

February 6, 2023

Representative Lee Hewitt,

The Town of Pawleys Island would like to request your support in the implementation of a critically important drainage study that was recently completed. At their December 12, 2022 meeting, Town Council adopted a Sea Level Rise Adaptation Plan for the island. This planning initiative examines the location and frequency of pronounced flooding conditions associated with King Tide occurrences and moderate to severe storm events. The study also evaluates the condition of existing drainage infrastructure and identifies areas on the island where storm drains are lacking or are insufficient to adequately eliminate flooding on the Town's streets and adjacent properties. The study concludes by creating an implementation strategy to prioritize initiatives that the Town needs to focus on over a multi-year period. The strategies outline both traditional stormwater infrastructure techniques and other innovative practices such as storm drain backflow preventers, creekside embankments, and nature-based infiltration practices. Please see attached a copy of the Town of Pawleys Island Sea Level Adaptation Plan.

The majority of the Town's roads are owned and maintained by SCDOT. In cooperation with SCDOT, the Town recently installed storm drain backflow preventer devices at two locations near the Town Hall and Nature Park complex. These pilot projects have been successful in minimizing flooding conditions in that area of Town. The Town proposes to install devices at up to ten additional locations, primarily on Myrtle Ave between First and Third Street, and in the Birds Nest neighborhood along Pritchard Street. The estimated cost to install these ten devices is \$300,000. The Town also proposes to create Living Shoreline projects incorporating a creek embankment parallel to roadways that experience recurring flooding on the island. Three locations that have been identified for this work are at the intersection of North Causeway and Myrtle Ave at the Old Town Hall property, Myrtle Ave near Second Street, and along Myrtle Ave between the North and South Causeways. The estimated cost to construct these living shoreline practices is \$400,000. Finally, there are several other long-term infrastructure needs identified in the Sea Level Rise Adaptation Plan that will require further engineering analysis and the development of accurate cost estimates before proceeding. The Town proposes to create a 10-year Drainage Capital Improvements Plan that will serve as an immediate resource to pursue additional funding through SCDOT, FEMA, SC Office of Resiliency, etc. A detailed townwide Drainage Capital Improvements Plan will cost approximately \$50,000.

This request of \$750,000 will provide great momentum for the Town in implementing our Sea Level Rise Adaptation Plan. These efforts will relieve a serious public safety threat for both property owners and visitors on Pawleys Island. The Town would be honored to serve as a case study for pursuing ambitious and proactive management efforts to address the impacts of Sea Level Rise here in South Carolina. The Town recognizes the need to continue to learn from other communities across the state and to partner with any and all local, state, and federal resource agencies to accomplish this goal.

The Town of Pawleys Island sincerely appreciates your consideration of this request. If you have any questions, please contact me at any time.

Respectfully submitted,

Mayor Brian Henry

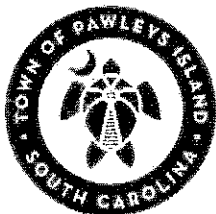
mayorhenry@townofpi.com

843-240-1564



Town of Pawleys Island

Sea Level Rise Adaptation Plan



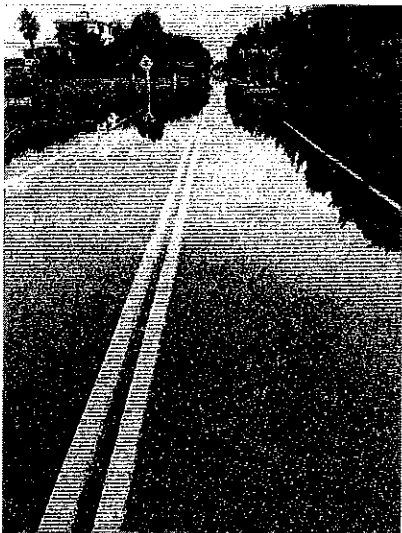
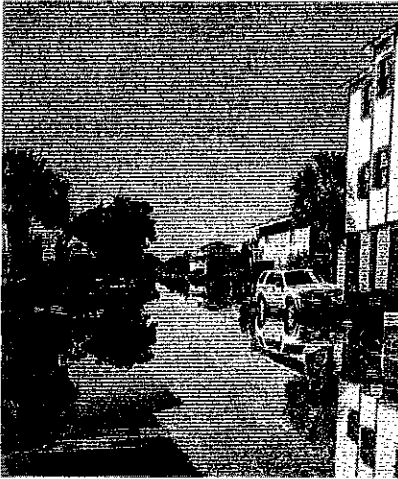
November 2022



This page left intentionally blank



Contents



Message from the Mayor	4
Introduction	5
Sea Level Rise Adaptation Actions Summary	6
Planning Engagement.....	7
Water Level Measurements	8
Community Concerns	9
Flood Mapping.....	10
Problematic Storm Drain Inventory	11
Priority Flood Areas	12
Adaptation Actions	13
Gray Infrastructure.....	14
Green Protection	15
Planning & Mitigation.....	17
New Approaches.....	18
Funding.....	19
Engagement	20
Recommended Actions.....	21
Implementation	22
References	23

Resilient Pawleys

Message from the Mayor

The Town of Pawleys Island's rich history of coastal living is known by many to be the oldest seaside resort in America. This community is bound by water and tied to its comings and goings. The tide and water level changes on the island can vary considerably from day to day and residents are more wary of the threats associated with wind-driven water level rises, King Tides, and recent storm surge events.

My hope for this Plan is to identify a number of Town projects that will improve our resident's quality of life by reducing pressure from rising water. With this plan, the Town will be poised to apply for state and federal grant opportunities to support these projects. We want to make Pawleys Island more resilient in the decades ahead, and this is a first step forward to demonstrate our commitment to that goal.

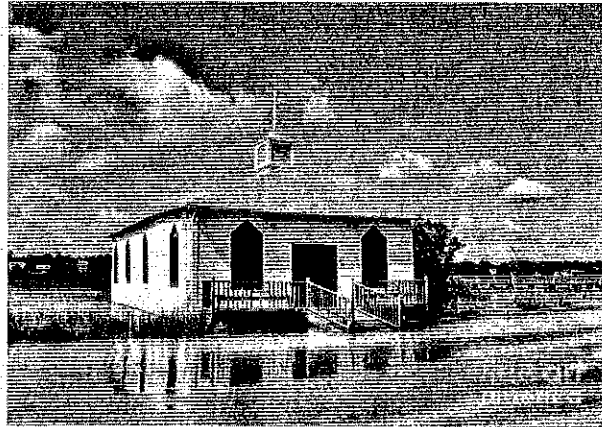


Introduction

Pawleys Island, South Carolina, is one of the oldest summer resorts on the East Coast. The community sits on a barrier island located 70 miles north of Charleston and 25 miles south of Myrtle Beach. It is less than 4 miles long and mostly 1 house wide, separated from the mainland by a beautiful salt marsh and accessible by two short causeways. The Town's economy is entirely dependent on the water that surrounds it. Thus, managing these waters is critical for the community's future.

This is the first town document to focus on sea level rise and adaptive management with flood mitigation as a major focus. The Town has taken an important and proactive first step toward long-term resilience to sea level rise in the formal adoption of this plan. There are still relatively few examples of sustainable and effective solutions implemented by barrier island communities to adapt to sea level rise; however, the Town has made a conscious effort to mitigate flooding as long-term strategic objective, and is committed to being progressive in achieving that goal.

In June 2020, community-informed strategic planning identified four key issues for Pawleys to address over the next several years: 1) beach maintenance, 2) flooding, 3) creek silting, and 4) funding to address these issues. To address issue #2, the strategic planning process recommended development of a long-term flood mitigation plan.



Other Town information that has informed this effort include the Local Comprehensive Beachfront Management Plan (2012), Description of Storm Drainage System (2008), the Town's [Online Flood Information](#), and its [Code of Ordinances](#). A successful 2021 pilot project to prevent tidal flooding back through the storm drain system near Town Hall also informed and motivated this work.

The goal of this plan is to address Pawleys' urban, flooding-related challenges that have become more common in recent years, and will continue to be exacerbated by sea level rise over the coming decades. The plan utilized existing information, collected new data and input, and developed new products to inform and prioritize recommendations. Flood mitigation provided by the beach and dune system was intentionally excluded, as separate planning efforts are underway in that area.

