencing tidal flooding and seepage is vital to the overall connectivity of the island's road system and to the accessibility of places and resources. This can become especially important during times of evacuation. While most roads in Longboat Key do not require sea level rise adaptation in the mid term, planning in the mid term to elevate critical access roads in the long term is necessary.

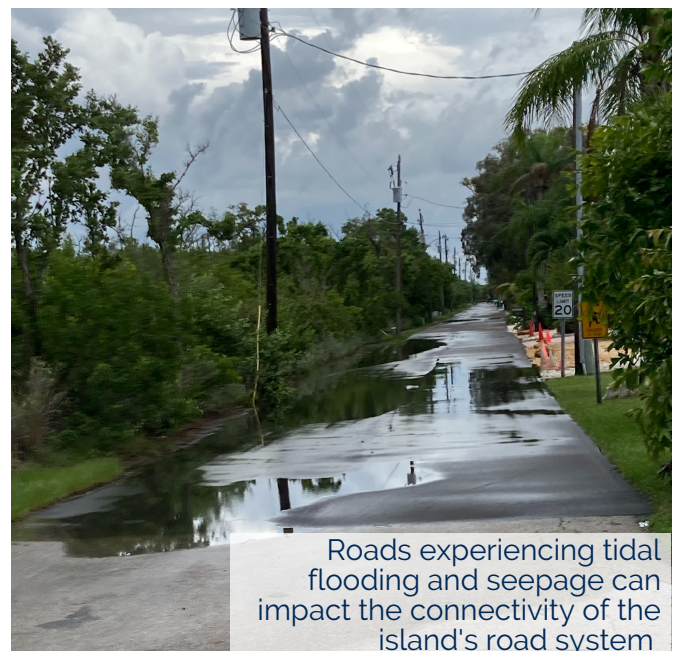
Road pavement and roadbed materials weaken and deteriorate when subjected to frequent flooding. Road maintenance costs have increased in locations across the region where tidal flooding occurs. Monitoring recurrent repairs and areas of deterioration are suggested to inform the timing for a road adaptation or elevation project.

PRIORITY AREAS

- Planning for road maintenance suggested near the intersection of Longboat Dr/ Russell St
- Planning to elevate Longboat Dr/ Bayside Dr/ Broadway and Longboat Dr S/ Jackson Way to mitigate recurrent road damage from tidal flooding in 2040

STAKEHOLDERS

Town of Longboat Key (Implementation)



Roads experiencing tidal flooding and seepage can impact the connectivity of the island's road system

ACTION 12: MAINTAIN BEACH ACCESS POINTS

TIMEFRAME

Mid Term (5-10 Years)

DESCRIPTION

Beach access points connect inland development to the beach and shoreline, often serving as pathways that intersect dune systems. These points provide a public service and increase accessibility to the Town's natural resources and are important to maintain and fortify. As stated previously, these access points can unintentionally serve as flow paths for surge and rising tides, providing a pathway from the Bay to inland infrastructure. In order to prevent this and to reduce the risk of surge propagation, it is important to evaluate the condition of the beach access points and address elevation needs.

Maintaining parking adjacent to the beach access points is critical to maintaining eligibility for grant funds from the state's Beach Management Funding Assistance Program. In long term, parking spaces may need to be elevated when projected to be at risk to permanent inundation without adaptation.

PRIORITY AREAS

Oceanfront shoreline

Parking spaces along General Harris St

STAKEHOLDERS

Town of Longboat Key



Examples of key beach access points throughout Longboat Key that require maintenance and evaluation to address elevation needs

ACTION 13:

INCREASE WATER QUALITY MONITORING NEAR SEPTIC SYSTEMS AT JEWFISH KEY

TIMEFRAME

Mid Term (5-10 Years)

DESCRIPTION

When floodwaters cover the ground above outdoor, underground, septic systems, the oversaturation of the soil around the septic tank can cause the tank to flood. This results in wastewater leaking out into the adjacent property or waters.

To avoid water quality issues with inundation, more stringent and consistent monitoring of the septic system network within Jewfish Key is recommended and surrounding waters. It is also recommended that the Town of Longboat Key encourages private adaptation from septic to individual on-site treatment options to prevent related water quality issues in the future. Examples of on-site treatment technology can be found online

<https://floridadep.gov/Water/Onsite-Sewage>

PRIORITY AREAS

Jewfish Key

STAKEHOLDERS

- Town of Longboat Key
- Sarasota County for NPDES monitoring



As many as 8 homes on Jewfish Key have individual septic systems to process wastewater. Once submerged, septic systems will release bacteria and nutrients into adjacent waters.

