South Carolina
Resilient Coastal Communities Collaborative Program

Salkehatchie Watershed Plan



Resilience Portfolio for

St. Helena Island

SCOR South Carolina Office of Resilience

Sea Grant S.C. SEA GRANT CONSORTIUM

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

National Fish and Wildlife Foundation NFWF

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Biohabitats

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1. Executive Summary

Planning at the watershed level has been recommended by both the South Carolina Floodwater Commission and the ***Strategic Statewide Resilience and Risk Reduction Plan*** to reduce impacts from flooding and enable communities, economies, and ecosystems to recover more quickly from disasters. Watershed planning was piloted in the Salkehatchie Watershed between January 2024-March 2026 through the ***South Carolina Resilient Coastal Communities Collaborative Program*** (SCRCCCP). The South Carolina Office of Resilience (SCOR) received funding from the National Fish and Wildlife Foundation (NFWF) National Coastal Resilience Fund (NCRF) in December 2022 to provide technical assistance to ten communities in the Salkehatchie Watershed to assess risk and vulnerability, mitigate flooding, and increase resilience. SCOR partnered with S.C. Sea Grant Consortium and S.C. Beach Advocates to engage with communities throughout the watershed to identify locations of and impacts from flooding. Three engineering consultant firms, Weston & Sampson, McCormick Taylor, and Biohabitats, worked with SCOR and S.C. Sea Grant to synthesize community input and develop risk and vulnerability assessments and portfolios of flood reduction strategies that are included in the Community Reports section o f this Salkehatchie Watershed Plan.