The plan recommends a variety of sea level rise Adaptation Actions (Figure 1). They include gray infrastructure projects, such as drainage system improvements; green protection such as living shorelines; refining policies and regulations; a comprehensive drainage management plan; and completely new approaches to build resilience over time. To ensure the plan is used to mitigate flooding on the ground, an **Initiatives and Champions Chart** illustrates the initiatives for each Action Item Category, the Champion of each initiative, and the Implementation timeline.

This plan is envisioned to be a living document, revisited every five years to assess the effectiveness of implemented recommendations and adapted as needed for improved flood mitigation.

Adaptation Actions Summary

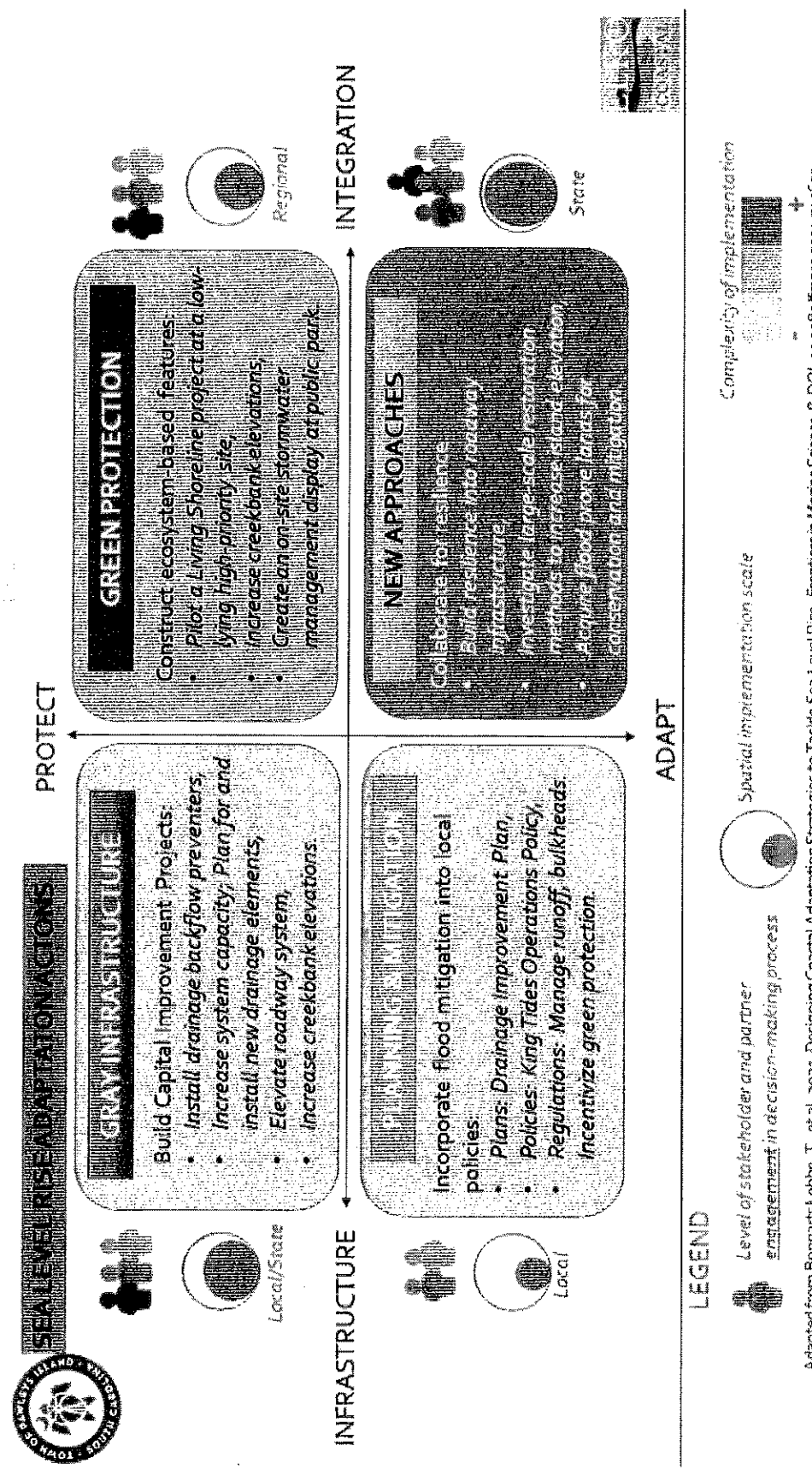


Figure 2. Summary of sea level rise adaptation actions recommended by this plan.

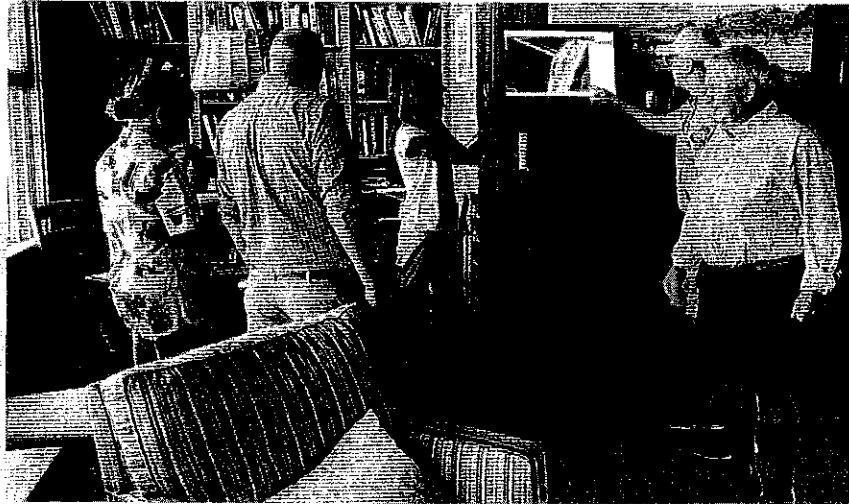
Plan Development

Planning Engagement

Development of this plan began in May 2022 with reviews of prior work and interviews with staff and key stakeholders to establish an understanding of the Town's challenges related to sea level rise. The College of Charleston and S.C. Sea Grant Consortium began original flood mapping shortly thereafter. Community engagement began immediately with a [website](#), email blasts, and an online survey, which was distributed in July to understand community concerns and specific locations, timing, and depth of flooding.

The consultant visited the island on numerous occasions to interact with staff and the Planning Commission, to film an outreach video with the mayor, and to conduct an elevation survey of problematic storm drains.

The highlight of the planning process occurred on Labor Day weekend in conjunction with the Pawleys Island Civic Association annual event. It included a presentation in the chapel and an engagement session for residents to interact with the flood maps and discuss concerns with the consultant team.



Following this event, the online survey was reactivated.

All of these engagement opportunities served to include island residents throughout the planning process. Recommendations are a direct result of stakeholder and resident input.

Water Level Measurements

Pawleys Island is a vulnerable, low-lying barrier island community that has been experiencing increased flooding due to faster rates of sea level rise in recent years. The latest [U.S. interagency report](#) predicts an average sea level rise of up to 1 ft by 2050 (<30 years), which is about equal to the water level change in Myrtle Beach (Springmaid Pier station) in the last 100 years (see Intermediate Scenario, Figure 2). This will result in a “profound shift” in coastal flooding over the next 30 years. Storm surge and high tides will increase and reach further inland. This is consistent with the “living memory” of the Town of Pawleys Island (i.e., flooding is happening more often) and was a driver to initiate this Sea Level Rise Adaptation effort.