ACTION 14: PLAN FOR MANGROVE ADAPTATION

TIMEFRAME

Mid Term (5-10 Years)

DESCRIPTION

Mangrove protection and restoration along the Town of Longboat Key is recommended as a green adaptation strategy that contributes many benefits. Adaptable living shorelines of natural vegetation such as mangroves can reduce erosion, dampen waves and surge elevations, protect habitat and ecosystem services.

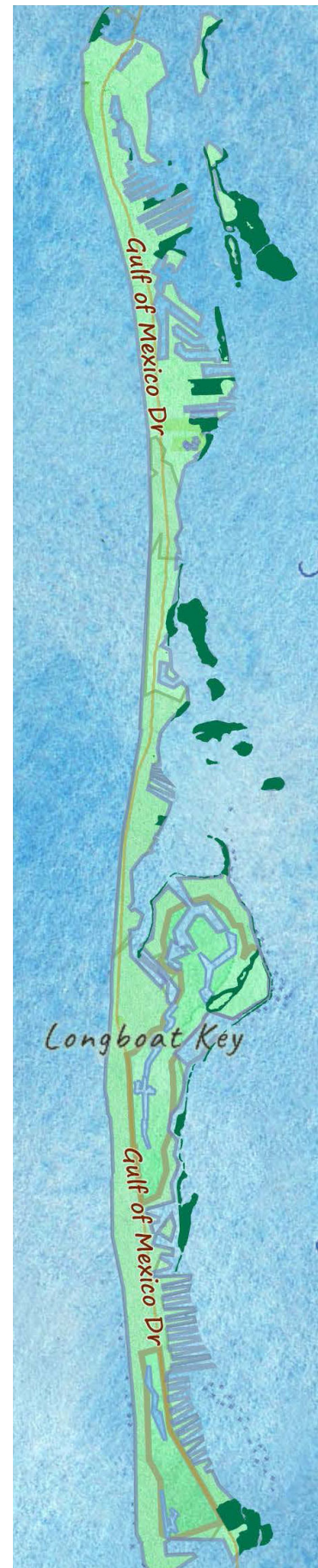
Mangroves will not adapt naturally without space to migrate upland or sediment supply. To retain mangrove areas, a plan for adaptation would be necessary. The plan should include which mangroves areas should be prioritized and when adaptation should occur. Testing mangrove adaptation strategies and developing long term monitoring criteria may be initiated through a pilot project in the mid term. A pilot project has been included in the capital improvements section of this plan.

PRIORITY AREAS

Mitigation areas with maintenance requirements. Mangrove areas include partial acreage of the following Town-owned parks: Quickpointe Preserve, Durante Park, Lyons Lane, and Greer Island Park.

STAKEHOLDERS

Florida Department of Environmental Protection for permitting and maintenance to implement plan



Mangrove locations throughout Longboat Key

ACTION 15: EVALUATE OPPORTUNITIES TO INTEGRATE GREEN INFRASTRUCTURE

TIMEFRAME

Near Term (0-5 Years)

DESCRIPTION

Green infrastructure elements should be considered and incorporated into adaptation strategies to mitigate climate impacts of flooding, heat and ecosystem degradation. The suggested action is for Town administration to add the inclusion of green infrastructure as criteria for project development. Specifically, identifying opportunities to reduce impermeable areas and to plant vegetation with high absorption capacity and salt tolerance. Financing opportunities for environmental restoration should be considered at project conceptualization.

PRIORITY AREAS

Town swales and right of ways

STAKEHOLDERS

Town of Longboat Key



Examples of existing green infrastructure within the Town of Longboat Key, including mangroves and permeable vegetated areas to mitigate flooding

Objective 4: Leverage Redevelopment to Implement Adaptation Strategies

Actions #16-18

Issue:

- The Town of Longboat Key has properties that were developed in different time periods since 1914. The majority of properties at risk of tidal flooding were developed 40 to 60 years ago. Roads were typically built at the time of initial development and well below the elevation of the buildings. Swales and drainage systems were built below roads and relied on gravity to move stormwater.
- A minimum elevation for buildings was established locally in 1983. While buildings may have been elevated after that year, roads likely were not.
- Sea levels are up to 1 foot higher today than they were in the 1960s and are projected to be over 3 feet higher by 2070.
- More than 20% of properties and 20-65% of various sectors of infrastructure on Longboat Key may need adaptation to mitigate future flooding due to sea level rise by 2040.
- Adapting single properties could result in islands of resilience without sustained access or services.
- If costs of adapting infrastructure are not considered as part of redevelopment, the burden may not be equitably distributed.

