

2017

# City of Folly Beach, South Carolina, Sea Level Rise Adaptation Report



Final report  
5/18/2017

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# City of Folly Beach Sea Level Rise Adaptation Report

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## Executive Summary

Through an award provided by the S.C. Sea Grant Consortium, the City of Folly Beach collaborated with research and outreach professionals from the S.C. Sea Grant Consortium, the Carolinas Integrated Sciences and Assessments Program at the University of South Carolina, and Elko Coastal Consulting to develop this sea level rise adaptation report. Using a participatory approach, this project explored potential adaptation actions for making the City more resilient over time.

Long-term data from the National Oceanographic and Atmospheric Administration (NOAA) tide gauge at Charleston, SC document 12 inches (1 foot) of sea level rise since its installation in 1921. Folly Beach is already being impacted by rising seas, particularly during “King” tide events when stormwater drainage systems backup and flood low-lying roads and yards.

This report highlights several adaptation options within five categories to make the City of Folly Beach more resilient to sea level rise and coastal flooding. The categories include: Water Infrastructure Management, Land Management, Education, Transportation Adaptation, and Coordination, Collaboration, and Cooperation.

The report includes the following recommendations which are detailed in the Recommended Adaptation Actions on page 13. Each item includes recommended actions in the near-, medium-, and long-term ranges.

1. The City of Folly Beach should plan for 3 feet of sea level rise over the next 50 years, or by 2066
2. City Council should consider the Sea Level Rise Adaptation Actions, which were prioritized by stakeholders and the public as follows:
  - a. Drainage Management Plan
  - b. Septic Vulnerability Assessment
  - c. Marshfront Management Plan

Outreach and Education was ranked third, just above the Marsh Front Management Plan, by public meeting participants. This report recommends that each of the above three recommended Adaptation Actions include a detailed and strategic education component. Additionally, the report recommends that the City continue development of a geodatabase with layers of the different types of infrastructure (drainage, septic, sewer, water lines, etc.), administrative boundaries, topography, imagery, etc. organized into a common operating picture, which can ultimately be accessed by web, mobile, and hardcopy techniques.

## Introduction

The City of Folly Beach is located on a barrier island and the adjacent lands on the Atlantic Ocean in Charleston County, SC. Known to Charleston locals as "the Edge of America," the City's vulnerable position to coastal hazards is clear.

The City has invested significantly in its beachfront through a 50-year Local Cooperation Agreement (LCA) between the U.S. Army Corps of Engineers (USACE) and the City which remain in effect from 1992 until 2042. The City has also planned for beach management alternatives in addition to the Federal project in its State-Approved [Folly Beach Local Comprehensive Beachfront Management Plan](#) (LCBMP<sup>1</sup>). The goal of this plan is to "develop a long-term beach preservation strategy such that the restored beach and dune system is not lost between periodic renourishments."

By contrast, long-term management plans for other important City infrastructure projects have not been developed. The Folly Beach Comprehensive Plan identifies the need to adapt to the effects of sea level rise specifically in the **Protecting Natural Resources** section of the "Needs, Goals and Implementation Strategies" section (Section 3):

*In the next decade Folly Beach **must be prepared to adapt to the effects of sea level rise**, decreasing federal and state funding, and increased tourism. The Plan recognizes the need for proactively managing the beach, the river and marsh areas, and wildlife habitat within the City.*

The Plan highlights Relevant Needs in this Protecting Natural Resources Section that would benefit from sea level rise adaptation planning:

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### RELEVANT NEEDS FROM THE FOLLY BEACH COMPREHENSIVE PLAN (PROTECTING NATURAL RESOURCES SECTION)

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- 1) Need: Property in Folly Beach includes beach front, marsh and wetland environments, and historically important lands and structures which must be protected through sensitive development.  
Goal: Eliminate existing encroachments on sensitive water fronts, marshes, wetlands, and riparian areas while encouraging environmentally sensitive development to protect the environments that define the beauty of Folly Beach.  
Implementation: Vigorous enforcement of ordinances such as setbacks, sand dune disturbance, and impervious surfaces. Incorporate recognized Green Building Practices into the Folly Beach Building Code.
  
- 10) Need: Undeveloped, environmentally sensitive lands in the marsh behind Folly Island are not protected from intense development.  
Goal: Protect marsh islands from inappropriately intense development.  
Implementation: Create a new lower density zoning classification for Long Island. Work with Charleston County to insure that marsh islands out of Folly's jurisdiction are regulated.

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<sup>1</sup> City of Folly Beach Local Comprehensive Beach Management Plan, 2015

Under the **Public Services** thematic area, several relevant Needs would also benefit from sea level rise adaptation planning:

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#### RELEVANT NEEDS FROM THE FOLLY BEACH COMPREHENSIVE PLAN (PUBLIC SERVICES SECTION)

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- 1) Need: Water quality is threatened by lack of stormwater facility maintenance and construction.

Goal: To reduce potential and actual pollution of ground and surface water.

Implementation: Map all drainage facilities on the island, establish regular monitoring to ensure proper functioning, and improve existing drainage systems and components, and work with Charleston County and DOT to identify and construct new drainage infrastructure where needed.

- 8) Need: At present there is no updated map or inventory of the water and sewer infrastructure. There are vulnerabilities that need to be assessed as well as limited reserves for replacement.

Goal: Continued funding for future water/sewer system infrastructure replacement reserves. Locating, mapping, and evaluating the existing water/sewer lines.

Implementation: Make yearly contributions to appropriate reserve accounts for water and sewer.

**Work with Sea Grant Consortium on mapping infrastructure as part of an overall resiliency effort.**

Hire an outside engineering firm to assess the system and develop a depreciation schedule.

Involve the Utilities Advisory Board with infrastructure planning

- 11) Need: The island remains mostly dependent on onsite septic systems for waste management.

Goal: Coordination with the South Carolina Department of Health and Environmental Control regarding septic system monitoring and regulation.

Implementation: Consider ordinances to require regular pumping and inspections of septic tanks that service rental properties. Explore alternate strategies related to waste management to reduce reliance on septic systems.

Given its vulnerable position to coastal hazards, the City developed a plan to create a Sea Level Rise Adaptation report. The City of Folly Beach partnered with the S.C. Sea Grant Consortium, the Carolinas Integrated Sciences and Assessments Program at the University of South Carolina, and Elko Coastal Consulting (the “project team”) to develop strategies for the City to adapt, or increase its capacity to adapt, to future sea level rise impacts. Adaptation is the process of adjusting activities to a changing environment to take advantage of benefits and reduce negative effects.

The project team kicked off the adaptation planning process by administering an online survey (Appendix A) to gauge the level of knowledge and gather information on problem areas and desired outcomes prior to the Stakeholders’ Workshop. The Stakeholders’ Workshop was held in August 2016. Outcomes and recommendations served as the basis of an initial draft version of this report.

The draft report was published on the City’s website and three public workshops were advertised online, in the City’s newsletter, and on social media. The public meetings were held on April 5, May 4, and May 16, 2017. Additional input from workshop attendees was incorporated into this final report.

This report includes information on local sea level rise trends and details the 11 adaptation actions identified by the project team. This report serves to initiate the process for the City of Folly Beach to begin adapting to sea level rise. The next step is for City Council to consider implementation of the recommendations of the project team.

### Sea Level Rise Adaptation Action List

The following adaptation actions were identified and prioritized by the stakeholders’ workshop participants. They will help the City of Folly Beach prepare for sea level rise via direct adaptation of policy and by expanding the City’s adaptive capacity.