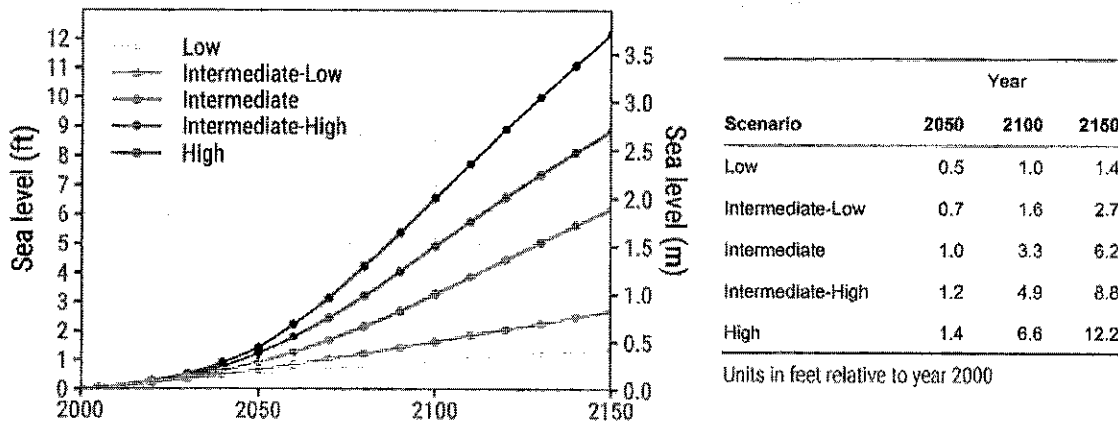


Figure 2. Global sea level rise projections from the 2022 Sea Level Rise Technical Report⁴.

In collaboration with the South Carolina Beach Advocates, the Town installed a local water level sensor or tide gauge in 2021 (Figure 3). Whereas in the past, there was no nearby gauge; today, Pawleys Island has real-time water level data to help inform decisions related to flooding and sea level rise adaptation.

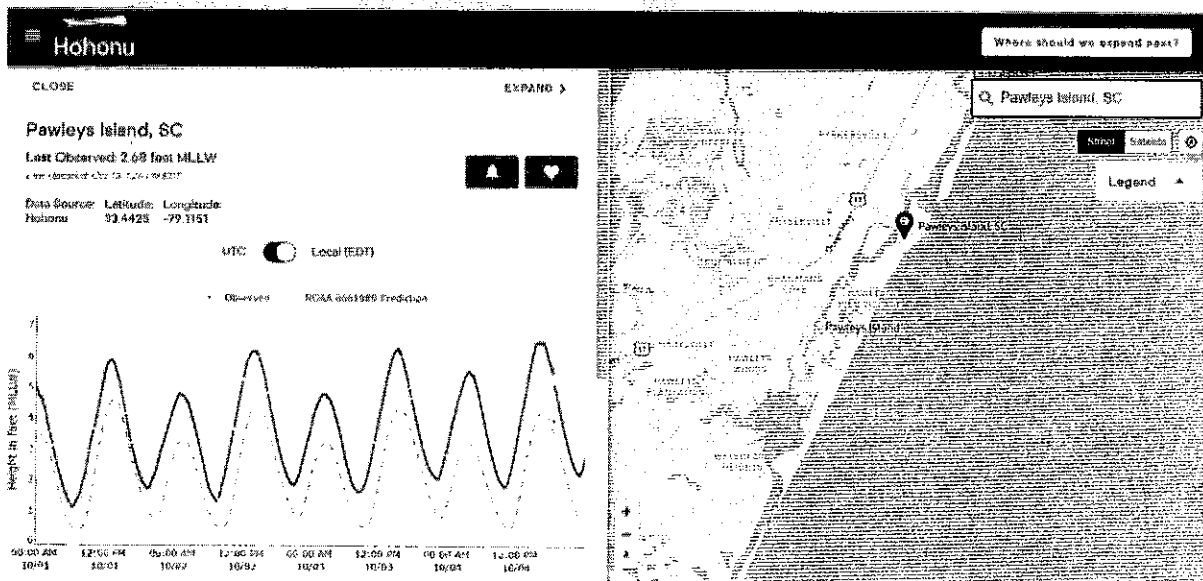


Figure 3. Collection of local, real-time water level data for Pawleys Island began in 2021.

Community Concerns

As described in the Planning Engagement section above, concerns of Pawleys' residents have guided the development of this plan. Primary concerns were about the Town's vulnerability to flooding during high water events, and when these events coincide with significant rains, strong northeast winds, or storms. Flooding occurs when storm drains back up and when the creek bank overtops.

The vast majority of Pawleys Island property owners are concerned about flooding (Figure 4). Survey respondents indicated that water backs up through storm drains (45%) and/or overtops the creek bank (65%), flooding the road or their property during King tides or moderate storm events. Road flooding was reported to be between a few inches and up to 36 inches in some areas. The most significant flooding reported in the survey was flagged and included in the Priority Flood Areas section. Most survey respondents indicated that they drive through flood water on Pawleys roads at least once or twice a year, monthly, or up to two to three times per month (e.g., Figure 5).

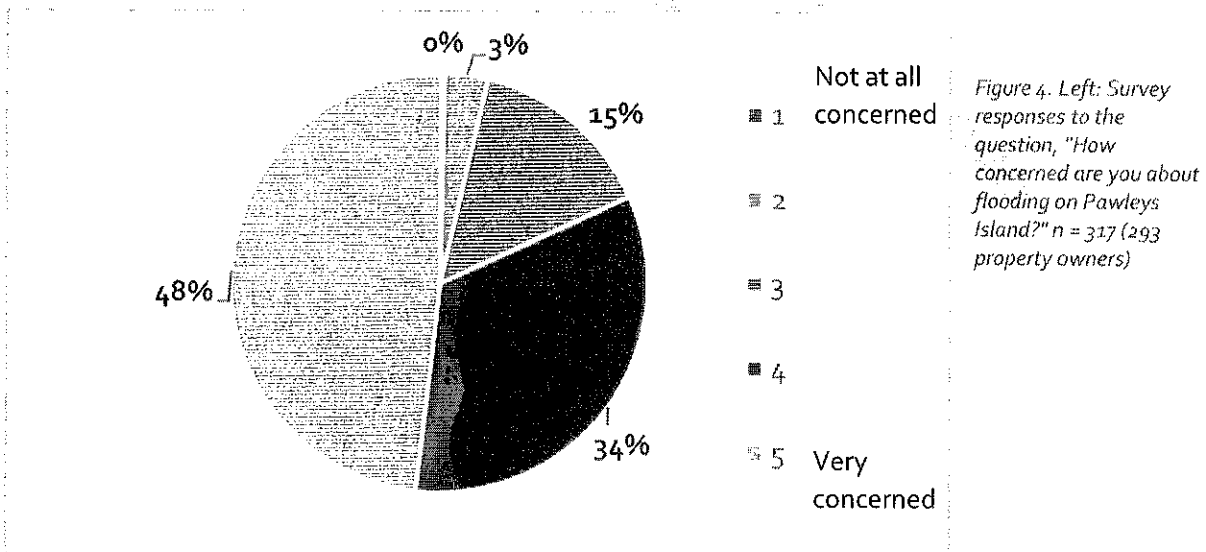


Figure 5. Photo of vehicles driving through flooded roadways on Pawleys Island. Most residents report having to drive through flood waters at least once or twice a year, if not more.

Flood Mapping

The S.C. Sea Grant Consortium and the College of Charleston conducted a sophisticated, local flood mapping analysis to develop an [interactive online tool](#) to support this effort (

Figure 6). The analysis used lidar data, geospatial locations of roads, parcels, buildings, and businesses, and tidal flood heights at half foot increments above Mean Higher High Water (MHHW, similar to today's King tide). The mapping results allowed for a vulnerability analysis which revealed that nearly 40% of the roads flood with 2 feet of added water level (Figure 7). Thus, the Town decided to plan for **2 ft of increased water level over the next 30 years**.