Strategy:

- Provide information to support resilient redevelopment
- Reference resilience standards in policy
- Encourage enhancement of projects with resilient features



ACTION 16:

ADOPT POLICY MAP SHOWING SEA LEVEL RISE PROJECTIONS

DESCRIPTION

For public informational purposes, a map of land areas that may experience tidal flooding or permanent inundation as a result of future sea level rise should be added to the comprehensive plan. The map should be cross-referenced in relevant sections of land use, stormwater, redevelopment and capital improvement policy. An example map is presented on the following page. Inclusion and application of this map would be consistent with other maps incorporated into the comprehensive plan already. The map would delineate locations of sea level rise affected areas in 2040 and 2070 based on the NOAA Intermediate High sea level rise projection. Measured trends in water levels are currently tracking this projection. The map may be updated every 5 years as projections change. Use of the map will encourage the integration of adaptation measures in projects and redevelopment.

TIMEFRAME

Near Term (0-5 Years)

PRIORITY AREAS

Islandwide

STAKEHOLDERS

Town (Implementation)
Residents and property owners (Hazard awareness and adaptation planning)

ACTION 17:

CONTINUE TO SUPPORT RESILIENCE STANDARDS IN POLICIES

DESCRIPTION

While adaptation focuses heavily on physical resilience strategies and actions, the support and implementation of resilience policies is critical to guiding private adaptation. The examples below have already been implemented and should be continued.

- Continue to require review of permit applications for proximity to at-risk areas and require flood risk mitigation measures to be included in application.
- Continue to require new drainage permits for redevelopment
- Continue to update comprehensive plan for consistency with Peril of Flood legislation.

TIMEFRAME

Near Term (0-5 Years)

PRIORITY AREAS

Islandwide

STAKEHOLDERS

Town of Longboat Key



Jewfish Key

The Villages

Gulfside

Sleepy Lagoon

Hideaway

Dream Island

Emerald Point

Spanish Main

Gulf of Mexico Drive

Longboat Key Harbor

Twin Shores Gulfshore

Gulf of Mexico Drive

Twin Shores Gulfshore

Bay Isles

Buttonwood

Country Club Shores

NOAA 2040 Intermediate High
 NOAA 2070 Intermediate High

ACTION 18:

CONSIDER ADAPTATION NEEDS IN EVALUATION OF REDEVELOPMENT IMPACTS

PRIORITY AREAS

Islandwide

STAKEHOLDERS

Town of Longboat Key

TIMEFRAME

Near Term (0-5 Years)

DESCRIPTION

When evaluating impacts of proposed redevelopment, it is important to consider adaptation needs. Redevelopment can have impacts on a variety of systems and networks, including water and sewer systems and stormwater maintenance costs. To ensure that impacts to these systems and that consideration is being made regarding future inundation projections, the following actions are recommended:

- Include a map of land areas that may experience tidal flooding or permanent inundation as a result of future sea level rise in technical sea wall height criteria (Action 16).
- Develop method to determine future costs of continued adaptation.
 - Through monitoring of changing flood conditions, water levels, infrastructure disruption frequency and maintenance costs (roads, conveyance systems and exposed electrical equipment), Town staff may be able to determine if redevelopment projects with increased population or usage are resulting in increased operational costs as environmental conditions change.
 - Future costs may also be forecasted based on sea level rise projections as in the Capital Improvements section at the end of this plan (page 45).
 - Development impact fees for redeveloped properties may raise revenue for the adaptation or replacement of capital facilities that benefit the development through flood mitigation in the community.
 - Redeveloped properties built at elevations above base flood elevations may drive interest in raising roads to mitigate flooding and disruption in traffic. Determining a method to assess development impact fees could support projects of interest to the community in a more efficient and sufficient way than other tax revenues.
- Identify channels for sharing costs during redevelopment. Opportunities for funding adaptation projects may include:
 - Impact fees, stormwater assessment or special assessment taxes
 - Public private partnerships
 - Municipal/ green infrastructure/ collaborative revenue bonds with developer participation
 - Tax increment financing, sets aside property tax revenue increases for specific use
 - Incentives to developers for storing more water onsite than required

Objective 5: Engage Community to Build Resilience

Actions #19-23

Issue:

- Hurricanes and heat waves resonate with people but tracking long term changes in climate and environmental conditions can be challenging. Without easy to apply information and guidance, property owners may avoid adaptation rather than investing in protection ahead of impacts.
- Insurance discounts through the Community Rating System are based on success of planning to avoid flood damage to property.
- Construction periods, harmonization of future road elevations with adjacent homes and driveways and addressing flooding across properties can be challenging without community support.
- Adaptation requires the owner's action and consent. As owners, the Town, the state and the private property owners will decide how much to invest and when in order to maintain their assets. Without coordination, repeat disruption or incompatible projects could occur without coordination.