1. Water Infrastructure Management
  - a. Drainage Management Plan
  - b. Septic Vulnerability Assessment
  - c. Drinking Water Delivery Improvement Plan
2. Land Management
  - a. Marshfront Management Plan
  - b. Building Code Modifications
  - c. Adaptation Enforcement through Existing Codes, Permit Requirements
  - d. Monitor Ownership of Marsh Islands near Causeway
3. Education
  - a. Outreach to Property Owners and Elected Officials
4. Transportation Adaptation
  - a. Causeway & Roadway Adaptations
5. Coordination, Collaboration, and Cooperation
  - a. Coordination between Governments and Agencies
  - b. Approaches to Implementation of Adaptation Action Items



## The City of Folly Beach Vulnerability Assessment

With its low-lying topography, the City of Folly Beach is particularly vulnerable to elevated water levels. This section examines historic and future sea level rise and the occurrence of King Tides or nuisance flooding. This section also presents output from the National Oceanic and Atmospheric Administration (NOAA) Sea Level Rise viewer depicting 3 feet base sea level rise. Lastly, this section explores what these water levels are like on the ground by drawing comparisons to flooding events associated with the passage of Hurricane Joaquin in October 2015.

The U.S. National Climate Assessment (NCA) included more than 300 experts guided by a 60-member Federal Advisory Committee, and the assessment was reviewed by the public, federal agencies, and a panel of the National Academy of Sciences<sup>2</sup>. The NCA concludes that the evidence of human-induced climate change continues to strengthen and that impacts are increasing across the country.

### Observed Local Tide Gauge Data

Here, we consider long-term tide gauge data from nearby [NOAA station 86655300](#) at Charleston, SC. Located at the Cooper River Entrance, this station provides the long-term data necessary for identifying sea level trends. It can be used as a proxy for major trends across the County, but may differ somewhat from specific tide gauges around Folly Beach, especially if they are located on an insulated river. Since the station's establishment in 1921, relative mean sea level has risen an average of 0.126 inches (3.21 mm) per year (Figure 1). This translates to 1.05 feet/century. Note the linear rate of sea level rise.

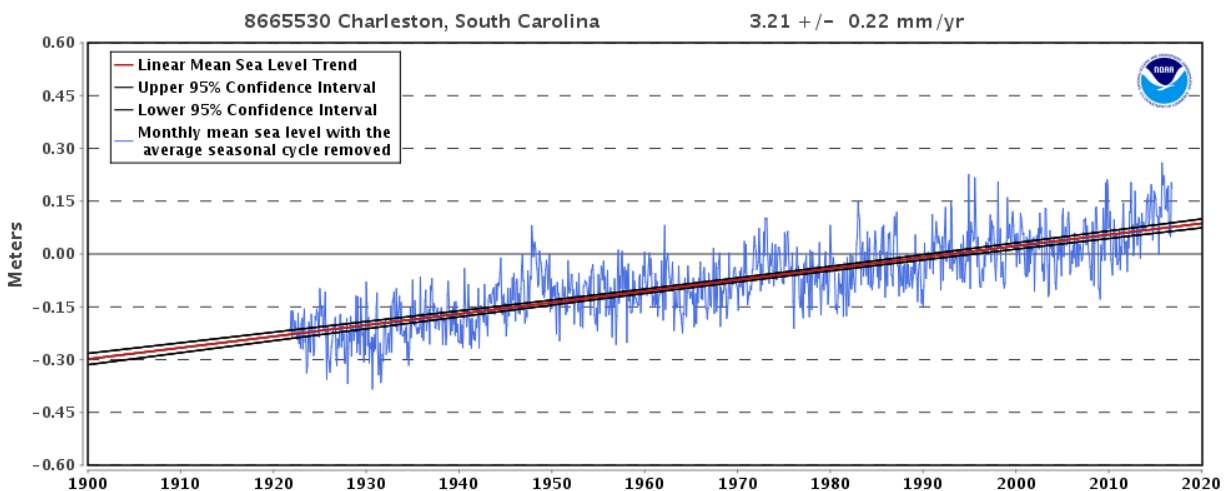


Figure 1. Graph of observed monthly mean sea level in Charleston, SC resulting in a linear rise in sea level of 0.126 in/yr. From [NOAA Tides & Currents](#).

NOAA tide gauges around the continental U.S., and in Charleston, show that sea level rise has caused an increase in tidal floods associated with nuisance-level impacts. Nuisance flooding events are often associated with “King” or spring tides (higher than normal high tides when the moon is closest to the earth). Nuisance floods are events in which water levels exceed the local threshold (set by NOAA’s National Weather Service) for minor impacts, such as road closures and overwhelmed storm drains<sup>3</sup>.

<sup>2</sup> National Climate Assessment, 2014. U.S. Global Change Research Program, [www.nca2014.globalchange.gov](http://www.nca2014.globalchange.gov)

<sup>3</sup> Runkle, J., K. Kunkel, L. Stevens, R. Frankson, B. Stewart, and W. Sweet, 2017: South Carolina State Summary. NOAA Technical Report NESDIS 149-SC, 4 pp, <https://statesummaries.ncics.org/sc>

The frequency of nuisance flooding events is not only increasing, but also accelerating in time<sup>4</sup>. Since the 1980s, nuisance flood days have increased particularly along the U.S. East Coast, and specifically in Charleston (Figure 2). The greatest number of tidal flood days (all days exceeding the nuisance level threshold) occurred in 2015 at Charleston.

Note that the rate of days with nuisance flooding is increasing at an accelerating rate, as compared to the linear rate of increase in sea level (Figure 1), and is projected to continue to increase at this rate. This is consistent with the “living memory” of the City of Folly Beach (i.e., nuisance flooding seems to be happening more often) and was a driver to initiate this Sea Level Rise Adaptation effort.

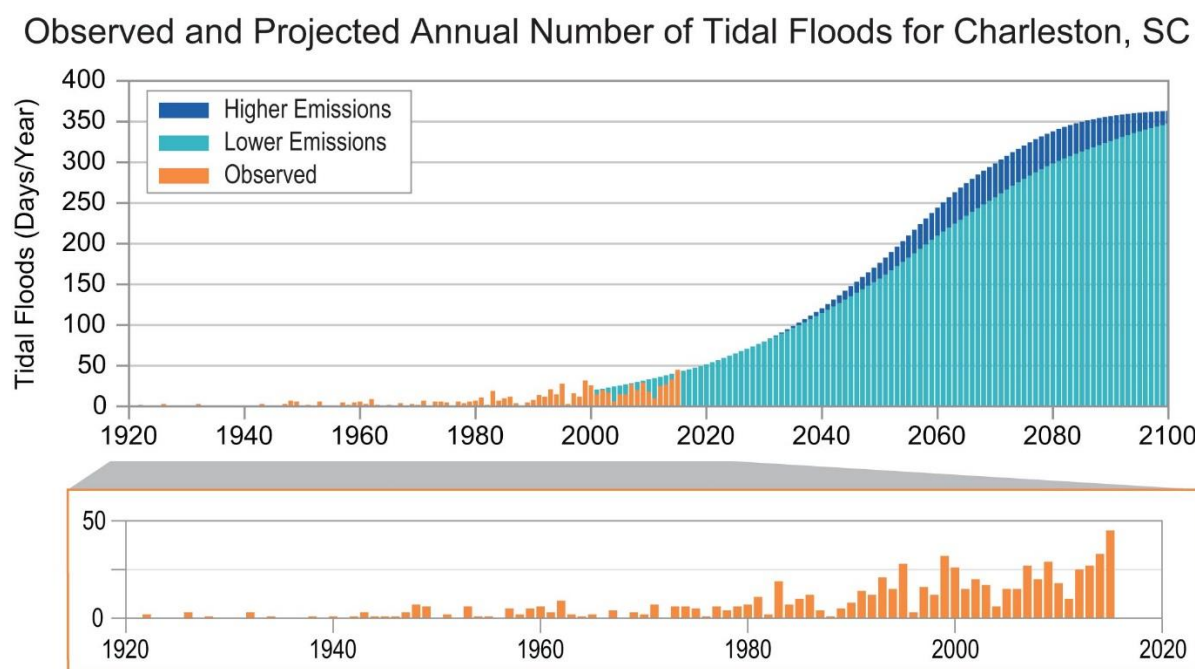


Figure 2. Number of tidal (“nuisance”) flood days per year for the observed record (orange bars) and projections for two possible futures: lower emissions (light blue) and higher emissions (dark blue) per calendar year for Charleston, SC since 1921<sup>5</sup>.