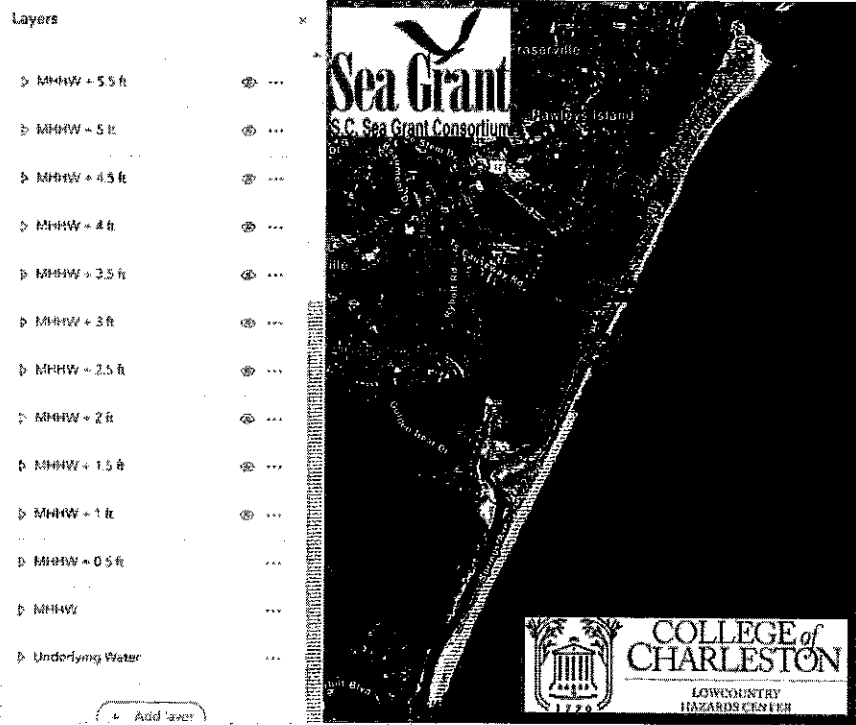


Figure 6. Tidal Flooding Mapping Tool developed by the College of Charleston and S.C. Sea Grant to assist this plan.

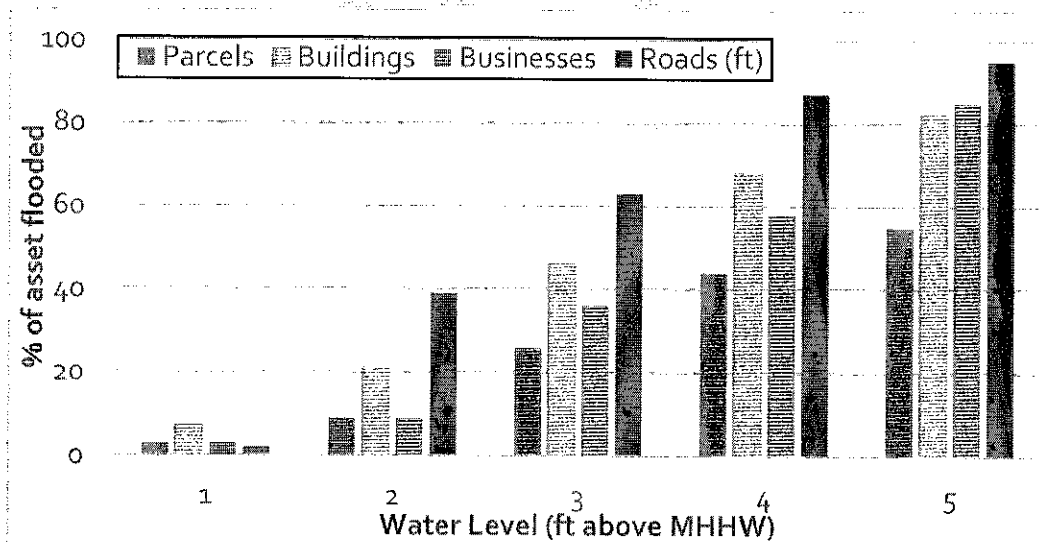


Figure 7. Vulnerability analysis developed from College of Charleston flood mapping showing the percentage of assets (parcels, buildings, businesses, roads) that will flood with increasing water levels. Note parcels are flooded when water touches the center line.

Problematic Storm Drain Inventory

The storm drain system on Pawleys Island consists of 87 drains and 50 outfalls, all draining to Pawleys Creek on the west side of the island. In 2021, a pilot project was designed adjacent to Town Hall near the North Causeway to prevent tidal flooding back through the storm drain system impacting the adjacent roadway. The project scope entailed the installation of *Wapro Wastop* check valve backflow preventer devices at two separate storm drain outlets. To date, the project has clearly been an effective strategy for reducing the extent of flooding observed through the storm drain system.

Utilizing the 2008 Description of Storm Drainage System report and a listing of problem areas provided by town officials, the consultant conducted a survey and inventory of storm drains during the summer of 2022. Fifteen storm drains were surveyed using a Real Time Kinematic GPS to obtain accurate x, y, z coordinates (location and elevation). This effort revealed that the average elevation of the 15 drains surveyed was only 0.2 ft above the King tide flooding level (approximately Mean Higher High Water). Additionally, many of the drains were clogged and in need of maintenance. Thus, low-elevation, poorly maintained storm drains are contributing to the flooding problem on the island.

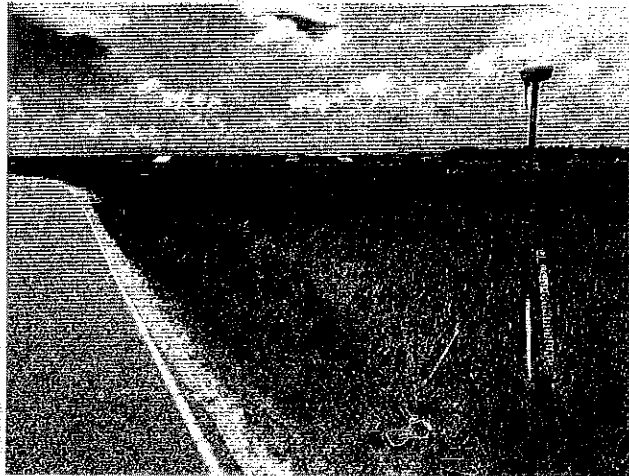


Figure 8. Photos of storm drains in need of maintenance at 252 Myrtle Ave (left) and 240 Myrtle Ave (right).

Priority Flood Areas

Flood mapping, community survey responses, and Town-identified problematic storm drain locations were combined onto one GIS map to better highlight areas of immediate concern. These priority flood areas were flagged when two or more of the following occurred in the same location:

- 1) Mapping revealed road flooding under a 2 ft water level scenario (due to low elevations),
- 2) Survey reports indicated high flood severity, and
- 3) Problematic storm drains were identified nearby.

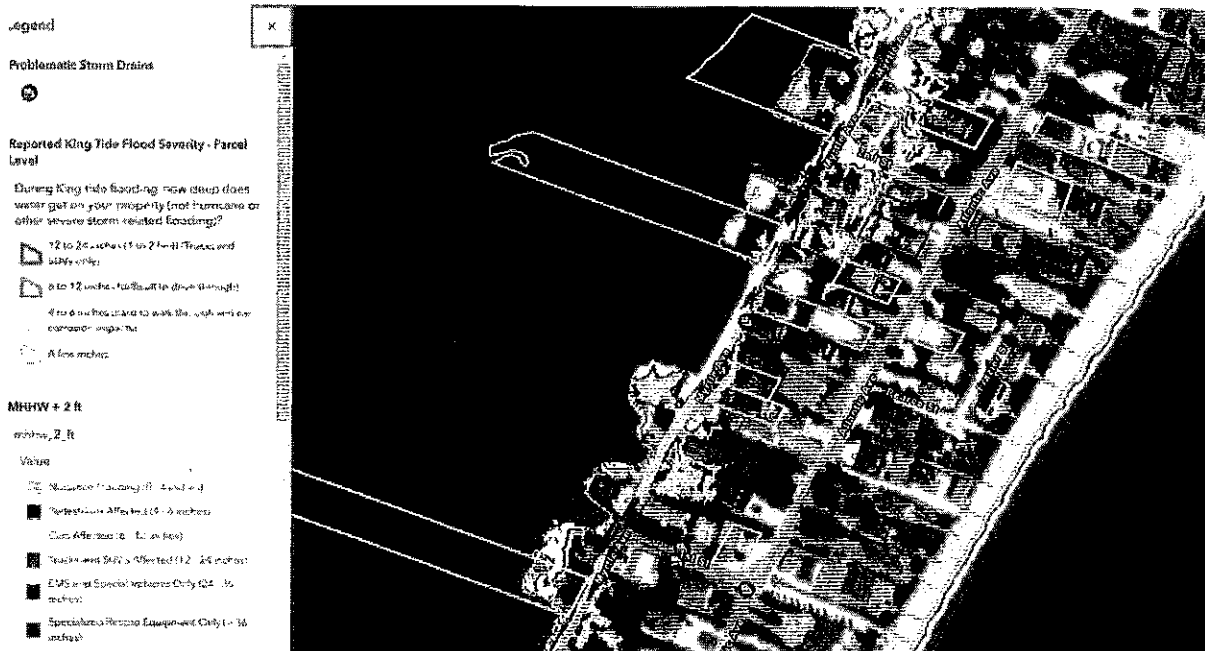


Figure 9. Overlay of a 2-ft water level scenario, survey responses of flood severity, and problematic storm drains. Note the difference between 1st (problematic storm drains) and 2nd St. (flooded at the 2ft scenario due to low elevations).