Strategy:

- Educate the community stakeholders on future conditions.
- Incentivize adaptation through coordination and information distribution.



2019 Longboat Key Democratic Club Luncheon

ACTION 19: ENCOURAGE PRIVATE ADAPTATION

TIMEFRAME

Mid Term (5-10 Years)

DESCRIPTION

Much of the vulnerable infrastructure on Longboat Key is privately owned and would require private adaptation. Through policy and providing easy to implement planning guidance, Town staff could support private adaptation. Policies such as the tidal flood barrier requirement (Action 2) and providing a minimum elevation for barriers will encourage adaptation. Private adaptation of shorelines and seawalls is necessary to limit flood trespassing into common areas, to reduce the burden on the Town's drainage system, and to protect Town investments in adaptation.

Town staff may identify additional methods of incentivizing adaptation such as prioritizing stormwater system improvements in areas where policy compliance is uniform.

PRIORITY AREAS

Private shoreline adaptation

STAKEHOLDERS

- Town of Longboat Key
- Private owners



Seawalls at 6633 Gulf of Mexico Drive and 6541 Gulfside Road.

ACTION 20: MAINTAIN OR IMPROVE COMMUNITY RATING SYSTEM GRADE

DESCRIPTION

The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program (NFIP).

Communities that participate in the CRS can receive discounted flood insurance premium rates comparable to the level of reduced flood risk they achieve through efforts that address the goals of the program.

It is recommended that Town Administration strive to increase its CRS Class rating by implementing additional mitigation planning and floodplain management activities to earn more points.

TIMEFRAME

Near Term (0-5 Years)

PRIORITY AREAS

Islandwide

STAKEHOLDERS

- Town of Longboat Key
- Private owners
- Manatee County
- Sarasota County

ACTION 21: CONDUCT COMMUNITY OUTREACH

DESCRIPTION

Community input and feedback is a valuable and necessary piece when considering new projects and strategies. Outreach can include community workshops, presentations, and focus groups. Specifically, it is recommended to conduct community outreach to gain support for road harmonization, utility hardening, policy development, to purchase right of ways for road adaptation, and for easements for water storage. Action should focus on engagement and education efforts explaining future changes, risk and adaptation strategies. Current outreach is in progress with the Village, Sleepy Lagoon, Buttonwood and other areas.

TIMEFRAME

Near Term (0-5 Years)

PRIORITY AREAS

Islandwide

STAKEHOLDERS

- Town of Longboat Key
- Private owners

ACTION 22: CONTINUE INTERGOVERNMENTAL AND STAKEHOLDER COORDINATION

DESCRIPTION

Prepare for intergovernmental and stakeholder coordination to support adaptation of evacuation routes, natural areas and green infrastructure and water storage. Gulf of Mexico Drive has two low points along Longboat Key. While near term sea level rise is not a priority concern, storm surge, seepage and compound flooding drainage may contribute to potential flooding in these areas under future conditions. The Florida Department of Transportation is conducting resilience studies through the local MPO to evaluate potentially vulnerable corridors. Requesting evaluation of this corridor would be beneficial as a foundation for future coordinated adaptation. Similarly, the Florida Department of Environmental Protection is developing the resilience plan for the state with priority project needs. Adaptation of submerged lands, seagrass areas and mangrove areas may be an opportunity for intergovernmental adaptation projects.

TIMEFRAME

Near Term (0-5 Years)

PRIORITY AREAS

Islandwide

STAKEHOLDERS

- Town of Longboat Key
- Manatee County
- Sarasota County
- Florida Department of Transportation
- Southwest Florida Water Management District

ACTION 23: ENCOURAGE FLOODPROOFING OF ELECTRICAL CHARGING STATIONS AND BATTERY STORAGE EQUIPMENT AS APPLICABLE

DESCRIPTION

Electrification of motor vehicles has led to the installation of electrical charging equipment at residences, businesses, and government facilities. As demand for renewable energy increases, battery storage equipment is also increasingly being installed. These electrical systems will require floodproofing to avoid damage in vulnerable areas. In near term, floodproofing the four lift stations with equipment below the 10 year storm surge elevation of 5.4 feet NAVD is suggested. In the long term, an additional 14 lift stations may need floodproofing to provide resistance to 10 year storm surge flooding.

TIMEFRAME

Near Term (0-5 Years)

PRIORITY AREAS

Flood vulnerable areas

STAKEHOLDERS

- Town of Longboat Key
- Private owners



Longboat Key beach
renourishment project

Objective 6: Integrate Resilience in the Capital Improvement Program

Actions #24-25

Issue:

- The existing threat of tidal flooding and recent experience of Hurricane Ian adds urgency to specific asset maintenance projects.
- Costs of adaptation can be significant. Avoiding replacement prior to an asset's life-cycle end will save capital.
- Opportunities for funding for resilience projects exist now.
- Budgeting for resilience features and standards in projects in advance reduces potential for shortfalls in future.