### Future Sea Level and Nuisance Flooding Rates

According to NOAA (2014), “it is apparent that a time horizon exists, largely dependent upon the local rate of sea level rise (SLR), when critical elevation thresholds for various public/private/commercial serving systems will become increasingly compromised by tidal flooding in the future. We stress that in many areas, *the frequency of nuisance flooding is already on an accelerating trajectory, and many other locations will soon follow even with a continuation of linear SLR rates*. This fact needs to be recognized, as it is critical for coastal planning entities to prevent critical-system degradation from SLR impacts and to promote resiliency efforts in general.”

<sup>4</sup> NOAA, 2014. Sea Level Rise and Nuisance Flood Frequency Changes around the United States. NOAA Technical Report NOS CO-OPS 073.

<sup>5</sup> Runkle, J., K. Kunkel, L. Stevens, R. Frankson, B. Stewart, and W. Sweet, 2017: South Carolina State Summary. NOAA Technical Report NESDIS 149-SC, 4 pp, <https://statesummaries.ncics.org/sc>

Tide gauge observations suggest that the frequency of nuisance flooding impacts will continue to accelerate in the future, even if the rate of sea level does not accelerate, but rather continues to increase at a linear rate. Thus, it is critical to begin consideration of the recommendations made in this report.

## Flood Mapping

To determine the impact of future projections in sea level, the stakeholders needed to decide on a planning time horizon and a sea level rise scenario. The project team used photographs from Hurricane Joaquin and ESRI's geographic information systems software, ArcGIS®, to help attendees visualize the potential impact of elevated water levels across the City of Folly Beach.

The project team compared one-half-foot sea level rise contours provided by the [NOAA Office of Coastal Management's Sea Level Rise and Coastal Flooding Impacts Viewer](#) (e.g., Figure 3). The layers simulate the vertical and horizontal movement of the tidal water line onto the topography of the land surface. This methodology is sometimes known as a “bathtub model” because the water fills the basin up to the modeled land surface just like water fills a bathtub. This type of mapping does not factor in other forces that will shape Folly Beach as the sea rises, including wave action due to storm surge, erosion of the shoreline, changing hydrological patterns, or the protection of shoreline by humans. Thus, Figure 3 should be utilized as an estimate, or a general depiction, of what Folly Beach might look like under a 3-foot sea level rise scenario. The specific, property-level details cannot be validated.

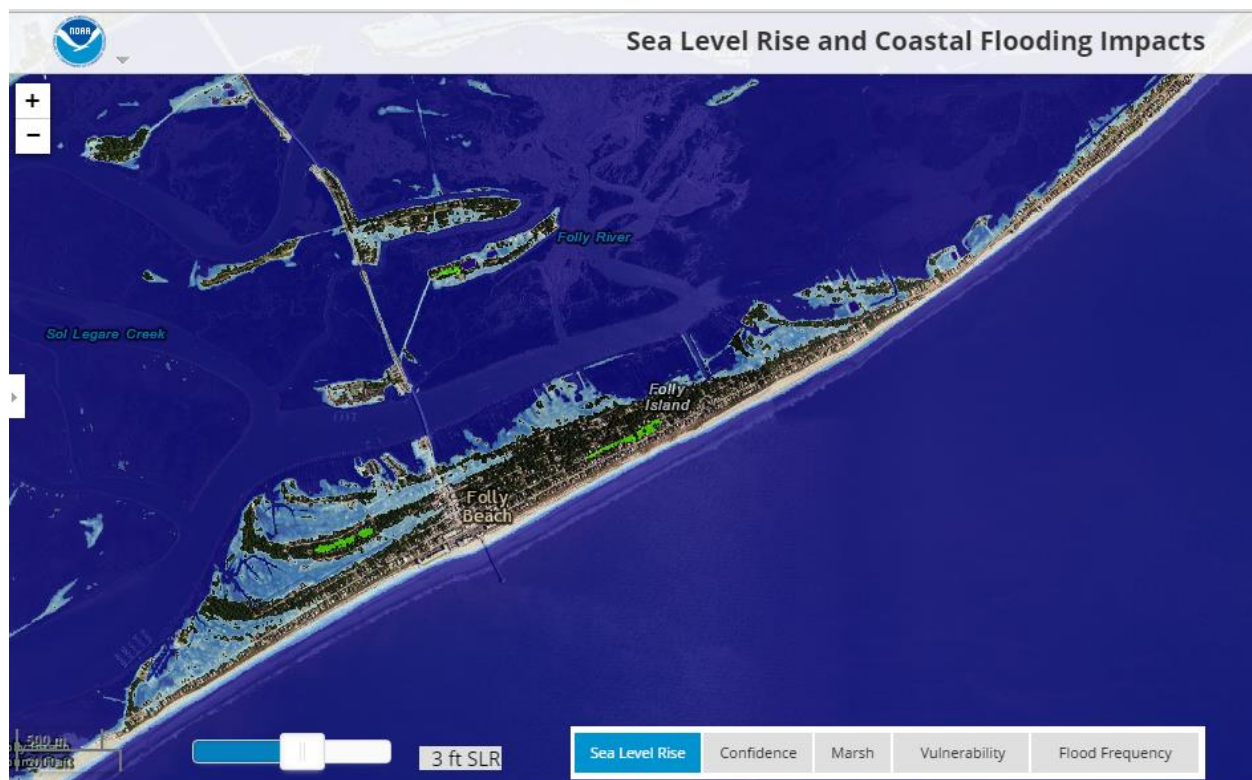


Figure 3. NOAA Sea Level Rise Viewer depicting 3 ft of sea level rise on Folly Beach, SC.

The NOAA Sea Level Rise Viewer allows the user to toggle water level scenarios to visualize potential impacts. Interestingly, little effect is obvious even at 3 feet of sea level rise on the beachfront, while the

back side of the island and the causeways are significantly affected. This confirms the need to develop long-term management plans for City infrastructure projects that are housed in, or service, these low-lying areas. Thus, beachfront adaptation is not a major focus of this report.

The most extreme floods today offer a glimpse into the regular tidal floods of the future. In late October 2015 following the passage of Hurricane Joaquin, local water level approached 2 feet (~1.7 ft.) above predicted water levels amid several days of intense rainfall. Drainage systems on Folly Beach were overwhelmed. The City documented flooding across the island during this time (Figure 4 and Figure 5).



*Figure 4. Photograph of the Charleston County Boat Ramp on the marshside of Folly Beach during the passage of Hurricane Joaquin in 2015. Water levels approached 2 ft above predictions. Photo used to illustrate “what 2 ft of sea level rise looks like” with workshop participants. Photo credit: Eric Lutz.*



*Figure 5. Photograph of East Arctic Ave., Folly Beach during the passage of Hurricane Joaquin in 2015. Water levels approached 2 ft above predictions. Photo used to illustrate “what 2 ft of sea level rise looks like” with workshop participants. Photo credit: Eric Lutz.*



Overall, the flood maps and photographs presented here provide a big-picture perspective of encroaching sea level. They are intended to inform the public and introduce sea level rise as an important City planning challenge.