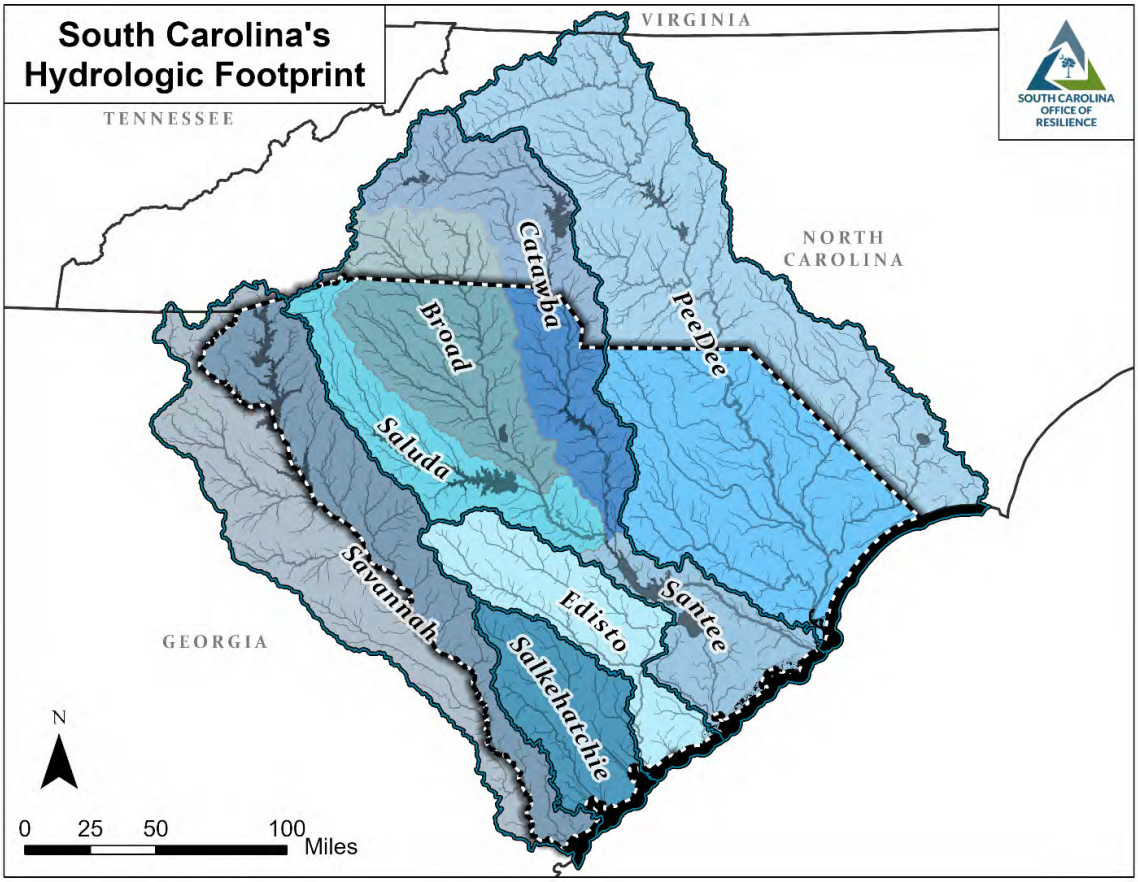


Figure 1: Salkehatchie River Basin

1a. The Salkehatchie River Basin

The Salkehatchie River Basin is located between the Lower Savannah and Edisto River Basins in the Southwestern Coastal Plain region of South Carolina. "The basin is the 7th largest in the State, encompassing approximately 653,606 acres and approximately 1,012 stream miles and 2,928 acres of lake waters" (SCDNR). The tributaries of the Salkehatchie Basin are predominantly shallow, blackwater bottomland swamps, and the rivers in the south of the basin are tidally influenced and brackish. The basin extends 95 miles inland from the Atlantic Ocean and contains eighteen HUC 10 watersheds spanning all or parts of seven counties (Allendale, Bamberg, Barnwell, Beaufort, Colleton, Hampton, and Jasper), thirty-four municipalities, and three military installations.

This Basin originates in the Upper Coastal Plain with the headwaters of the Salkehatchie and Little Salkehatchie in Barnwell and Bamberg, South Carolina and continues through the Lower Coastal Plain and Coastal Zone regions, merging to form the Combahee River just south of Horse Bay and just north of Yemassee in between Hampton and Colleton counties. The basin also contains the Coosawhatchie River which originates in Allendale and Fairfax, SC and flows through Allendale, Hampton, Jasper, and Beaufort Counties before merging with the Pocotaligo River to form the Broad River which then flows into Port Royal Sound and the Atlantic Ocean. The renowned ACE Basin is in the southeastern part of the Salkehatchie Basin and is comprised of the Ashepoo,

3

The Salkehatchie River Basin includes **three military installations**

7

The basin covers all or parts of **seven counties** (Allendale, Bamberg, Barnwell, Beaufort, Colleton, Hampton, Jasper)

7th

It is the **seventh largest basin** in the state

18

The basin spans across **eighteen HUC 10 watersheds**

34

It includes **thirty-four municipalities**

95

It extends **95 miles inland** from the Atlantic Ocean

1,012

The Salkehatchie River Basin includes **1,012 stream miles** (***SCDNR***)

315,000

Approximately **315,000 people** reside across the seven counties of the Salkehatchie River Basin

653,606

The basin encompasses approximately **653,606 acres**



Combahee, and Edisto Rivers. "The coastal area of this basin contains the most extensive estuarine water bodies in the State. These coastal water bodies are dominated by St. Helena Sound and Port Royal Sound and include numerous, often interconnecting, tidal creeks and rivers" (SCDNR). This basin also contains hundreds of thousands of acres of saltmarsh and is bounded by numerous barrier sea islands.

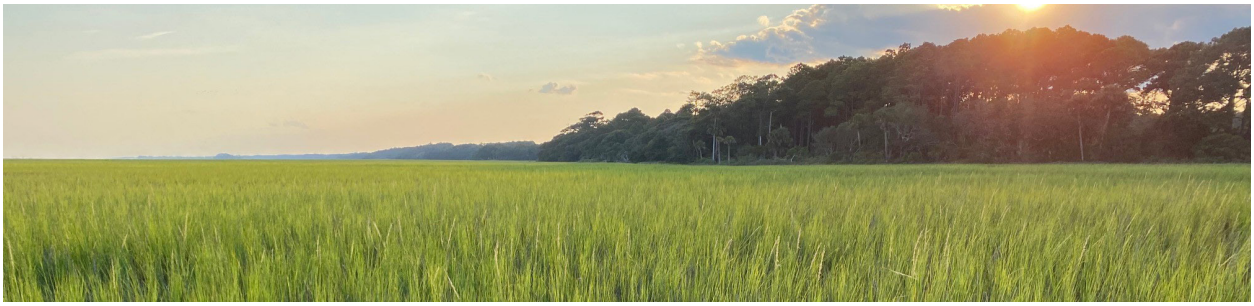
POPULATION: Aproximately 315,000 people reside in the seven counties located in the Salkehatchie River Basin. Beaufort County has the largest population center in the watershed (187,117), followed by Colleton, (38,604), Jasper (28,791), Barnwell (20,589), Hampton (18,561), Bamberg (13,311), and Allendale (8,039) Counties (2020 US Census). Rapid growth is occurring in Jasper and Colleton Counties, and development pressure is high in coastal areas. Populations in the communities in the middle and upper parts of the watershed have been decreasing in recent years, as people relocate to more urban areas and young adults move away after graduating from school. The coastal region of the Salkehatchie Watershed is home to Gullah Geechee communities represented by several organizations, including the Gullah Geechee Cultural Heritage Corridor Commission, the Gullah/Geechee Nation, and the Gullah Geechee Chamber of Commerce. The majority of the Gullah Geechee population resides on the sea islands in the basin.