Strategy:

- Evaluate benefits of prioritizing projects with available cost share funding availability where feasible
- Plan for 5, 10 and 20 year adaptation projects and costs

ACTION 24: PRIORITIZING RESILIENCE PROJECTS AFTER STORM AS APPLICABLE

TIMEFRAME

Near Term (0-5 Years)

DESCRIPTION

Post-storm recovery can be challenging if clear priorities and plans are not established in advance. Assuming disaster recovery and mitigation funding is made available from state and federal sources following an event, resilience projects should be advanced for funding requests to support implementation of the resilience plan. County administration must be aware of the Town's priorities. Review of the capital plan should occur in advance of hurricane season to identify which resilience projects would likely be eligible for funding and to pre-determine if the Town administration is inclined to prioritize resilience projects over some recovery projects or competing needs. Integrating resilience into the recovery plan and considering priorities in advance of an event eases the burden on staff during challenging post-disaster times.

PRIORITY AREAS

Islandwide

PARTNERSHIPS (FOR FUNDING)

- State of Florida
- Department of Environmental Protection
- Department of Economic Opportunity
- Southwest Florida Water Management District

Longboat Key post hurricane
damage and recovery



ACTION 25:
SCHEDULE PROPOSED PROJECTS
BASED ON URGENCY, FUNDING
AVAILABILITY AND POTENTIAL FOR
BUNDLING



TIMEFRAME

Near Term (0-5 Years)

DESCRIPTION

The Sea Level Rise and Recurring Flooding Vulnerability Assessment ranked vulnerable Town assets by urgency, risk value, criticality of the asset to the surrounding area and the number of residents potentially impacted if the asset was not operational. This information was compiled into a geodatabase for ongoing scenario planning by the Town. The geodatabase allows for easy review of which assets and areas could be affected by sea level rise and storm surge today, in the near future and over the longer term.

The list of vulnerabilities from the assessment was paired with adaptation strategies to implement over the next 5, 10 and 20 years. If the frequency of disruptive flood occurrences increases or the rate of sea level rise slows or accelerates, the timeframes for implementation can be adjusted based on risk tolerance. The capital improvement projects proposed to implement the Sea Level Rise and Recurring Flooding Resilience Plan are listed with preliminary cost estimates in the next section. Note actual bids for these projects may differ from these preliminary estimates.

Implementing a plan that can respond to changes in conditions requires reliable local data on water level elevations, flood extents and impacts and rainfall. Maintaining a local tide gauge on Longboat Key will support a critical portion of this requirement.

As a reminder, proactive adaptation will reduce the risk of flooding in the near and long term. Adaptation that provides protection against storm surge impacts will also address risks associated with sea level rise. Avoiding damage costs will aid in offsetting maintenance costs that will likely increase with burden to the system by sea level rise. Cost effective investments to build new infrastructure to a higher resilient standard will also be beneficial.

To implement the initial 5-year phase of the Sea Level Rise and Recurring Flooding Resilience Plan inclusive of the stormwater capital improvements for Sleepy Lagoon, an estimated \$1.5M would be necessary annually. Projects in the plan may be eligible for federal and state grant funding to offset costs. Potential funding sources are identified in the following table of projects.

The Town has proactively engaged in a Town-wide electrical undergrounding project and has also engaged in analyses for the Village, Sleepy Lagoon and Buttonwood, which represent some of the most vulnerable island and structure areas of the island.