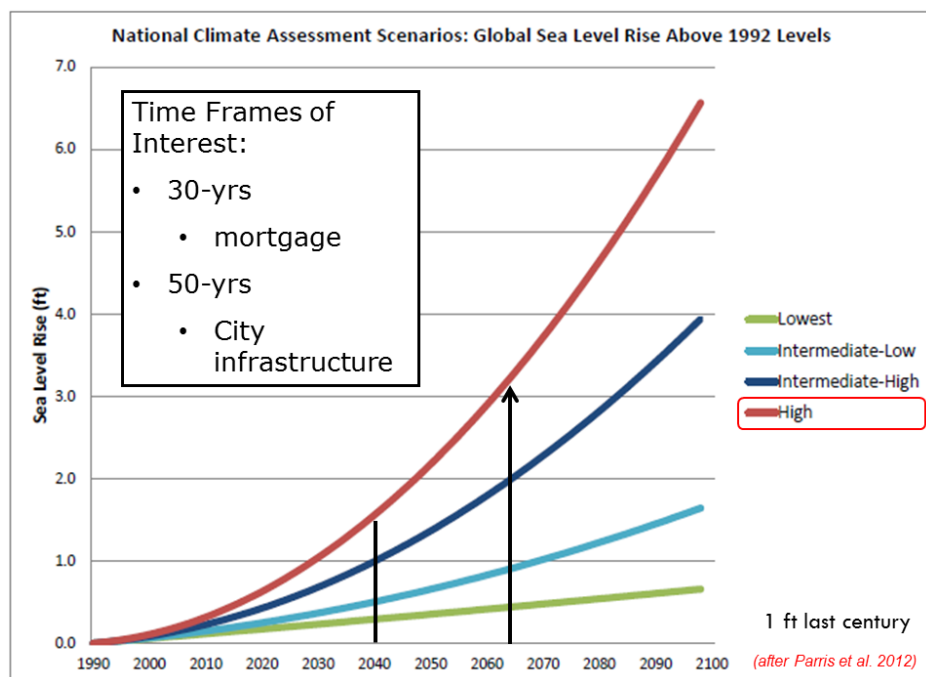


Figure 6. Sea level rise scenarios from the National Climate Assessment used to help stakeholders decide on appropriate planning horizons and scenarios, after Parris et al., 2012.

The stakeholders discussed appropriate planning horizons of both 30 years, comparable to a home mortgage life, and 50 years, comparable to the expected life of city infrastructure. The stakeholders also discussed different sea level rise scenarios (Figure 6) and agreed to **plan for 3 feet of sea level rise over the next 50 years, or by 2066** - the first recommendation of this report. The rationale was that extreme events (e.g., the passage of Hurricane Joaquin) and nuisance flooding are already impacting the island at levels comparable to 2 feet of sea level rise; thus, the stakeholders decided that it was appropriate to plan for 3 feet over the next 50 years.

## Community Input Process

Participants and stakeholders included the project team, local decision makers, their colleagues, and other members of the public. There were three formal phases of community input: an online survey, a Stakeholders' Sea Level Rise Adaptation Workshop, and a public workshop.

### Online Survey (July 2016) and Stakeholders' Workshop (August 2016)

The first step in the process was to distribute an online survey (Appendix A) to the future workshop participants so the project team could provide the most relevant data and information at the workshop to encourage a productive conversation on adaptation strategies the City might consider. Survey responses provided the project team with an initial level of understanding of the participants' highest adaptation priorities and flooding areas of concern. It also provided a gauge for how well the stakeholders understood the City's infrastructure assets and maintenance needs prior to the workshop.

The second step was a Stakeholders' Sea Level Rise Adaptation Workshop hosted at City Hall by the project team. The participants were selected based on their expertise and included the following.

### Participants

Mark Patrick, Charleston County Park and Recreation Commission

Gered Lennon, S.C. Department of Natural Resources

Melissa Bimbi, U.S. Fish and Wildlife Service

Dan Burger, SC DHEC-OCRM

Will Salters, SC DHEC-OCRM

Liz Fly, SC Sea Grant Consortium and Carolinas Integrated Sciences and Assessments Program (CISA)

Kirstin Dow, University of South Carolina, CISA

Spencer Wetmore, City of Folly Beach (COFB), City Administrator

Aaron Pope, COFB, Zoning Administrator

Beth Saunders, COFB Planning Commission Chair

Teresa Marshall, COFB City Council Member

Kyle Sullivan, COFB Public Works

Nicole Elko, Elko Coastal Consulting, Inc.

### Workshop Agenda

The group discussions were structured using the Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) [process](#)<sup>6</sup>. VCAPS is an approach to decision support that integrates local knowledge with scientific understanding. It has been previously used in at least 13 coastal communities, including Sullivan's Island and McClellanville in South Carolina.

Throughout the discussion, the participants identified many adaptation actions. Their actions were the foundation of the list contained in this report. Participants ranked the action items from most to least important at the conclusion of the workshop.

### Public Workshops (April 5, May 4 and May 16, 2017)

On April 5, May 4, and May 16, 2017, the City of Folly Beach hosted public workshops and a local Civic Club meeting seeking local input on the stakeholders' prioritized list of adaptation actions. The public workshops were advertised publicly via the City website, newsletter, and word of mouth during the month prior.

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<sup>6</sup>SERI & CISA. 2014. "VCAPS: Vulnerability, Consequences, and Adaptation Planning Scenarios." <http://vcapsforplanning.org/>

16 and 10 people attended the April and May public workshops, respectively, and 16 people attended the May 16 Civic Club meeting. Figure 7 identifies the affiliation of the attendees according to an online poll conducted during the public workshop and Figure 8 identifies the affiliation of the attendees at the Civic Club meeting. The three groups with the most representation included concerned citizens, council members/elected officials, and City employees. The Civic Club meeting attracted the most concerned citizens.

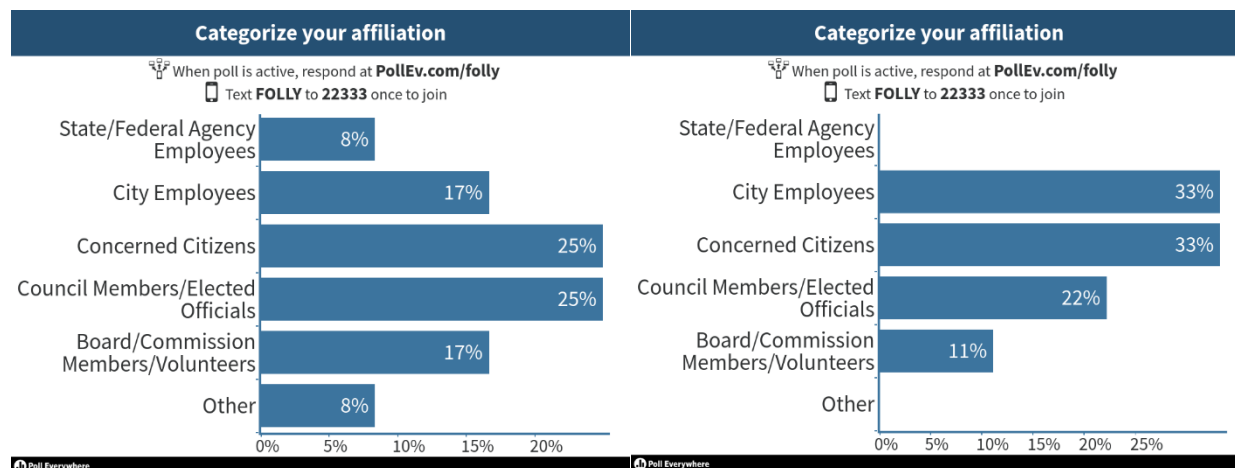


Figure 7. Affiliation of attendees of the April (left) and May (right) public workshops.

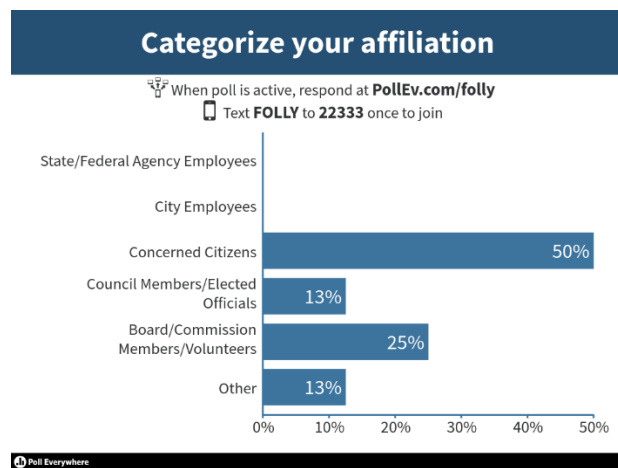


Figure 8. Affiliation of attendees of the May 16 Civic Club meeting.