DEVELOPMENT PRESSURE: While the upper part of the Salkehatchie Watershed is primarily rural and agricultural, there is a high level of developmental pressure in the coastal region, specifically in Beaufort, Jasper, Colleton, and Hampton Counties. Forested and Agricultural land cover in the basin has decreased over the past two decades and impervious surfaces have increased, especially in coastal communities. Community members in the coastal counties expressed concerns about clearcutting, deforestation, and development in floodplains. Many voiced support for conservation and more stringent zoning and environmental policies. They also expressed the need for education for developers, homebuyers, and foresters related to flood risk and the benefits of nature-based solutions for flood control and heat reduction.

HAZARDS & IMPACTS: The Salkehatchie Watershed is impacted by a variety of natural hazards and environmental changes, including flooding, hurricanes, tropical storms, lightning, tornados, extreme heat, drought, wildfire, and winter weather. Over the course of the SC Resilient Coastal Communities Collaborative Program (2024-2026), the most frequent hazards of concern mentioned in surveys, interviews, and at community meetings were flooding, extreme heat, high winds, and drought. Community members from sea islands and coastal areas also reported significant impacts from erosion, saltwater intrusion, and flooding due to sea level rise in addition to flooding from rain events and tropical storms/hurricanes. Community members throughout the basin reported impacts from these hazards to roads, buildings, cultural sites, and agriculture. There is concern throughout the watershed that ditches are not being cleaned and are often contributing to flooding and mosquito proliferation. As impacts from flooding were the primary focus of the SCRCCCP, the team focused on identifying locations in the Watershed that are prone to flooding, with a focus on roadway and parking lot flooding that is impacting access to services and ability to evacuate. Locations were reported and documented through interviews, surveys, and paper and electronic mapping exercises at 4 community meetings.

PLANNING CONDITIONS: There are a variety of planning efforts and projects being implemented in the Salkehatchie Watershed in addition to the SC Resilient Coastal Communities Collaborative Program. Two Council of Governments, the Lowcountry COG and the Lower Savannah COG, serve the region and assist communities with planning efforts, including Hazard Mitigation Plans, Transportation Plans, and Comprehensive Plans. Together, the two COGs support the seven counties and thirty-five municipalities located within the Salkehatchie River Basin. Major plans that are currently being updated or created include the Lowcountry Hazard Mitigation Plan , the Lower Savannah Hazard Mitigation Plan, the Lowcountry Transportation Resilience Improvement Plan, the Beaufort-Jasper Water and Sewer Authority Master Plan, and the Town of Hilton Head Island's Resilience Planning Initiative. Additionally, Hampton County, Jasper County, the City of Hardeeville, and the Towns of Yemassee, Allendale, Varnville, and Ridgeland are in the process of updating their comprehensive plans. Several regional planning collaborations, the South Carolina Lowcountry Sentinel Landscape Partnership, the Southern Lowcountry Resilience Collaborative, and the Southern Lowcountry Regional Board (SoLoCo), are also actively working to increase coordination of resilience initiatives in the region.

ECONOMIC DRIVERS & COMMUNITY RESOURCES: The primary economic drivers in the region are agriculture, education, research, industry, and tourism. Clemson Extension and SCDNR Soil and Water Conservation Districts offer community education and assistance and both have offices in all seven counties. The Watershed hosts a variety of academic institutions, including USC Salkehatchie West (Allendale), USC Salkehatchie East (Walterboro), USC Beaufort, Technical



College of the Lowcountry, Denmark Technical College, Voorhees University, and Barnwell County Career Center. Additionally, there are a number of non-profit and community-based organizations that operate in the region, offering resources and strengthening local communities. Some of the organizations that are most active in the river basin include Habitat for Humanity of the Lowcountry, Port Royal Sound Foundation, Open Land Trust, Southern Palmetto Regional Chamber, Keep Bamberg County Beautiful, Keep Allendale County Beautiful County, Coastal Conservation League, Audubon SC, and The Nature Conservancy-South Carolina.