High priority locations identified from south to north are listed with the possible cause of flooding (storm drain backups, low elevations, or both).

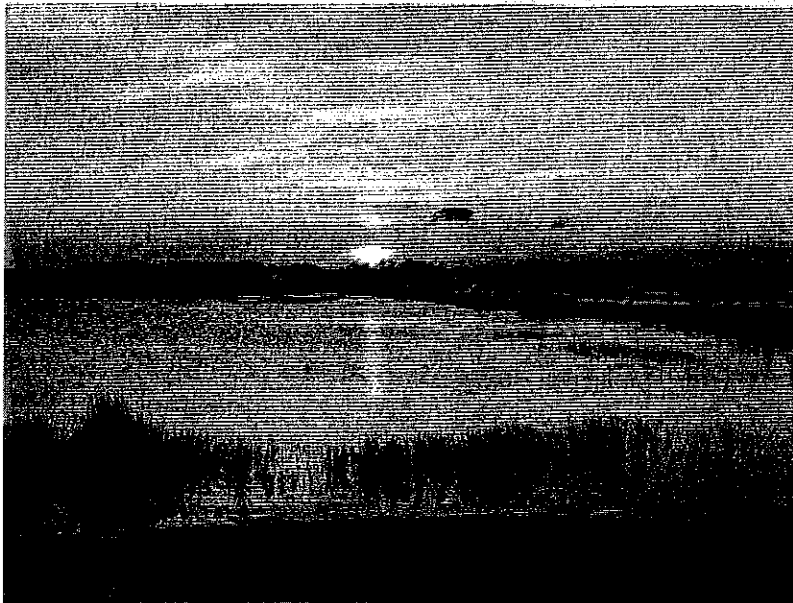
1. **Birds Nest area** (storm drains):
 - a. Springs Ave. between Hazard and Pritchard Streets:
 - b. Pritchard St. intersections of Springs and Doyle,
2. 550 to 570 Myrtle Ave. (low elevation, creek bank approaches the roadway),
3. Vicinity of the south causeway (low elevation),
4. 391 Myrtle Ave. around the **Pawleys Island Chapel** (both),
5. Vicinity of **370 Myrtle Ave.** (both),
6. Vicinity of the north causeway from 342 to 308 Myrtle (low elevation),
7. Vicinity of **1st Street and Myrtle Ave.** (storm drains),
8. Vicinity of 2nd and 3rd Street and Myrtle Ave. (low elevation), and
9. Shell Rd to 113 Atlantic Ave. (low elevation).

Adaptation Actions

This section offers solutions to the flooding problem on Pawleys Island. Flood mitigation will take many forms over the coming decades and will include both gray and green infrastructure, changes to long-standing policies and regulations, and new plans and actions. A combination of mitigation approaches will be required to reduce flooding on Pawleys Island.

The following adaptation actions were developed during engagement activities and with staff review and input. The town cannot implement these solutions alone. The actions will require community buy in and participation, as well as partnerships at the regional, state, and federal levels.

The sea level rise adaptation actions have been categorized as follows: Gray Infrastructure, Green Protection, Planning & Mitigation, and New Approaches (Figure 1). Each of the following sections describes the approach and offers recommendations for implementation. In most cases, partners include but are not limited to Georgetown County Stormwater Division and SCDOT.



Separate sections are dedicated to funding and engagement; however, they are both essential elements to the implementation of all four adaptation actions.

Gray Infrastructure

Hard protection from sea level rise, or “gray infrastructure” projects, are widespread and an important part of the flood mitigation approach. Here, solutions focus on drainage improvements; however, **roadway system modifications and creek bank stabilization projects** may also include gray elements.

Seawalls along the creek bank are not recommended as a flood mitigation tool for several reasons. Seawalls are armoring structures designed to protect upland property from erosion (“hold the line”). There is little erosional pressure on private creek front lots on Pawleys Island. Seawalls often exacerbate erosion at neighboring properties and result in scour of the seabed. They can also cause ponding of flood waters on the upland side.

Drainage backflow preventers

To address flooding, the Town installed tidal flood check valves, or backflow preventers, on two drains adjacent to Town Hall as an effective pilot project in 2021. Tidal flood valves, or check valves, allow stormwater to drain out and prevent water from the creek from backing up into the drainage system.

Increase capacity

Maintenance and repair of clogged and damaged drains and pipes is needed on a regular basis to ensure the system is operating at optimal performance and full capacity.

New drainage elements

Pipe upgrades

Flooding can occur as a result of insufficient pipe capacity as well as flat/negative slopes. Ensuring that the drainage system is properly sized with slopes that comply with stormwater standards may reduce the need for alternative interventions such as storage which would require additional operation and maintenance costs. Oversized pipes can also be used as extra storage for runoff when space and elevation limitations prevent alternative interventions.

Additional Drainage Networks

No drainage system currently exists in some areas of the island. In these instances, the addition of new drainage systems should be considered in compliance and coordination with partners.

Storage

Underground storage tanks could be used if the pipe network cannot be increased to sufficient capacity. When pipes are flowing above full capacity during floods, water could overflow into underground storage tanks. These tanks or basins would need to be emptied after the rainfall event either by a portable pump or by reconnecting with the drainage system. Ideally, no storage tanks will be added to the system and sufficient drainage will be achieved by other less expensive methods.

Recommendations: Install backflow preventers at the four (4) Priority Flood Areas with storm drain problems (above). Implement a regular cleaning and blockage inspection schedule of the entire system including the valves, particularly in advance of King tides and storm events. Use the Drainage Improvement Plan to guide and prioritize new drainage elements.

Build Capital Improvement Projects:

- *Install drainage backflow preventers,*
- *Increase the capacity of existing drains/pipes,*
- *Plan for and install new drainage elements.*

Green Protection

Soft protection from sea level rise, or “green infrastructure” projects, rely on the concept of integrating nature rather than fighting it. Also known as nature-based solutions, they are designed to reduce flood exposure and enhance the resilience of coastal communities and habitats to a changing climate. When combined with open space preservation and floodplain management, these approaches can complement gray infrastructure approaches.

Where creekfront property loss is a challenge, soft approaches such as living shorelines can help stabilize the shoreline and reduce erosion. Beach nourishment and dune restoration are examples of soft protection with a proven track record on the oceanfront.

Construct ecosystem-based features:

- *Initiate a Living Shoreline pilot at high priority site,*
- *Increase creekbank elevations, and*
- *Create an on-site stormwater management display at a public park.*

Install on-site stormwater management features

Green infrastructure can include bioswales, rain gardens, cisterns, and permeable pavers, as well as a robust tree canopy. These practices absorb flood water as close to its source as possible and can reduce the volume of stormwater in the public drainage system. They offer the added benefits of aesthetics, improved water quality, and often, the use of stormwater as a water source for irrigation. Bioswales and rain gardens require sufficient space which isn't always available in flood prone areas. Generally, the techniques aim to manage the first inch of rainwater. When rainfall exceeds 1-inch or occurs during high-water events that saturate the groundwater system, these methods alone are insufficient to alleviate flooding.