The 1-hr public workshops were held at the City of Folly Beach Public Services Building and the Civic Club meeting was held at the Folly Beach Community Center. All included a presentation of the findings and prioritized recommendations of the Stakeholders' Sea Level Rise Adaptation Workshop. The presentations were followed by a public comment period which facilitated the critique, expansion, and clarification of the adaptation actions.

During the public meetings, each participant ranked their first and second priorities from the list of adaptation actions.

## How Stakeholder and Community Input was Used

Community input was the cornerstone of this project. The online survey provided the necessary context information for subsequent steps. The project team learned about major infrastructure projects managed by both the City and outside agencies that needed to be discussed for climate adaptation efforts.

The Stakeholder Group, using the VCAPS process for structure, created the initial list of adaptation actions. Group members continued to provide input throughout every stage of the project, including final edits to the report.

The public workshops critiqued, expanded, and combined adaptation actions. Whereas membership to the Stakeholder Group was by invitation only, the workshops offered a wider opportunity for anyone in the Folly Beach community to participate.

## Top Priorities of Workshop Participants

During the stakeholders and public workshops, each participant ranked their priorities from among the adaptation actions. In this tabulation of participant voting, the stakeholders ranking was applied directly to the action's weighted score (e.g., the highest ranked priority received 10 points). Each public workshop participant's first and second priorities were awarded a weighted score of 2 for the 1<sup>st</sup> priority and 1 for the 2<sup>nd</sup> priority.

Items that did not receive priority votes were not necessarily unimportant to the participants. For example, the City already has a drinking water delivery improvement inventory project underway. That action item likely received fewer votes because of this ongoing effort. "Approaches to Implementation" was ranked last because it was not included in the voting.

*Table 1. Prioritized List of Sea Level Rise Adaptation Actions for the City of Folly Beach*

<b>RANK</b>	<b>ADAPTATION ACTION</b>	<b>CATEGORY</b>	<b>WEIGHTED SCORE</b>
<b>1</b>	Drainage Management Plan	Water Infrastructure Management	43
<b>2</b>	Septic Vulnerability Assessment	Water Infrastructure Management	43
<b>3</b>	Marshfront Management Plan	Land Management	20*
<b>4</b>	Outreach	Education	21
<b>5</b>	Causeway & Roadway Adaptations	Transportation Adaptation	10
<b>6</b>	Building code modifications	Land Management	9
<b>7</b>	Drinking Water Delivery Improvement Plan	Water Infrastructure Management	7
<b>8</b>	Coordination between governments and agencies	Coordination, Collaboration, and Cooperation	5



9	Adaptation enforcement	Land Management	3
10	Monitor ownership of marsh islands near causeway	Land Management	2
11	Approaches to implementation	Coordination, Collaboration, and Cooperation	0

\*The project team elected to incorporate a public education campaign into all of the top priorities – essentially recommending the top 4.

### Recommended Adaptation Actions

This report recommends that the City of Folly Beach plan for 3 feet of sea level rise over the next 50 years, or by 2066. Additionally, City Council should consider the top Sea Level Rise Adaptation Actions, which were prioritized by stakeholders and the public. The Education and Outreach action has been incorporated into each of the following three recommended actions: Septic Vulnerability Assessment, Drainage Management Plan, Marshfront Management Plan. For each action, recommended steps forward are given for the near-, medium-, and long-term below.

In addition to education as a pervasive theme in all three recommended actions, mapping and inventorying is also a consistent recommendation. The City should consider developing a comprehensive geodatabase to accomplish the mapping objectives. The geodatabase may contain layers of the different types of infrastructure (drainage, septic, sewer, water lines, etc.), administrative boundaries, topography, imagery, etc. organized into a common operating picture, which can be accessed by web, mobile, and hardcopy techniques.

#### *Recommended Adaptation Action: Drainage Management Plan*

##### Near-term (1 year)

1. Hold face-to-face meeting with County and DOT reps responsible for maintenance of drainage infrastructure to determine ownership and to catalog maintenance schedules.
2. Develop strategic education campaign of property owners and elected officials

##### Medium-term (3 years)

1. Collection, organization, and mapping of drainage infrastructure components as well as natural drainage patterns and problem areas.
2. Learn from other communities, possible hiring of engineering firm
3. Continue strategic education campaign of property owners and elected officials

##### Long-term (5 years+)

1. Construct specific infrastructure projects targeted at improving drainage that result from above steps
2. Adapt strategic education campaign of property owners and elected officials

#### *Recommended Adaptation Action: Septic Vulnerability Assessment*

##### Near-term (1 year)

1. Enforce septic limitations on rental applications
2. Learn from other beach communities with septic challenges (Edisto, Sullivan's, Isle of Palms, Nags Head NC, etc.)

3. Approach SCDHEC about possibly hosting a workshop to educate stakeholders and for communities to share lessons learned
4. Initiate a strategic education campaign of property owners and elected officials
5. Map and inventory septic tanks

#### Medium-term (3 years)

1. Hire an engineering firm to conduct a vulnerability assessment of septic at elevated water level scenarios, ID priority areas (Marshfront Management Plan may help), and provide estimates of cost per linear foot.
2. Consider a [septic inspection incentive program](#)<sup>7</sup>
3. Continue strategic education campaign of property owners and elected officials

#### Long-term (5 years+)

1. Expand sewer to prioritized areas (high risk + enough customers)
2. Adapt strategic education campaign of property owners and elected officials

#### *Recommended Adaptation Action: Marshfront Management Plan*

##### Near-term (1 year)

1. Initiate partnership with SCDHEC-OCRM to develop a pilot Marshfront Management Plan for a South Carolina beach community.
  - a. Understand critical line permitting and building requirements
2. Participate in SCDHEC-OCRM's Living Shorelines Working Group
3. Begin Plan development
4. Develop strategic education campaign of property owners and elected officials

##### Medium-term (3 years)

1. Complete and Adopt Plan, which will include a detailed inventory of all structures, property lines, habitat, erosion control devices, a vulnerability (historic and present) assessment of the marshside, as well as the consideration of management and adaptation options such as setbacks, ordinance/code modifications, and living shoreline incentives.
2. Continue strategic education campaign of property owners and elected officials

##### Long-term (5 years+)

1. Implement Plan
2. Assess modifications to setbacks, codes, and regs to determine effectiveness of plan implementation.
3. Adapt strategic education campaign of property owners and elected officials

## Adaptation Actions

This section provides expanded information on the adaptation actions developed during the Stakeholders' Sea Level Adaptation Workshop and the public workshops. Each recommended action entry describes the action, summarizes community input (concerns and suggestions), and lists potential partners where applicable. The Additional Information section for each action includes specific

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<sup>7</sup> Nags Head, NC Septic Health Initiative: <http://www.nagsheadnc.gov/index.asp?SEC=F43EBE1E-2B2D-4F36-8182-0544F0BEEAD1&Type=NONE>

information either provided during the community input process or gathered by the project team beyond that discussed during the community input phases.

## Category 1: Water Infrastructure Management

### 1.1 Drainage Management Plan

A Drainage (or Stormwater) Management Plan for the City of Folly Beach is intended to assist the dewatering of the island, particularly the roads, following a significant rain or flooding event. It will also assist the City in its sea level rise adaptation program, as water levels rise. The Plan will initially focus on collection, organization, mapping, cataloging maintenance schedules, and initial implementation recommendations.