1b. Project Approach

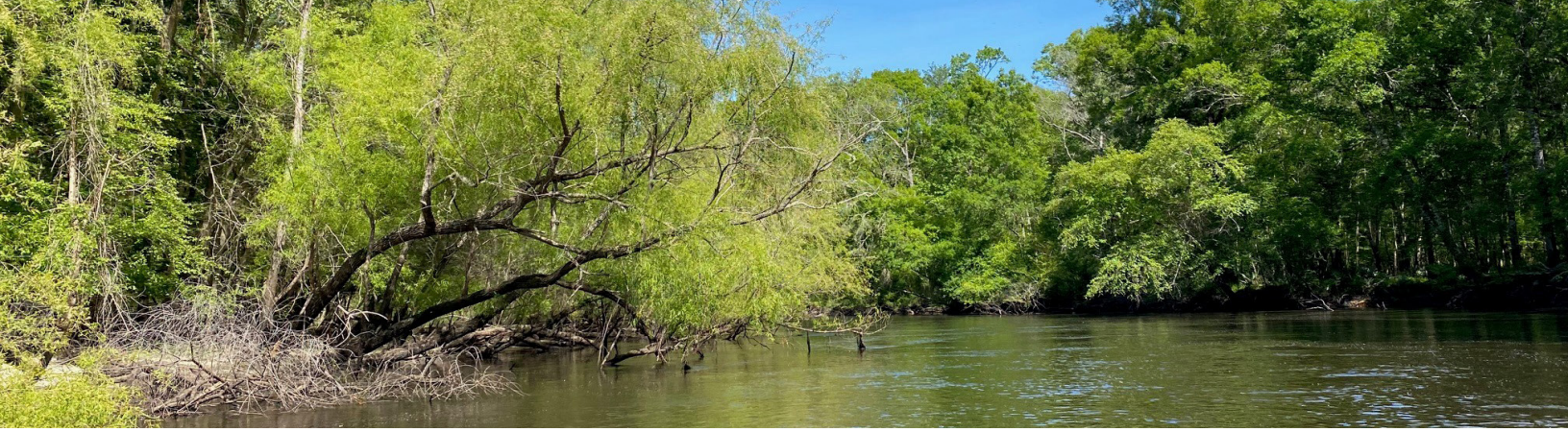
As a foundational step, **SCOR and SCSG reviewed local planning efforts** to better understand existing conditions and identify opportunities to leverage planned efforts.

The Project Team then conducted **multi-scale vulnerability assessments** at the watershed, community, and parcel levels to assess the natural hazards. This technical analysis was paired with **robust community engagement** through Community Action Team meetings, public surveys, field site visits, and consultant assessments to ensure that the vulnerability assessment results and proposed strategies were **grounded in local knowledge and priorities.**



Community Engagement

SCOR and SCSG worked together to identify local community members to form 9 Community Action Teams, which represent the 10 communities of focus. These Community Action Teams were involved with community outreach, input, and decision-making throughout the project. During the first Community Action Team meetings (Fall 2024-Winter 2025), team members shared concerns related to impacts from flooding and environmental changes. At the second Community Action Team meetings (Spring 2025), community members identified and mapped flood-prone areas directly on maps at public events, capturing localized issues often missing in broader state models. The third Community Action Team meetings (August 2025) included Community Action Team members and was also advertised for the public to attend, to gain broader perspectives. The purpose of the third Community Action Team meeting was to provide an overview of the results of the vulnerability assessments, review potential strategies, and obtain community feedback regarding strategies and priorities to guide strategy siting. The fourth and final Community Action Team meetings took the form of two larger regional meetings



in December 2025. A 6-hour regional gathering was held in the Town of Yemassee for the 5 Community Action Teams in the lower half of the watershed on December 4th and a second 6-hour regional gathering was held in the Town of Fairfax for the 4 Community Action Teams in the upper half of the watershed on December 5th. These meetings were designed to foster networking, collaboration, and coordination of regional efforts and to enhance collaborative opportunities for future implementation. The participants in these fourth Community Action team meetings were still divided into their smaller community-specific teams during part of the meeting to review proposed project ideas which contained information and photos from field visits. Participants were encouraged to evaluate each project idea using a visual grid, scoring them on two vital factors:

1. **Impact** (How much will this help the community?)
2. **Feasibility** (How realistic is it to build and maintain?)

Vulnerability Assessment

In July 2025, the Project Team completed a multi-scale vulnerability assessment. The assessment was conducted at three scales: 1) watershed-scale, 2) community-scale, and 3) parcel-level. The assessment was aimed at identifying the most vulnerable areas to flooding, extreme heat, wind, and wildfires.

The project team used First Street Foundation datasets to identify the most vulnerable areas across the Salkehatchie River Basin. For the community-scale assessment, modeling efforts focused on the 34 census tracts that encompass the ten communities of focus. The parcel level assessment focused on both near term (present day) and future (2055) conditions within the five most vulnerable areas identified in the community-scale analysis.

Strategy Siting

Strategy siting was conducted at the community level using community-specific data, feedback from the third Community Action Team meetings, and the results of the multi-scale vulnerability assessment. Following the desktop analysis, the Project Team conducted targeted site visits across the ten communities of focus in the Salkehatchie Watershed. At each location, the Project Team used a standardized field data sheet to evaluate the feasibility of the identified projects, **documenting conditions relevant to design and permitting, including:**

- land ownership
- structures on site
- paved surfaces
- drainage information
- vegetation cover
- site photos

Prioritization

Prioritization criteria were developed with SCOR and SCSG to identify projects that were both feasible to implement and capable of delivering the greatest benefits to each community. **Criteria were divided into three categories:**

1

Flood reduction benefit

Informed by project drainage areas and runoff reduction rates.