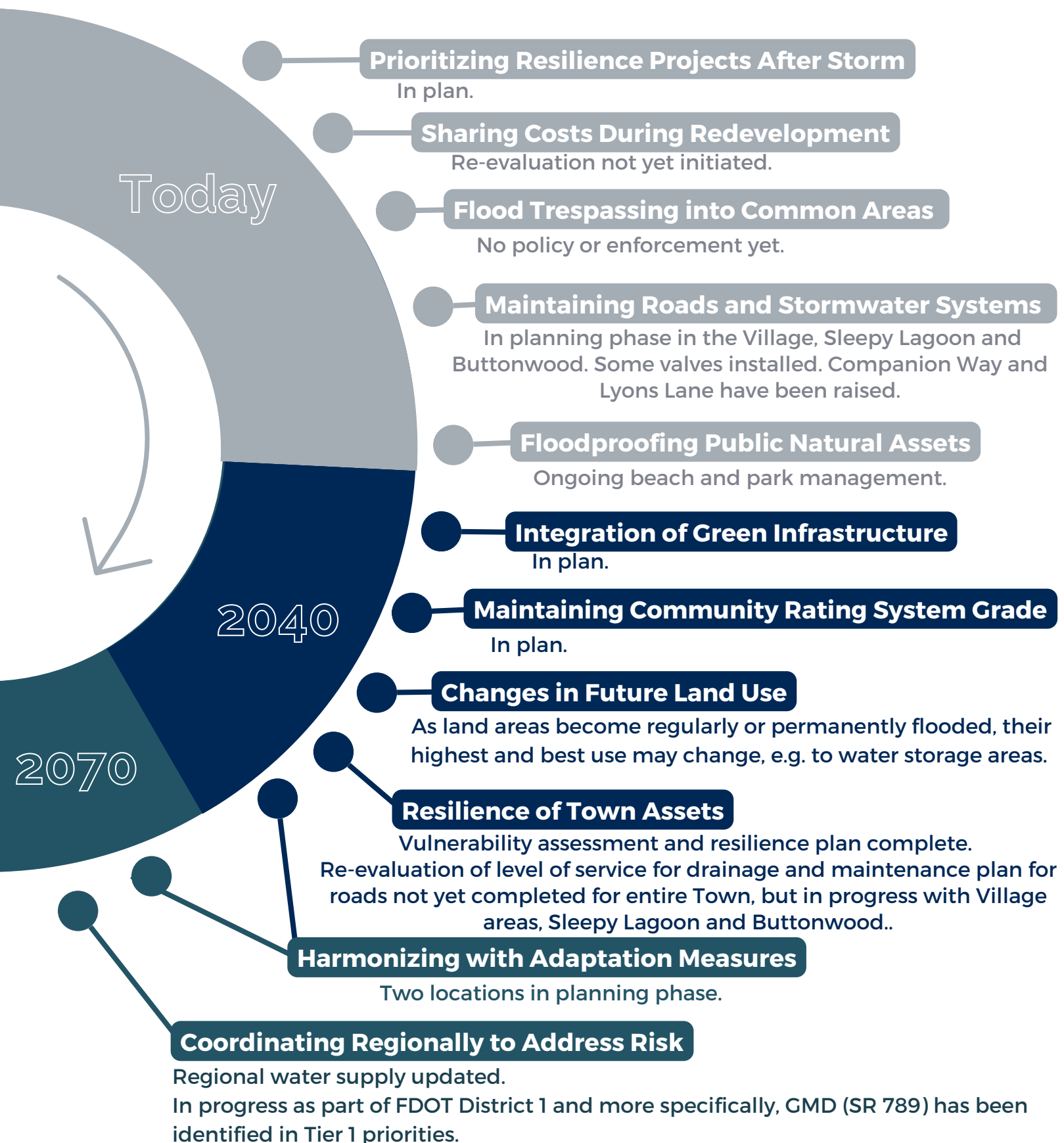
PRIORITY AREAS


Islandwide

STAKEHOLDERS

Town of Longboat Key

Potential Operational Challenges And Status





**SEA LEVEL RISE AND
RECURRING FLOODING
RESILIENCE PLAN
CAPITAL IMPROVEMENTS**

Resilience Capital Improvement Plan

Planning Horizon (years)	Timeframe	Item Description	Unit	Number of Units	Unit Cost	Subtotal	Section Total	Annual Total
<5	2023-2028	Gulf of Mexico Dr, Non-Neighborhood	Each	11	\$2,000	\$22,000	\$9,048,000	\$1,809,600
		The Village Tide Valve Installation	Each	5	\$2,000	\$10,000		
		Sleepy Lagoon Tide Valve Maintenance	Each	9	\$2,000	\$18,000		
		Buttonwood Tide Valve Maintenance	Each	2	\$2,000	\$4,000		
		Dream Island	Each	1	\$2,000	\$2,000		
		Country Club Shores Tide Valve Installation	Each	8	\$2,000	\$16,000		
		Emerald Harbor	Each	6	\$2,000	\$12,000		
		Hideaway	Each	2	\$2,000	\$4,000		
		Sleepy Lagoon Phases 1-3	Project	3	N/A	\$4,930,000		
		Buttonwood Projects 1A-3	Project	4	N/A	\$4,030,000		
5-10	2029-2034	Buttonwood Projects 4-6	Project	4	N/A	\$1,188,000	\$8,203,000	\$1,640,600
		Sleepy Lagoon Phase 4A,B	Project	2	N/A	\$2,250,000		
		Buttonwood Lift Station Floodproofing	Each	1	\$3,000	\$3,000		
		Tide Valve Maintenance	Each	44	\$1000	\$44,000		
		The Village: Initial Road Elevation	Feet	800	\$3,200	\$2,560,000		
		Living Shoreline Pilot, Durante Park	Feet	1500	\$1,300	\$1,950,000		
		Dunes	Areas	10	\$20,800	\$208,000		