#### a. Community Input

##### i. Concerns

1. Ownership of drainage infrastructure is unclear and not well documented.
2. What if City of Folly Beach cleans out County- or DOT-maintained ditches? Does ownership/future maintenance responsibility revert?
3. Need for mobile, and perhaps fixed, pumps to address specific problem areas

##### ii. Suggestions

1. Map drainage infrastructure, natural drainage patterns, and problem areas. Include ownership of ditches and maintenance schedules.
2. County just raised stormwater fee, so should have capital reserve for both operations and capital projects such as cleaning out drainage ditches.
3. Specific stormwater/pump station feasibility study

##### iii. Partners

1. SC Department of Transportation (DOT) and Charleston County

#### b. Additional Information

- i. [Low Impact Development](https://www.epa.gov/green-infrastructure) (LID)<sup>8</sup> is an integrated, comprehensive approach to land development or redevelopment that works with nature to manage stormwater as close to its source as possible. LID practices can protect local water quality and reduce urban flooding through best practices in stormwater management.
- ii. The ACE Basin and North Inlet-Winyah Bay National Estuarine Research Reserves, the Center for Watershed Protection, the S.C. Sea Grant Consortium, and partners have recently published an [LID manual](http://www.northinlet.sc.edu/lid/)<sup>9</sup> for coastal South Carolina. Appendix G of this manual includes actions for adapting stormwater management to climate change. These include implementing LID practices at the site scale to reduce runoff volumes, modifying practices to prevent bypass during

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<sup>8</sup> <https://www.epa.gov/green-infrastructure>

<sup>9</sup> <http://www.northinlet.sc.edu/lid/>

intense storm events, periodically revisiting design storms and mapped flood plains, using adaptable plants in place of native species, and using stormwater as a water source for irrigation.

## 1.2 Septic Vulnerability Assessment

### a. Community Input

#### i. Concerns

1. Water quality and human health implications of both old, deteriorating septic tanks, and also overused drain fields that become part of the island water system during flooding events.
2. Septic will be obsolete at 3feet of SLR, so how to plan appropriately?
3. When will impacts of groundwater pressure on sewer system be realized?
4. Delicate balance between septic and sewer to control development. However, the “rogue council” fear is relatively unfounded, need education for decision makers.
  - a. Today, some lots won’t “perc” and therefore cannot be developed
5. Zoning controls prohibit condo development now. Need strong zoning laws. Need education of voters.
6. Septic testing process is reactionary (i.e., neighbor reporting a problem). Hard to test viability of tank/drainfield.
7. Septic monitoring enforcement: at time of sale, should have a 5 yr record of pumping.
8. Challenge: funding sewer to some less populated areas expensive with few clients

#### ii. Suggestions

1. Need: map and inventory all septic tanks to track failures, site use, age of system, size of tank, location of system in relation to surface waters, etc.
2. Engineering firm to conduct vulnerability assessment of septic at 3’ SLR, provide estimates of cost per linear foot, etc.
3. Weigh pros and cons of potential sewer expansion zones. For example, an area with high risk of septic breach and enough customers to fund sewer could be considered as a possible sewer expansion zone.
4. Identify priority areas where sewer needs to be developed primarily in single family areas.
5. Benefit of adding sewer might be added revenue once costly infrastructure was paid off.
6. Enforce septic monitoring not only at time of house sale but also on a regular basis. Start with rental properties.

b. Additional Information

- i. [SCDHEC Septic Tanks Information page](#)<sup>10</sup>
- ii. Existing sewage system extends from commercial district to Berts along Ashley and Sunset Point.
- iii. Water table is 3.5 feet deep on average.
- iv. When septic tank is compromised, home is ruled unfit for occupancy until septic tank is fixed or relocated (e.g., eroded off beachfront).
- v. Sullivan's Island, Isle of Palms, Edisto Beach all have septic challenges
- vi. Nags Head, NC [septic inspection incentive program](#)<sup>11</sup>: a free system inspection if that system is not defined as innovative by its permit with the local health department. In addition to the inspection refund, a property owner that has their septic tank pumped because of the septic inspection can also receive a water credit voucher worth \$30 towards their water service account. All they must do is provide proof of pump out. The septic inspection reports are entered into a town-operated database to track failures, site use, age of system, size of tank, location of system in relation to surface waters, among other items. To assist property owners with failing septic systems, the town also offers a low interest loan program to owners of malfunctioning systems in need of repair or replacement. The maximum amount financed to owners is \$5,000 (payable over three years at prime interest rate minus 2.5%). The Inspection program runs from July through May of every fiscal year.

### 1.3 Drinking Water Delivery Improvement Plan

The City had previously recognized and addressed the need to improve drinking water delivery. Presently, the Drinking Water Mains Mapping Project is an ongoing and important Capital Project. It includes GIS mapping and depreciation schedule of all drinking water supply infrastructure (year installed, materials, etc.).

a. Community Input

i. Concerns

1. During Hurricane Joaquin, canal bringing water into water treatment plant was breached in Columbia
2. City's pipes are made of plastic, iron.
3. Age of water system
4. Unmapped system of mains.
5. Limited options

ii. Suggestions

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<sup>10</sup> <http://www.scdhec.gov/HomeAndEnvironment/YourHomeEnvironmentalandSafetyConcerns/SepticTanks/>

<sup>11</sup> Nags Head, NC Septic Health Initiative: <http://www.nagsheadnc.gov/index.asp?SEC=F43EBE1E-2B2D-4F36-8182-0544F0BEEAD1&Type=NONE>

1. Continue with ongoing Drinking Water Mains Mapping Project
  2. Replacement of City water tower and in-ground tank with a more sustainable and higher capacity water aquifer
  3. Include consideration/discussion of a new west-end water tower/storage tank
  4. Public education: Need water in your emergency supply kit
- iii. Partners
1. Charleston Water System
- b. Additional Information
- i. City has approximately one day's worth of water supply in tower.
  - ii. Charleston Water System's major hazards concern is earthquakes
  - iii. Existing storage: underground tank and water tower.
  - iv. Hurricane plan: Charleston County and state of SC have collaborated on disaster response contracting to provide adequate drinking water and arrange emergency repairs to critical water infrastructure in the aftermath of a natural disaster.

## Category 2: Land Management

### 2.1 Marshfront Management Plan

In 2015, the City of Folly Beach and the state of South Carolina approved a Local Comprehensive Beach Management Plan (LCBMP). A similar plan is envisioned for the marshfront shore of Folly Beach. Although no specific criteria are recommended for such a plan, as opposed to the LCBMP, which has prescribed criteria based on communities' desire for public funding, SCDHEC OCRM is interested in partnering with the City on this new planning tool to share with other communities. The marshfront management plan would include a detailed inventory of all structures, property lines, habitat, erosion control devices, etc. as in the LCBMP. Management and adaptation options such as living shorelines would be considered.

- a. Community Input
- i. Concerns
    1. Habitat loss – natural accretion areas are best for habitat, development is limiting marsh migration.
    2. Use of hardened shorelines on private property just upland of critical line.
    3. City does not have requirements/prohibitions of hard stabilization on the marsh side. Potential for incentives for living shorelines.
    4. Limited understanding of vulnerability on marsh side. Are additional marsh set backs and/or building codes needed in addition to setbacks from critical line (OCRM) and FEMA requirements?
  - ii. Suggestions

1. Inventory: type of marsh, habitat, structures, Where are platted lines? Determine public/private property.
  2. Parcel level inundation analysis at 3 ft sea level rise needed
  3. Historic assessment of physical marshfront dynamics (shoreline change, etc.).
  4. Economic valuation of today's marsh – flood mitigation value of marsh and oyster reefs for storm protection (as living shorelines) and the commercial value of crab and shrimping industries.
  5. Scientific review of spectrum of erosion management options like living shorelines
  6. Include inventory of critical infrastructure or assets
  7. Use living shorelines as primary erosion management tool
  8. Encourage restoration/maintenance for natural areas not yet armored
- iii. Partners
1. SCDHEC OCRM LCBMP Program
- b. Additional Information
- i. As of March 2017, SCDHEC-OCRM had established a Living Shorelines Working Group to assess data from a Science Collaborative project from S.C. DNR and NOAA's National Estuarine Research Reserves. From this assessment, OCRM will aim to develop a regulatory definition for "Living Shoreline", along with success criteria and installation guidance. Once regulations are promulgated, individual permits for living shoreline projects will be more easily obtained by individual property owners, ideally making such projects a more, or at least equally, attractive alternative to armoring.
  - ii. SCDHEC, in partnership with the Governors' South Atlantic Alliance, is promoting the use of a spatial analysis tool that can be used by state and local coastal managers and scientists to improve comprehensive and hazard mitigation planning, post-disaster redevelopment, as well as determine areas best suited for restoration and mitigation efforts. [Hazard Vulnerability Assessment \(HVA\)](#) tool<sup>12</sup>. The HVA is an analysis tool that evaluates coastal hazard vulnerability from four hazards: storm surge, shoreline change rate (erosion or accretion), flooding, and social/economic vulnerability (SoVI®). The final product is a vulnerability index on a scale of 1 to 5 (1 being the least risk, 5 being the most risk).
  - iii. A common living shoreline approach in the Lowcountry is the restoration of oyster reefs. Oyster reefs can protect marsh habitats and the upland behind them from erosion if the conditions are right. Oysters do best when placed in