2

Feasibility

Considered factors such as land ownership, anticipated permitting effort, and maintenance costs.

3

Co-benefits

Accounted for water quality improvements, heat reduction, and wildlife habitat creation.

The prioritization matrix was used to **identify the top two projects in each community**, which then received a rough order of magnitude opinion (high-level cost estimate) which included project planning, design, and construction.

Results

Building resilience in the Salkehatchie River Basin is a continuous and adaptive process. This document is one of **nine (9)** Community Portfolios that are combined into the comprehensive, basin-wide Salkehatchie Watershed Resilience Plan. **Over fifty (50)** adaptative strategies and proposed projects were identified through this SCRCCCP process. Each portfolio provides specific information on community vulnerabilities and unique concerns as well as opportunities to reduce impacts from flooding and enhance community resilience.

The communities of the Salkehatchie River Basin have demonstrated commitment and capacity to continue to lead this work. By maintaining momentum, strengthening collaboration across the watershed, and staying engaged through regional partnerships such as the Salkehatchie Watershed Advisory Group and the Southern Lowcountry Resilience Collaborative, these communities can continue to identify sustained pathways to implementation, ensuring a **vibrant, safe, and resilient future for generations to come**.

St. Helena Island is defined by a network of tidal creeks and vast salt marshes, but experiences recurring inundation compounded by drainage and stormwater infrastructure that is aging, shallow, or limited by flat terrain. Because flood reduction and ecological value were identified as the community's highest priorities, the desktop analysis gave particular attention to areas with known flooding and practices with wildlife habitat co-benefits, prioritizing community-preferred practices such as bioswales and living shorelines. **For cost estimation, the prioritization matrix highlighted two projects that consistently performed well across all criteria: the Stormwater Park at Ball Park Road (Wesley E. Felix Park), which had the highest overall score, and the Living Shoreline at the Penn Center, which had the second highest score in the community.**