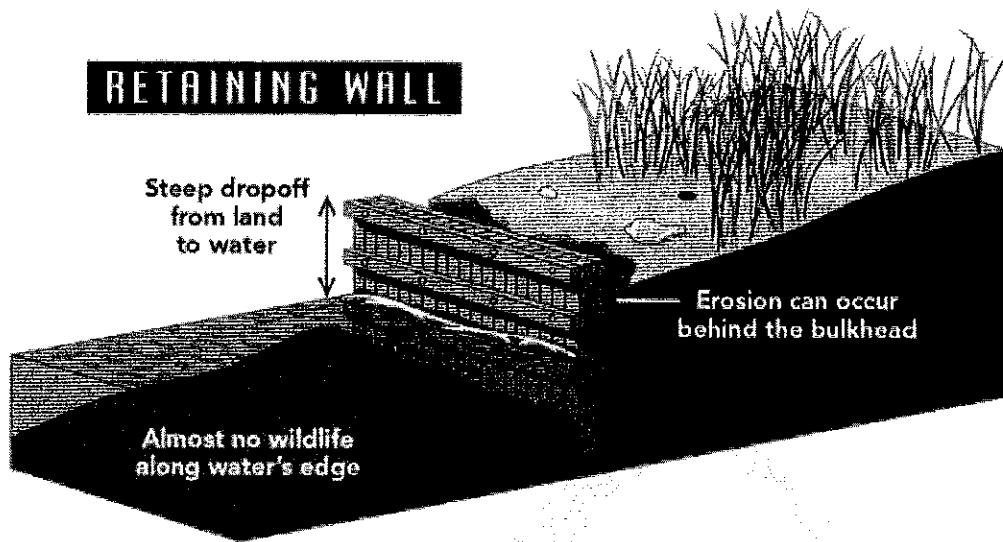
Increase creekbank elevations

Elevating the creek bank was identified as a desired solution to help with flood mitigation during engagement activities. The bank is susceptible to erosion if it is devoid of vegetation. As tides, runoff, heavy rains, or flood waters attack the unprotected bank, it loosens and washes away. This can lead to slumping and collapse of the bank. Keeping foot traffic off the bank and planting vegetation *above the critical line* can help mitigate this erosion. Over time, root systems will trap sediment, encouraging additional growth and sediment accumulation.

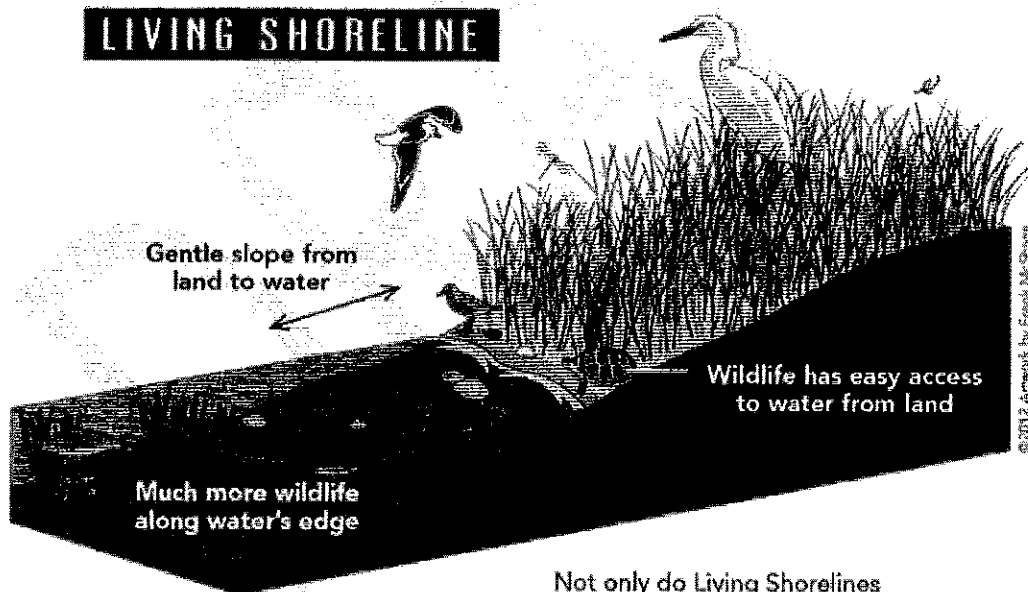
Design and permit Living Shoreline projects

Like vegetation, living shorelines help stabilize shorelines by combining plants and other natural materials (like oyster beds) to reduce erosion and mitigate flooding. Rather than creating a barrier between the bank and water, as with conventional bulkheads, a living shoreline allows for a natural transition. The shoreline can then provide erosion protection while still performing valuable ecosystem services thereby enhancing resilience (Figure 10). Living Shorelines are constructed *at and/or below the critical line*. ¹ has recently streamlined the living shorelines permitting process.

Recommendations: Adopt a tree conservation ordinance. Initiate a Living Shoreline pilot project at one of the low elevation Priority Flood Areas. Create an on-site stormwater management display at the Nature Park behind Town Hall to educate and encourage property owners to install similar features. Use the flood mapping tool to identify low-lying priority areas along the creek bank for enhancement.



'Hard' infrastructure like retaining walls abruptly severs the ecological connection between the coast and water.



Not only do Living Shorelines defend land against destructive waves, but they also provide crucial habitat for fish and wildlife.

Figure 10. Schematic of shoreline responses to hard infrastructure (bulkhead top) and a Living Shoreline (bottom). Source: Delaware Living Shorelines Committee: <http://www.dlsc.org/our-work/our-approach-to-living-shorelines>

Learn More: SC-DHEC and Clemson Extension provide the basics of living shoreline benefits, installation techniques, site assessment, and case studies [here](#).

Planning & Mitigation

This category of solutions is sometimes referred to as “accommodation” responses, and include diverse methods to mitigate flooding. Rather than building infrastructure, a variety of policies, plans, and regulations are discussed to increase resilience. Also included in this category is ongoing mapping and monitoring of flood hazards as described in the section on Flood Mapping above.

Incorporate flood mitigation into local plans and policies:

- *Plans: Develop a Drainage Improvement Plan.*
- *Policies: Adopt a King Tides Operations Policy.*
- *Regulations: Manage runoff, bulkheads, incentivize green protection.*

Plans

A **Drainage Improvement Plan** is intended to assist the dewatering of the island, particularly the roads, following a significant flooding event. The Plan will include GIS mapping of existing infrastructure and its condition, natural drainage patterns, and problem areas. The feasibility of additional elements such as underground storage and/or pump stations should be considered. It will also identify priority areas for initial improvements to maximize flood reduction. A comprehensive cost estimate should be included. This will be important when submitting grant applications to implement the plan.

Policies

As King Tides become more common, it will be helpful to implement a repeatable operations plan to implement in advance of these predictable flood events. A **King Tides Operations Policy** could include advance public notification, posting appropriate signage and/or barricades to maintain public safety, photo documentation, coordination with other agencies, debris cleanup/removal, etc.

Regulations

Current stormwater regulations simply direct designers to convey water to the critical line or other outfall point, without consideration of its potential effects on flooding. Currently, the post-development runoff (discharge) cannot exceed the pre-development discharge rate. The Town in collaboration with the County Stormwater may consider increasing these regulations to retain more water on site and decrease potential runoff. **On-site stormwater management** methods are described in the Green Protection section above.

As described in the Gray Infrastructure section above, **bulkheads** are not flood control devices; thus, it is important to educate the public on appropriate use of bulkheads and to regulate their construction to avoid adjacent impacts. Green protection techniques should be incentivized over bulkheads. When necessary, Town and OCRM permits should be obtained for bulkheads beyond the critical line. Bulkheads should be constructed flush with adjacent grade/elevation, and any disturbed land should be backfilled and planted with native vegetation. All erosion control or flood mitigation construction regardless of type or location relative to the critical line should require a Town permit with proof of location and a depiction of the certified critical line.

Recommendations: Hire a firm to develop a Drainage Improvement Plan. Adopt a King Tides Operation policy. Explore ways to strengthen Town regulations for flood mitigation (e.g., tree ordinance^{xii}, further reductions in impermeable surfaces). Incentivize green protection techniques on private properties by adopting on-site stormwater management, erosion control, and flood mitigation project permitting regulations.