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<sup>12</sup><http://www.scdhec.gov/HomeAndEnvironment/Water/CoastalManagement/CoastalZoneManagement/CoastalHazards/>

- environments with low wave energy. [SCDNR](#)<sup>13</sup> and [The Nature Conservancy](#)<sup>14</sup> each manage ongoing oyster restoration projects in South Carolina.
- iv. To ensure future marsh habitats through conservation, the likely pathways of marsh migration need to be identified. Salt marsh will migrate onto former upland areas where not blocked by development. It is difficult to accurately predict future habitat change, but there are some preliminary tools that can help planners. The NOAA Office for Coastal Management has a Marsh Impacts/Migration tab on its [Sea Level Rise and Coastal Flooding Impacts](#)<sup>15</sup> tool. This tool predicts marsh migration based on the concept that marsh grows within a specific range of elevation between land and sea.
  - v. Known critical infrastructure not necessarily on the marshfront: Community center (Red Cross staging area), churches (shelter), parks/boat ramps, water plant. ID future park zoning area. No real historic structures (except Porgy house on 7<sup>th</sup> St, 710).

## 2.2 Building Code Modifications (where possible to incentivize better design)

Building codes ensure private development is conducted in a manner that protects the public health, safety, and welfare of citizens. Building codes set minimum construction standards. They are designed to consider natural hazards like floods and hurricanes based on their probability.

### a. Community Input

#### i. Concerns

1. Code was not originally designed to address sea level rise adaptation measures.
2. Existing building codes are enforced well.

#### ii. Suggestions

1. Use incentives to promote better compliance with building codes
2. Consider LEED certification incentives
3. Rebates on stormwater fee/permitting
4. Encourage smaller building footprints
5. Encourage fewer impervious surfaces – only ones allowed now are pools
6. Clearly identify regulatory authorities, especially for private property permitting, for example

### b. Additional Information

- i. New building code adopted in 2014 requires all new construction on the island must be built to V-zone standards.
- ii. The largest threat to buildings is flood damage. The City of Folly Beach currently requires all buildings to have their lowest floor at 1 foot above base flood

<sup>13</sup> <http://score.dnr.sc.gov/>

<sup>14</sup> <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/southcarolina/howwework/oyster-reef-restoration-southern-solutions-for-a-global-problem-1.xml>

<sup>15</sup> <https://coast.noaa.gov/digitalcoast/tools/slr>



elevation, or the elevation at which there is a 1% annual probability of a flood. This is known as 1 foot of freeboard.

- iii. The new 2016 updated [FEMA Flood Insurance Rate Maps](#) do not incorporate calculations of future sea level rise. Therefore, flood risk may be higher than what base flood elevations suggest and wider than what the current special flood hazard zones suggest.

## 2.3 Encourage Adaptation through Existing Codes, Permit Requirements

- a. Community Input
  - i. Concerns
    - a. The City has no authority to require existing properties to retrofit to modern codes.
  - ii. Suggestions
    - a. Certain permit requirements, codes that encourage adaptation measures, such as septic inspections, may be easier to enforce with rental properties

## 2.4 Monitor Ownership of Marsh Islands near Causeway

- a. Community Input
  - i. Concerns
    - 1. Significant inundation with sea level rise along marsh islands
  - ii. Suggestions
    - 1. COFB to monitor real estate transactions and discuss annexation of these islands to be more proactive in zoning/management.
  - iii. Partners
    - 1. Local realtors
    - 2. Charleston County
- b. Additional Information
  - i. Located within the City limits are Long Island and everything except Oak Island on the northeast side. Islands in the marsh that do not touch the causeway southwest of Folly Road is unincorporated Charleston County.

## Category 3: Education

### 3.1 Outreach

Public education or outreach campaigns involve reaching out to City residents to inform them of flood risk, the potential for environmental change, and relevant laws or policies. The objective is to increase local awareness about risk to inspire individuals and organizations to act.

- a. Community Input
  - i. Concerns

1. Critical importance of educating the public and local policy makers
2. Homes in the low-lying areas
3. Limited restrictions on private property modifications
4. Delicate balance between septic and sewer to control development. Need to keep hearing from experts and other communities.
5. Zoning controls prohibit condo development now. Need strong zoning laws. Need education of voters.
6. Public needs to know to include drinking water in emergency supply kits.
7. With continued education will come eventual incorporation into Comprehensive Plan and City process. How?
8. Need to educate the average property owner. How to engage them?
9. Perceived conflict with the new FEMA flood insurance rate maps.

ii. Suggestions

1. Utilize this report and public workshops to educate with scenario-based water level maps
2. Develop a sea level rise adaptation webpage to track the implementation progress of each action item with status updates and time frames until completion
3. Promote and educate about products that come out of the recommendations of this report
4. Encourage real estate disclosures to purchasers of high-risk property.
5. Distribute a 3 page summary highlighting the report, the need, what the City is doing, and explain some challenges with the action items.
6. Make it hit home by titling correspondences “How it will affect your...” tax bill, utility bill, septic tank, quality of life, etc.

iii. Partners

1. Community organizations
2. Developers/realtors (to educate new home buyers)
3. Elected officials
4. S.C. Sea Grant Consortium
5. NOAA Office for Coastal Management

b. Additional Information

- iv. Real estate disclosure items include erosion rates, flood zone. SCDHEC-OCRM and NOAA created a [South Carolina Guide to Beachfront Property](#) to guide individuals purchasing coastal property.
- v. Folly Beach enforces a 10 ft. setback from the OCRM critical line. Septic tanks and tile fields, must conform to SCDHEC setbacks.

## Category 4: Transportation Adaptation

### 4.1 Causeway and Roadway Adaptations

The NOAA Sea Level Rise Viewer clearly illustrates the vulnerability of roadways and causeways serving Folly Beach. The primarily state-owned transportation system is low-lying and subject to closure and breaching during storms, floods, and rising sea level. One causeway provides access to Folly Beach. Many roads within city limits flood during “King” Tides today.

#### a. Community Input

##### i. Concerns

1. At what sea level elevation are roads and causeway impassible? Abandon some streets?
2. Communication challenges related to lacking process/policy with DOT. Last minute notification with limited input/coordination from stakeholders (e.g., not able to consider raising pavement).

##### ii. Suggestions

1. Determine risk-based prioritization areas (e.g., which portions of the roadways are along evacuation routes and lower than 3 ft. above mean sea level?)
2. Collaborate to build all new roads, improvements at higher elevation (See Additional Information)

##### iii. Partners

1. SC DOT, who maintains all roads including causeway except neighborhood roads with curb and gutter.

#### b. Additional Information

- i. The City has access to the following High water vehicles: 1 military Humvee, 2 F-250s, 2 jetskis, as well as vehicles provided by citizen volunteers and a possible new boat.
- ii. Improvements to evacuation routes can be justified based on their significance to the City and their risk to elevated water levels. There is already a high probability for flooding of some roads during high tide. Even a small change in base sea level will make such flooding of the evacuation route more likely.
- iii. Raising the surface of a road may pose challenges. For some roads to be raised, their shoulders must be widened. If the road runs along a causeway, this could mean that the road base needs to be extended into the wetlands. Depending on specific drainage conditions, road construction may also cause flooding on adjacent properties. An engineering assessment can provide more information about the opportunities to raise specific roadway segments.
- iv. In a similar [sea-level rise adaptation report](#), the City of Tybee Island recommended that current plans to modernize US Highway 80, the sole access road, consider the flood risk impacts from future sea-level rise as a primary design criterion. Collaborations with GA DOT are underway.