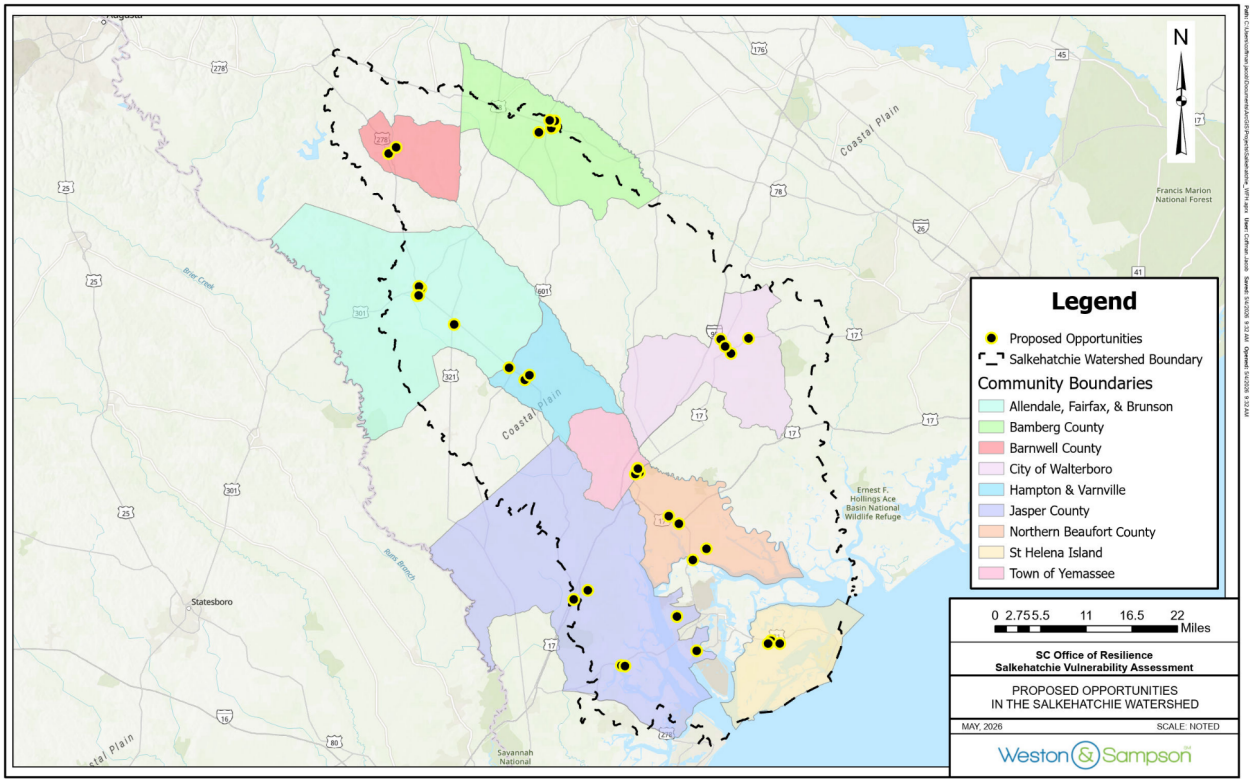


Figure 2: SCRCCCP Study Communities and Proposed Opportunities

2. Introduction

2a. Project Objectives

The goal of the South Carolina Resilient Coastal Communities Collaborative Program (SCRCCCP) is to **support communities in the Salkehatchie River Basin** by developing locally informed and locally prioritized strategies and plans that **reduce impacts from flooding and improve resilience** to natural hazards and environmental changes. This process included working with community partners to co-produce **nine (9) Community Portfolios** for ten(10) areas of focus which are combined into a basin-wide Salkehatchie Watershed Resilience Plan. Each community portfolio is intended to accomplish the following objectives.

1

Explain the community's **vulnerability and risk** through a comprehensive assessment

2

Document **community concerns** about infrastructure and vulnerabilities to natural hazards and environmental changes

3

Document input on **flooding impacts** and locations of flood-prone **vulnerable areas** within the community

4

Provide a suite of flood reduction and resilience **strategies,** that are ready for funding and implementation

5

Highlight **community preferred** resilience strategies

6

Strengthen **collaboration and partnerships** within the watershed

2b. Community Background

St. Helena Island and the surrounding Sea Islands have a rich and varied history, representing one of the most culturally and historically significant landscapes in the Southeastern United States. St. Helena Island is defined by subtropical climate, maritime forests, a network of tidal creeks, and

vast salt marshes. The land is low-lying and residents rely on a limited network of causeways and roads, such as Highway 21, as their sole access points to the mainland.

St. Helena Island is often referred to as the cultural heartland of the Gullah Geechee people, who have maintained a deep, generational connection to the island's coastal and agricultural resources. The Gullah Geechee people are descendants of West Africans who were enslaved on isolated coastal plantations in the southeastern United States, where they developed a distinctive culture that retains strong African influences in language, foodways, arts, music, and spirituality. Their language, cultural practices, and community traditions represent one of the most significant and enduring African American cultural heritages in the Country (Gullah Geechee Heritage Corridor Commission, 2025). The Island is also renowned for being the home of the Penn Center, the first school for freed African Americans in the Southern United States. Dr. Martin Luther King, Jr. visited the school several times and composed his "I Have a Dream" speech while staying at the Penn Center. Beaufort County's Cultural Protection Overlay (CPO) zoning ordinance and the passage of the Gullah Geechee Cultural Heritage Corridor Act in 2006 have been instrumental in protecting St. Helena Island from over development and for preserving the history and culture of Gullah Geechee community.

St. Helena is impacted by many coastal hazards, including hurricanes, tropical storms, sea level rise, and storm surge. Historic flooding experienced by the communities of St. Helena Island includes recurring inundation that severely affects both daily life and culturally significant areas. Critical roadways, such as Highway 21 near Hunting Island, Club Bridge Road, Eddings Point Road, Polowana Road, and Seaside Road, frequently flood during storms, high tides, and king tide events. Additionally, areas near the airport experience regular tidal flooding that overtops key transportation routes. Compounding these risks, much of the drainage and stormwater infrastructure in St. Helena, is aging, shallow, or limited by flat terrain, which significantly hinders drainage after heavy rainfall. Furthermore, many homes and businesses continue to rely on aging or failing septic systems that leak during storms, contributing to declining water quality in sensitive ecosystems.

Future threats identified by community members and stakeholders include rising sea levels that will exacerbate chronic flooding on low-lying roads, causeways, and neighborhoods, severely restricting mobility and emergency access during high tides or storms. Additionally, aging septic systems are expected to fail more frequently as groundwater tables rise. Continued development and the resulting increase in impervious surfaces will generate greater stormwater runoff, reduce natural filtration, and accelerate the decline of the maritime forests and wetlands that currently buffer the islands from flooding and coastal erosion.

The Project Team gained an understanding of existing vulnerabilities and future threats for St. Helena Island through robust community engagement, plan review, and a vulnerability assessment.

2c. Plan Review

SCOR and S.C. Sea Grant reviewed local planning efforts to better understand existing conditions and to identify opportunities to leverage planned efforts. The plans reviewed for the St. Helena Island are listed in Table 1.