New Approaches

Since the 1700s, the Town of Pawleys Island has always adapted to changing conditions. The historic, unspoiled charm is a testament to the community's ability to withstand the dynamic environment of a barrier island. In the future, community adaptation will continue to be a necessary action, but one Pawleys is well accustomed to. Solutions in this section promote adopting an integrated, systems-based approach.

Build resilience into roadway infrastructure

The primarily state-owned roadway system serving Pawleys Island is low-lying and subject to closure and breaching due to storms, floods, and rising sea level. Two causeways provide access to the Town. Included in this system are storm drains and right of ways. Flood Mapping clearly illustrates the vulnerability of the roadway system. With only 2 feet of increased water level, nearly 40% of the roads flood.

Collaborate for resilience:

- *Build resilience into roadway infrastructure,*
- *Investigate large-scale restoration methods to increase island elevation,*
- *Acquire flood prone lands for conservation and mitigation*

The Town is concerned that SCDOT does not have the resources or incentive to appropriately plan for sea level rise impacts to the coastal roads of the state. Repaving projects should include more foresight and be proactive and better coordinated with the Town.

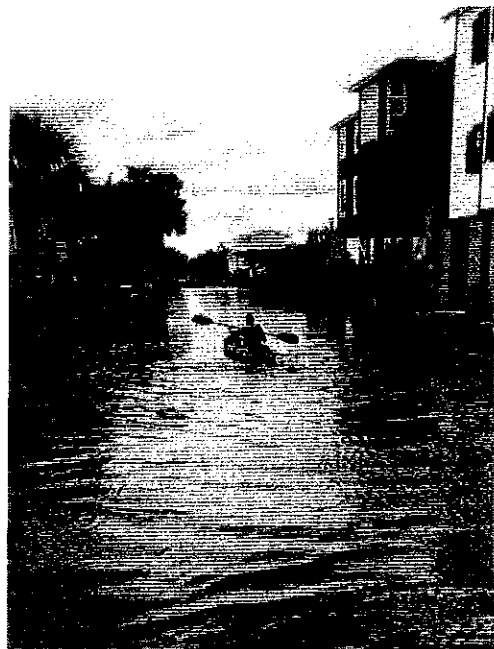
Investigate methods to increase island elevation

Roadway elevation projects are one piece of a larger solution that involves increasing island-wide elevations and beyond. Ecosystem-based adaptation includes the restoration of salt marshes and oyster beds to mitigate flooding and coastal erosion. These projects cover large coastal areas and provide multiple benefits for ecosystems as well as the Town.

Acquire flood prone lands for conservation and mitigation

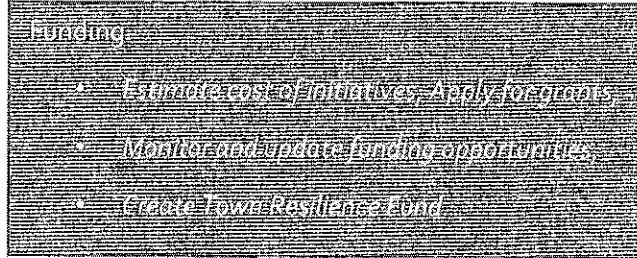
Repetitive flood properties can be ideal candidates for land acquisition. Funding opportunities exist, for example, for projects that eliminate the risk of repetitive flood damage. Acquired lands could be converted to open space areas and incorporate public flood mitigation projects.

Recommendations: Petition SCDOT to develop a strategic plan to elevate coastal roads. Consider large-scale restoration projects along the creek bank and in the marsh to enhance flood protection and increase island and marsh elevations. Discuss land acquisition as part of future strategic planning efforts.



Funding

A common requirement in recent funding opportunities is to explain the planning process. Projects proposed for funding are expected to have been prioritized to address specific community threats. Funding agencies require descriptions of completed work that makes the proposed project ready for funding. This plan has poised the Town to develop competitive applications for public funding. Funding opportunities are also recently leaning toward projects that incorporate both:



- **Nature-Based Solutions:** Natural, nature-based or hybrid solutions, such as restoring coastal marshes, reconnecting floodplains, rebuilding dunes or other natural buffers, or installing living shorelines to both reduce climate risks to communities while enhancing habitats (see Green Protection above).
- **Community Resilience Benefits:** Reduce current and projected threats to communities from coastal hazards, including, but not limited to: sea-level rise, coastal erosion, increased frequency and intensity of storms, and impacts from other chronic or episodic factors (e.g., flooding during high tides).

Funding to implement the recommendations of this plan will be available from a variety of sources as opportunities arise. Federal agencies often provide funding to state or regional agencies or associations. For example, the S.C. Infrastructure Investment Program was a major one-time initiative to improve stormwater systems throughout the state using federal funds from the 2021 American Rescue Plan Act. Other agencies that will likely continue to offer funding opportunities include:

The **Federal Emergency Management Agency** (_____^{xiii}), provides funding for pre- and post-emergency or disaster related projects. Grant categories include preparedness, hazard mitigation assistance (which includes _____^{xiv}), and resilience;

The **National Oceanic and Atmospheric Administration (NOAA)** regularly funds projects that increase coastal resilience to the effects of sea level rise;

The **National Fish and Wildlife Foundation (NFWF)** provides funding to assist communities with _____^{xv} projects;

The **South Carolina Office of Resilience** (_____^{xvi}), assists communities with mitigation and disaster recovery. The mitigation program includes assistance for infrastructure, buyouts, plans & studies, and funds match projects. SCOR is also administering the state's American Rescue Plan Act (ARPA) funding for stormwater infrastructure projects, which the Town was applying for at the time of publication.

Recommendations: Develop cost estimates for projects recommended by this plan. Submit grant applications to fund this plan's initiatives. Monitor and update funding opportunities for flood mitigation at least quarterly. Continue partnerships with organizations that focus on coastal resilience and flood mitigation such as the _____^{xvii}. Create a Town Resilience Fund, drawing on new sources of funding emerging from regulations and policy as laid out in this plan, to serve as an ongoing source of match funding when required by federal, state, or private grant entities.

Engagement

Engagement is the process of working with residents and decision-makers to achieve the long-term outcomes of Pawleys' flood mitigation approach. Engagement is a key activity for the implementation recommendations from all four adaptation actions (Figure 1). Engagement has been at the heart of this planning document. Moving forward, it should focus on education, and evolve into a more concerted effort to achieve the plan recommendations (e.g., engage first, adopt new ordinances, engage/educate more, issue warnings, eventually enforce regulations). This will encourage community buy in and support of the actions.

The first step toward implementation of this plan should be an off-island, day-long, Implementation Work Session. The goal of this session would be to build common understanding, trust, and long-term commitment to carrying out the plan. Partners and peer communities could be invited to share success stories and strategies during the morning, and local decision makers would use this information to refine the draft implementation plan provided on pages 22 & 23, to engage responsible entities and partners, and develop work plans in the afternoon.

A community-led citizen science program would encourage reporting of flooding issues as they occur in real-time. The date, time, and location, estimated water depth (if possible) and possibly a photo should be submitted. The reporting system could be as basic as setting up a general town email account or engaging residents in the ^{xviii}. This well-established effort documents the effect that extreme tides have on South Carolina's coastal communities.

The Town's Flood Mitigation Project website should include frequent updates on plan implementation and useful links such as to Clemson Extension, which offers trainings and other educational opportunities on the techniques described in the Green Protection section. Several links are provided in the text.

Recommendations: Hold an Implementation Work Session to engage responsible entities/partners and develop short- and long-term work plans. Expand the Town's Flood Mitigation Project website to include frequent updates on plan implementation and educational links. Develop a citizen science program for reporting of flooding issues in real-time. Evaluate implementation success annually and adapt work plans as needed. Update the Sea Level Rise Adaptation Plan every five years.

Engagement:

- *Hold Implementation Work Session,*
- *Expand Town's website,*
- *Develop Citizen Science program for flood reporting,*
- *Reevaluate and adapt plans.*



Recommended Actions

The following is a summary of the recommendations included in the previous sections. Here, they are characterized into short- to medium-term actions and longer-range opportunities. Actions are prioritized based on ease of implementation and amount of near-term reduction in flooding.