## Category 5: Coordination, Collaboration, and Cooperation

### 5.1 Coordination between Governments and Agencies

The number of government agencies with jurisdiction over common coastal issues makes collaboration challenging. By encouraging communication and joint activities, the City can increase its capacity to adapt to sea level rise.

#### a. Community Input

##### i. Concerns

1. Communication challenges related to lack of process/policy (e.g., prior to infrastructure improvements)
2. Boat wake induced erosion of marsh shore.
3. Discussion of roadway elevation options prior to improvement projects
4. Development potential of marsh islands

##### ii. Suggestions

1. Identify a point of contact at each collaborating agency
2. Learn from other communities
3. Increase/extend no wake zones to mitigate erosion
4. Identify adaptation strategies that will also improve the City's score with the National Flood Insurance Program's (NFIP) Community Ratings System (CRS). This may result in realized cost-savings for flood insurance policy holders.

##### iii. Partners

1. SC Department of Natural Resources
2. SC DOT, SC DHEC-OCRM
3. FEMA
4. Charleston County

#### b. Additional Information

- a. SCDHEC-OCRM has established the [Coastal South Carolina CRS Users Group](#)<sup>16</sup> to provide a forum for coastal communities to share lessons learned, identify best practices and gain efficiencies in planning processes that result in hazard mitigation and realized cost savings. The program aims to align the Local Comprehensive Beachfront Management Planning process with elements of the NFIP's CRS program.
- b. Increased partnership will take unique forms depending on the issue and the organizations involved. The City can begin by clarifying decision making authority among different agencies and levels of government in relation to specific actions outlined in this report.
- c. Other communities have used collaboration as a strategy to adapt to sea level rise. An example is the [Southeast Florida Regional Climate Change Compact 14](#)

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<sup>16</sup> <https://www.scdhec.gov/HomeAndEnvironment/Water/CoastalManagement/CoastalCRS/>

established in 2009. This ongoing effort involves four counties, all of their municipalities, partners, and all 5.6 million residents.

## 5.2 Approaches to Implementation

The workshop participants noted and discussed various approaches to implementation.

### a. Community Input

#### i. Concerns

1. The task of implementing the needed action items is overwhelming
2. Need to not only prioritize action items, but perhaps also prioritize locations
3. What will be our retreat or reclaim doctrine following a major event that permanently alters the island topography and an area of high ground becomes “permanently” underwater or vice versa?

#### ii. Suggestions

1. Rather than tackling an action item all at once for the entire island, high risk areas of the island are prioritized and several action items are addressed in that area first
2. Learn from other communities

#### iii. Partners

1. Local communities, Counties, State, Federal agencies depending on action item topic

### c. Additional Information

- a. The City of Charleston, Beaufort County, the Town of Nags Head (NC), Broward County (FL), the City of Miami Beach and many other communities are considering similar plans. Depending on the action items, learning how these different communities are approaching adaptation will be important.

## Appendix A: Online Survey Questions

**Background:** Thank you for participating in this survey and the upcoming workshop to discuss the challenges the City of Folly Beach is and will face with rising sea levels. Your responses to this survey will help us provide the most relevant data and information at the workshop to encourage a productive conversation on adaptation strategies the city might consider. There are no right or wrong answers! For the multiple choice questions, we've guessed at possible answers, but please also complete the "Other (please specify)" answer. We've certainly missed some important responses!

1. What is your position?
2. The type of short-term planning decisions that I make relate to the following areas: (select as many as applicable)
  - a. Roadways/transportation
  - b. Private property
  - c. Stormwater/drainage
  - d. Drinking water/fire hydrants
  - e. Wastewater/septic
  - f. Beach management
  - g. Land use
  - h. Recreation
  - i. Electric power
  - j. Funding
  - k. Public safety
  - l. Code enforcement
  - m. Technology
  - n. Community Outreach
  - o. Tourism
  - p. None
  - q. Other (please specify)
3. What types of long-term planning decisions are you involved in?

Future land use

Funding

Road/transportation

Stormwater/drainage

Drinking water/fire hydrants

Wastewater/septic

Beach management

Recreation

Electric power

Public safety

Tourism

None

a. Other (please specify)

4. Please select the top three most important/highest priority long-term weather or climate hazards facing Folly Beach.

Accelerating sea level rise

Increasing storminess (frequency and intensity of hurricanes or nor'easters)

Coastal erosion

Drought

Nuisance Flooding

Heat waves

Winter weather

a. Other (please specify)

5. Present day flooding from extremely high tides or rain impacts the following: (select all that apply)

Transportation/roadways

Drinking water supply

Wastewater infrastructure

Power supply

Private property

Tourism

a. Other (please specify)

6. With increasing sea levels in the coming decades, do you anticipate greater impacts from future flooding? If so, please provide up to 3 concerns.
7. *Please mark this map with your top three areas most vulnerable to future flooding. (if possible)*
8. The following types of planning documents can be used to minimize risk to community resources vulnerable to future flooding:
- a. Municipal Comprehensive Plan
  - b. Risk and vulnerability assessments
  - c. Future land use or zoning planning
  - d. Flood mitigation project plans
  - e. Guidance documents in flood-related planning, programs, and policy support

- f. Capital Improvements Program planning
    - i. How satisfied are you with the City's level of planning or consideration of measures to minimize risk?
      - 1. Very dissatisfied to very satisfied Likert scale response
  - 9. What are the challenges or barriers to planning for future flooding?
    - a. What additional information would help overcome these challenges/barriers?
  - 10. Please provide any other comments or questions about adaptation planning for discussion at the August 1 workshop (incentives to encourage risk minimization, needed tools, research, etc.).
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Possible 2<sup>nd</sup> set of questions to be redirected if respondents answer that their job requires short- or long-term planning for water, wastewater, or electric power.

- 1. Drinking water:
  - a. Where does it come from? How does it get here?
  - b. How does it get to homes?
  - c. Is pressure sufficient to provide water w/o power (i.e., gravity flow)? To fire hydrants?
    - i. Do private pumps at high-rises lift water above a few stories? If so, do they have back-up generators?
- 2. Wastewater:
  - a. Which areas have sewage?
  - b. What is it collecting? Wastewater discharge and runoff?
  - c. Where are wastewater treatment plant(s)? Are there also wastewater pump stations?
    - i. What if they lose power? Backup generators?
  - d. What is the result of a flooded plant or pump station? Discharge of untreated wastewater into river/ocean, sewer backups, street flooding?
  - e. Septic tank concerns
- 3. Stormwater/drainage:
  - a. Where are the trouble spots?
- 4. Electric power
  - a. Is it purchased or generated locally?
  - b. How do residents receive power? Private distribution networks? Where are they located? Supplied overhead or underground?
  - c. Where are the area substations?



## Appendix B: Sea Level Rise Adaptation Workshop Agenda

### **Folly Beach Sea Level Rise Adaptation Workshop**

**Location: Folly Beach Public Safety Building, 106 W. Cooper St., Folly Beach, SC**

**Date: Monday, August 1, 2016**

**9am – 3pm**

#### Goals:

1. To discuss and better understand the threats to Folly Beach's residents, businesses, and infrastructure posed by sea level rise.
2. To prioritize adaptation strategies developed during the discussion.

#### Agenda

9:00 – 9:15	Welcome and Introductions
9:15 – 9:30	Introduction to the VCAPS Process
9:30 – 10:00	Climate, Weather, and Local Impacts on Folly Beach
10:00 – 1:45	Facilitated Discussion on Sea Level Rise Impacts on Folly Beach and Adaptation Options <i>Lunch will be provided during this time.</i>
1:45 – 2:00	Break
2:00 – 3:00	Priority Setting
3:00	Wrap up and Next Steps

## Appendix C: VCAPS Diagram from 2016 Sea Level Rise Adaptation Workshop

Folly Beach VCAPS Diagram  
August 1, 2016