Table 1: Plans Reviewed for St. Helena Island

Plan Name	Year
2015 Beaufort County Hazard Mitigation Plan	2015
2015 Lowcountry Hazard Mitigation Plan	2015
2020 Lowcountry Natural Hazard Mitigation Plan- Updated 2026	2021
A Blueprint for Clean Water: Strategies to Protect and Restore Beaufort County's Waterways	1997
City of Beaufort Comprehensive Plan	2021
Beaufort County 2018 Stormwater Management Implementation Guide	2018
Beaufort County Comprehensive Water Quality Monitoring Plan	2018
Beaufort County Housing Needs Assessment	2021
Beaufort County Long Term Resilience Strategy	2022
Beaufort County Regional Stormwater Quality BMP Retrofit Project	2011
Beaufort County Special Area Management Plan	2002

Plan Name	Year
Beaufort County Regional Stormwater Quality BMP Retrofit Project	2011
Beaufort County Special Area Management Plan	2002
Beaufort County Stormwater Management Plan	2006
Beaufort Joint Land Use Study: SLR and Infrastructure	2017
Bluffton Comprehensive Plan	2014
Envision Beaufort County 2040 Comprehensive Plan	2021
Lowcountry Regional Water Quality Management Plan	2012
Sea Level Rise Adaptation Report: Beaufort, SC	2015
Southern Lowcountry Stormwater Design Manual	2020
St Helena Watershed Study Report	2022
The Lowcountry Lowdown on Sea Level Rise (Beaufort County)	2021

The Project Team conducted a review of existing vulnerabilities and future threats for St. Helena Island. **The vulnerabilities that were identified by the Project Team include:**



Diverse Coastal Hazards including hurricanes, tropical storms, seal level rise, and storm surge



Vulnerable causeways that serve as **evacuation routes**



Continued exposure to environmental change



Water quality impacts from **failing septic systems**



Increase in impervious surfaces increases stormwater runoff from development pressure



Robust cultural resources in need of continued protection

2d. Community Engagement

The SC Office of Resilience (SCOR) and SC Sea Grant Consortium (SCSG) worked together to identify local community members to form a **Community Action Team**. The Community Action Team was involved with community outreach, input, and decision-making throughout the project, specifically during the four Community Action Team meetings which took place in October 2024, March 2025, August 2025, and December 2025. The members identified for the St. Helena Island Community Action Team are listed in Table 2.

Table 2: Team Members of the St. Helena Island Community Action Team

Team Members Name	Team Members Title
Queen Quet	Chieftess of the Gullah/Geechee Nation
Dr. Robert Adams	Penn Center Executive Director
Juliana Zadik	Beaufort County Long Range Environmental Planner
Robert Merchant	Beaufort County Planning & Zoning Director
Belinda Jones	Morning Glory Homestead Farm Owner
Daryl Owens	Town of Port Royal Councilman
Sophia Truempi	Coastal Community Engagement Specialist, S.C. Sea Grant Consortium
Karen Hardison	Watershed Coordinator-Salkehatchie & Lower Savannah, SC Office of Resilience

During the **first Community Action Team meeting** (October 2024), Community Action Team members were given an opportunity to share impacts and concerns they have identified and experienced from natural hazards and environmental changes. They reported that the community is experiencing a wide range of climate and pollution related impacts that are affecting both the environment and residents. Community Action Team members spoke of negative impacts to their island community from storms, saltwater intrusion, and drought. High intensity rain events, tropical storms, and hurricanes cause runoff that reduces water quality and damages or washes away crops. Contamination of water from failing septic systems, waste dumping, and chemical leaching worsen water quality especially during storms, and "rain bombs" are altering the salinity of nearby estuaries. They also reported that saltwater intrusion is widespread, causing tree die off, ghost forests, and impacting farmers' ability to grow crops. Community Action Team members expressed a need for ditch cleaning and maintenance to improve water drainage and reduce mosquito breeding.

The **second Community Action Team meeting** (March 2025) was held at the Penn Center and provided participants with the opportunity to identify flood-prone areas directly on maps. Flooding was reported to be affecting several key roads and neighborhoods across St. Helena Island. Areas near Highway 21, especially the neighborhood just before Hunting Island State Park, regularly experience high water. Club Bridge Road near Seaside Road and the Reconstruction Era National Historical Park area along Highway 21 also experience saltwater intrusion. Eddings Point Road floods at the bend, and Polowana Road has recurring issues as well. Near the airport, high tides cause roads to flood, as shown on the maps, and additional mapped flood points appear in other low-lying areas. Seaside Road between Carolina Causeway and Lands End Road is another trouble spot where water frequently overtops the roadway. Praise Houses and graveyards on the Island have also experienced severe flooding, causing caskets to rise to the surface. Causeways are increasingly overtopped during king tides and storms, limiting access and ability to evacuate for residents.