Planning Horizon (years)	Timeframe	Item Description	Unit	Number of Units	Unit Cost	Subtotal	Section Total	Annual Total
20+	2035-2045	Elevate Seawall at Durante Park	Feet	1300	\$2,000	\$2,600,000	25974664	\$2,597,466
		Sleepy Lagoon Active Drainage System	Pump Stations	3	\$45,000	\$135,000		
		The Village Active Drainage System	Pump Station	1	\$1,000,000	\$1,000,000		
		The Village Road Berm Project	Feet	2500	\$3,200	\$8,000,000		
		Lift Station Floodproofing	Each	12	\$3,000	\$36,000		
		I&I Maintenance*	Foot	40128	\$200	\$8,025,600		
		Road Maintenance	Foot	40128	\$63	\$2,528,064		
		Mangrove Adaptation Pilot at Quick Point Nature Preserve	Acre	2	\$875,000	\$1,750,000		
		Adapt Dry, Wet Detention Areas and French Drains	Area	14	\$100,000	\$1,400,000		
		Water Quality Monitoring: Septic, Outlets	Event	10	\$50,000	\$500,000		

Potential Funding Source(s)

	FEMA Hazard Mitigation Grant Program (HMGP) FDEP Resilient Florida Implementation Grants
	FEMA Building Infrastructure and Communities (BRIC) FEMA Hazard Mitigation Grant Program (HMGP)
	DOT RAISE Discretionary Grants DOT PROTECT Program
	FDEP Resilient Florida Implementation Grants FDEP Coastal Partnership Initiative Grant Program

*Existing program that gets funded in 5-year increments



**SEA LEVEL RISE AND
RECURRING FLOODING
RESILIENCE PLAN
NEIGHBORHOOD
SUMMARY**

Action Summary by Location

The Village

Actions 1 and 2

Action 18

Actions 3, 5, and 6

Add pumps at collection points at Poinsetta/ Longboat Dr N, Longboat Dr E/ Fox St, Bayside Dr, Lois/ Broadway/ Bayside, Bayside/ Linley

Actions 8 and 10

Elevate intersection of Longboat Dr/ Russel St to mitigate impassable street at 2040 high tide
Elevate Longboat Dr/ Bayside Dr/ Broadway and Longboat Dr S/ Jackson Way to mitigate road damage from tidal flooding in 2040

Gulfside Road

Action 9

Increase elevations of low points in dunes along Gulfside Road to better fortify the shoreline's defense against flooding and protect inland infrastructure.

Sleepy Lagoon

Actions 1 and 2

Actions 3-7

Active stormwater management along Norton St, Marbury Ln, Penfield St

Actions 8 and 10

Complete Lyons Lane projects: elevate road, linear storage
Elevate Norton St, Marbury Lane, Penfield St to mitigate impassable roads at 2070 high tide

Action 18

Containerized swale along GMD, perpendicular to Channel Ln, Outrigger Ln, canal north of Putter Ln, north of Buttonwood, south of South Dr., Bayfront Park, 4200 GMD, 5100 GMD, 5900 GMD

Hideaway

Action 1

Action 10

Elevate evacuation route along General Harris St mitigate impassable road 2040 tidal flooding

Dream Island

Action 2

Actions 8 and 10

Seawall policy amendment to prevent flood impacts to private seawalls.

Emerald Harbor and 4030- 5655 Gulf of Mexico Dr

Action 1

Installation of tidal valves to prevent and manage inland inundation caused by tidal flooding.



4700 & 6700 Gulf of Mexico Dr

Action 9

FDOT is the responsible entity. Coordinate with FDOT to elevate low points to mitigate flooding in 2070. Town working through MPO and directly with FDOT District 1.

4400-5300 Gulf of Mexico Dr

Action 2

FDOT is the responsible entity. Town working through MPO and directly with FDOT District 1.