Categories are color coded as follows: Gray Infrastructure, Green Protection, Planning & Mitigation, and New Models. Recommendations on funding and engagement are also included.

Prioritized Recommendations:

Short- to Medium-Term Actions	<ul style="list-style-type: none"> • Hold an Implementation Work Session to engage responsible entities and partners and develop work plans. • Estimate project costs for the following and submit grant applications to fund the plan's initiatives. • Install backflow preventers at the four (4) Priority Flood Areas with storm drain problems. • Hire a firm to develop a Drainage Improvement Plan. • Petition SCDOT to develop a strategic plan to elevate coastal roads. • Initiate a Living Shoreline pilot project at one of the low-elevation Priority Flood Areas. • Expand the Town's Flood Mitigation Project website to include frequent updates on plan implementation and educational links. • Monitor and update funding opportunities for flood mitigation at least quarterly. • Implement a regular cleaning and blockage inspection schedule of the entire drainage system including the valves, particularly in advance of King tides and storm events. • Adopt a King Tides Operation policy. • Create an on-site stormwater management display at a public site to educate and encourage property owners to install similar features. • Consider large-scale restoration projects along the creekbank to increase island elevations. • Develop a citizen science program for reporting of flooding issues in real-time. • Continue partnerships with organizations that focus on coastal resilience and flood mitigation such as the Association of State Floodplain Managers: https://www.floods.org/. • Explore ways to strengthen Town regulations for green flood mitigation. For example, <ul style="list-style-type: none"> ◦ Adopt a tree ordinance to enhance natural flood-mitigating benefits, ◦ Expand impermeable surface restrictions from driveways and off-street parking to all surfaces not covered by a roof (i.e., patios, pool decks, walkways, etc.)
Longer-Range Opportunities	<ul style="list-style-type: none"> • Use the Drainage Improvement Plan to guide and prioritize new drainage elements. • Identify additional low-lying priority areas along the creek bank for enhancement. • Study large-scale restoration opportunities to elevate the marsh and enhance flood protection. • Incentivize green protection techniques on private properties by adopting on-site stormwater management, erosion control, and flood mitigation project permitting regulations. • Implement new drainage elements. • Create a Town Resilience Fund, drawing on new sources of funding emerging from regulations and policy as laid out in this plan, to serve as an ongoing source of match funding when required by federal, state, or private grant entities. • Construct additional Living Shoreline projects. • Discuss land acquisition as part of future strategic planning efforts.

Implementation

For the plan to fulfill its purpose, it must be supported by initiatives that implement the plan recommendations. This **Initiatives and Champions Chart** illustrates the initiatives for each Action Item Category, the Champion of each initiative, and the implementation timeline. This draft implementation strategy for the plan recommendations should be refined by fine-tuning the prioritization order, champions, and schedule during an Implementation Work Session in early 2023. In addition to the internal Town Champions listed here, other **supporting** partners include: Peer Communities, Funding Agencies, Consultants, Contractors; SCOR, S.C. Sea Grant, SCDHEC-OCRM, and other state agencies; NOAA, FEMA, and other federal agencies; and Clemson Extension and other educational partners.

	Gray Infrastructure	Green Protection	Planning & Adaptation	New Models	Outreach	Support
2023	Install backflow preventers at four locations TC	Initiate a Living Shoreline pilot at a high priority site TC	Develop a Drainage Improvement Plan TC	Petition SCDOT to elevate roadways TC	Estimate project costs, Apply for grants S	Hold Implementation Work Session S, TC, PC
	Implement drainage system maintenance plan TC, S	Create on-site stormwater management display at park TC	Adopt a King Tides Operations Policy S, PC	Consider large-scale restoration projects along creekbank TC, PC	Monitor & update funding opportunities S	Expand Town's Flood Mitigation Project website S
2024	Use the Drainage Improvements Plan to guide new projects PC	Identify low-lying priority areas along creekbank for enhancement TC	Explore ways to strengthen ordinances for flood mitigation PC	Study large-scale restoration opportunities to elevate the marsh TC, PC	Continue partnerships with flood mitigation organizations PC	Develop citizen science program for flood reporting S
	Implement new drainage elements TC	Construct additional Living Shoreline projects TC	Incentivize green protection techniques on private lands PC	Discuss land acquisition in future strategic plan PC	Create Town Resilience Fund TC	Evaluate implementation success, Adapt plan S, TC, PC
CHAMPIONS KEY: TC (Town Council), PC (Planning Commission), S (Staff)						

Figure 11. Sea level rise plan Initiatives and Champions Chart.

References

All website links were active as of November 1, 2022.

-
- ⁱ Town of Pawleys Island, Flood Information Website: <https://www.pawleysisland.com/flood-information/>
- ⁱⁱ CODE OF ORDINANCES Town of PAWLEYS ISLAND, SOUTH CAROLINA Codified through Ordinance No. 2022-03, enacted June 13, 2022. (Supp. No. 17), <https://www.pawleysisland.com/wp-content/uploads/2022/06/Code-Book-2022-03-17.pdf>
- ⁱⁱⁱ Town of Pawleys Island, Flood Mitigation Project, <https://www.pawleysisland.com/flood-mitigation/>
- ^{iv} Sweet, W.V., B.D. Hamlington, R.E. Kopp, C.P. Weaver, P.L. Barnard, D. Bekaert, W. Brooks, M. Craghan, G. Dusek, T. Frederikse, G. Garner, A.S. Genz, J.P. Krasting, E. Larour, D. Marcy, J.J. Marra, J. Obeysekera, M. Osler, M. Pendleton, D. Roman, L. Schmied, W. Veatch, K.D. White, and C. Zuzak, 2022: Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines. NOAA Technical Report NOS 01. National Oceanic and Atmospheric Administration, National Ocean Service, Silver Spring, MD, 111 pp., https://www.nos.noaa.gov/special/sea_level_rise/2022/01/20220101_nos01.pdf
- ^v NOAA, 2022. CO-OPS Tides and Currents, Relative Sea Level Trends, Springmaid Pier, SC, https://tidesandcurrents.noaa.gov/springmaid_pier.html
- ^{vi} See iv above.
- ^{vii} College of Charleston, 2022. Pawleys Island Flood Analysis, https://www.collegeofcharleston.edu/sites/default/files/2022-06/Pawleys_Island_Flood_Analysis.pdf
- ^{viii} Clemson Cooperative Extension, 2022. Master Rain Gardener, <https://www.clemson.edu/ce/extension/2022/06/22/master-rain-gardener/>
- ^{ix} Clemson Cooperative Extension, 2022. Carolina Yards, <https://www.clemson.edu/ce/extension/2022/06/22/carolina-yards/>
- ^x SC DHEC-OCRM, 2022. Department of Health and Environmental Control, Ocean & Coastal Resource Management, Living Shorelines regulations update, <https://www.dhec.sc.gov/ocean-coastal-resource-management/living-shorelines-regulations-update/>
- ^{xi} Clemson Cooperative Extension, 2022. Living Shorelines, <https://www.clemson.edu/ce/extension/living-shorelines/>
- ^{xii} City of Charleston 2019 Flooding and Sea Level Rise Strategy: <http://www.charleston-sc.gov/DocumentCenter/View/20299/Flooding-and-Sea-Level-Rise-Strategy-2019-web-viewing?bid=1>
- ^{xiii} FEMA, 2022. FEMA Grants website, <https://www.fema.gov/grants/>
- ^{xiv} FEMA, 2022. FEMA Flood Mitigation Assistance (FMA) Grant, <https://www.fema.gov/flood-mitigation-assistance/>
- ^{xv} NFWF, 2022. National Fish and Wildlife Foundation, National Coastal Resilience Fund, <https://www.nfwf.org/programs/national-coastal-resilience-fund/>
- ^{xvi} SCOR, 2022. South Carolina Office of Resilience Programs, <https://www.scor.sc.gov/>
- ^{xvii} ASFPM, 2022. Association of State Floodplain Managers homepage, <https://www.asfpm.org/>
- ^{xviii} SC My Coast, 2022. South Carolina King Tides Initiative, <http://www.southcarolinakingtides.org/>