Buttonwood **Action 1**

Action 9

Elevate Buttonwood Dr to mitigate 2070 high tide

Private Neighborhoods: Spanish Main, Twin Shores/ Gulf Shore, Bay Isles, Lighthouse Point

Action 9

Elevate S 6th/ Platinum Coast, Twin Shores (inundated 2040 high tide)

Elevate Harbor Sound Dr roads (mitigate 2070 high tide)

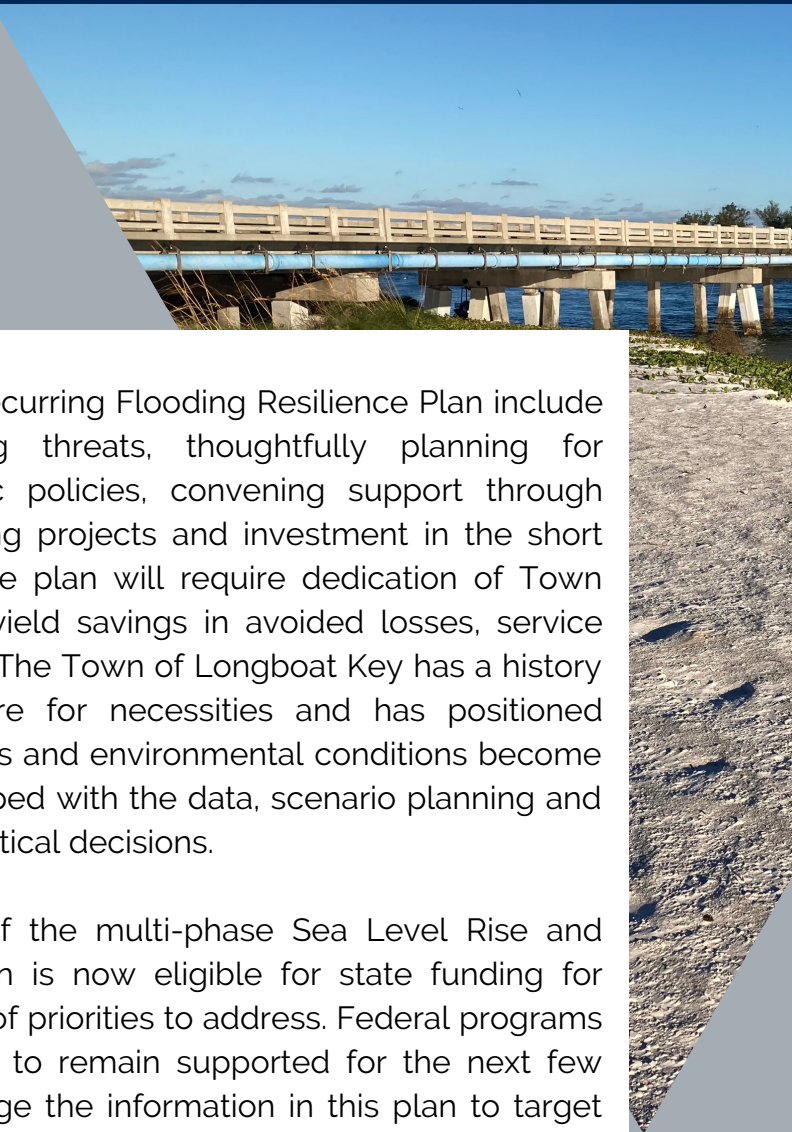
Elevate Companion Way to mitigate 2040 tidal flooding

Actions 1 and 2

LOOKING FORWARD

The strategies in the Sea Level Rise and Recurring Flooding Resilience Plan include acting expediently to address existing threats, thoughtfully planning for redevelopment, developing sound public policies, convening support through stakeholder engagement and implementing projects and investment in the short and long term. Although implementing the plan will require dedication of Town resources, the return on investment will yield savings in avoided losses, service disruptions and ultimately property values. The Town of Longboat Key has a history of looking forward to proactively prepare for necessities and has positioned themselves well. As changes in water levels and environmental conditions become more obvious, the Town is now well equipped with the data, scenario planning and solutions to continue to make wise and practical decisions.

With the accomplishment of the goals of the multi-phase Sea Level Rise and Recurring Flooding Assessment, the Town is now eligible for state funding for resilience projects and prepared with a list of priorities to address. Federal programs and policy regarding resilience are slated to remain supported for the next few years. It is in the Town's interest to leverage the information in this plan to target potential funds to increase the resilience of the community and coordinate regionally to enhance comprehensive planning and policy implementation.



Helpful Resources for Continuing to Assess Sea Level Rise and Recurring Flooding Conditions



NOAA Sea Level Rise Viewer
[Sea Level Rise and Coastal Flooding
Impacts \(noaa.gov\)](https://www.noaa.gov/sea-level-rise-and-coastal-flooding-impacts)

National Hurricane Center (NHC)
Storm Surge Flooding Vulnerability
[NHC Storm Surge Risk Maps
\(arcgis.com\)](https://arcgis.com)

Urban Land Institute Flood Risk Factor
[Find Your Property's Climate Risks -
Homepage | Risk Factor](#)

LONGBOAT KEY

End of Agenda Item