Figure 3: Images from the third Community Action Team meetings

The **third Community Action Team meeting** took place in August 2025. Community Action Team members attended, and the meeting was advertised to the public to gain broader perspectives. The purpose of the third Community Action Team meeting was to provide an overview of the vulnerability assessments, review potential strategies, and obtain community feedback regarding strategies and priorities to guide strategy siting and typology criteria. A total of eight meetings were held including a combined meeting for the Town of Yemassee and the Communities of Northern Beaufort County and one for each of the seven other communities in the Program. Participants were encouraged to talk with members from the Team and physically add feedback to displays with focus on adaptation strategies, benefits prioritization, existing conditions, and a map showing the most vulnerable areas in each community. Participants provided feedback on the adaptation strategies and benefits prioritization boards by placing color-coded dots to indicate preference for specific adaptation strategies (i.e. bioswale, tree planting, permeable pavement) or rank the importance of certain strategy benefits (i.e. aesthetics, cost, flood reduction, ecological value, and recreation value). The existing conditions and vulnerable area boards contributed important place-based information through conversational notes and location-specific pins. Community members were asked to provide locations of chronic flooding, known community assets, and identifiable landmarks. After the meetings, SCOR and SCSG provided an online survey to community members to provide feedback if they were unable to attend the third Community Action Team meeting in person. The community-specific data gained from the third Community Action Team meeting and the survey informed the type of strategies selected, the strategy siting, and prioritization matrix.

The **fourth Community Action Team meeting** took place in December 2025. A six-hour regional gathering was held in the Town of Yemassee for the five Community Action Teams in the Lower half of the Salkehatchie Watershed on December 4th, 2025 and a second six-hour regional gathering was held in the Town of Fairfax for the four Community Action Teams in the Upper half of the Salkehatchie Watershed on December 5th, 2025. These meetings were designed to foster networking, collaboration, and coordination of regional efforts. The fourth Community Action Team meetings began by reviewing the vulnerability assessments and possible strategies for implementation. Representatives from partnering agencies and organizations provided information on their respective efforts, which provided an opportunity to connect community members with potential project funding and resources.

In small, community-specific groups, participants reviewed and discussed project-level details for proposed projects with project team members. Members of the project team provided community members with project sheets that contained information gained from field site visits, including photos and conceptual renderings of the proposed projects. Participants were asked to evaluate each proposed project on two vital factors: Impact (How much will this help the community?) and Feasibility (How realistic is it to build and maintain this?). Participants scored each project using a visual grid, helping identify projects that deliver high community benefits without facing construction or permitting hurdles. Participants also provided additional valuable information to help inform the final project recommendations.





Figure 4: Participants at the fourth Community Action Team meeting reviewed project sheets (See Appendices) to discuss which projects are the most feasible and provide the greatest benefit to the community.

Following the fourth Community Action Team meetings, all community feedback, including the impact and feasibility scores, was compiled for further analysis. To translate the visual grids into quantitative data, the impact and feasibility axis were scaled from 1 to 10, and each project was assigned a standardized score for both metrics. These two scores were summed to generate a composite community preference score. Additionally, project sheets were updated to incorporate a "Community Action Team 4 Feedback / Notes" section to capture qualitative community input, such as proposed land uses, local observations, and potential funding sources.

After the fourth Community Action Team meetings, the project team met to discuss the proposed projects. The project team evaluated each project and assigned consultant opinion scores based on professional judgement informed by the break-out sessions during the fourth Community Action Team meeting, field observations, drainage patterns, and potential funding opportunities. Community preference and consultant opinion scores were considered during project prioritization.

3. Vulnerability Assessment

In July 2025, the Project Team completed a multi-scale vulnerability assessment for the Salkehatchie Watershed. **The vulnerability assessment was conducted at three scales:**

1

WATERSHED-SCALE

Utilizing the Salkehatchie Watershed Boundary

2

COMMUNITY-SCALE

Based on Census Tracts

3

PARCEL-LEVEL

Incoporating Building Point Data from First Street Foundation

Following discussions with SCOR and S.C. Sea Grant, as well as stakeholder input from the first two Community Action Team meetings, which indicated that **flooding, extreme heat, wind damage, and wildfire were top concerns**, the following raster datasets from First Street Foundation were selected for inclusion in the watershed scale and community scale vulnerability assessments:

- **Flood 2055** – 500 Year Storm Event
- **Heat Max Temperature** – 2055
- **Wind Speed 2055** – Shared Socioeconomic Pathway 2-4.5 r3000
- **Burn Probability 2055** – Shared Socioeconomic Pathway 5-8.5

i

Note: Shared Socioeconomic Pathway is a set of narratives that help describe future developments in society based on the use of fossil fuels and the social and economic factors that drive fuel consumption.

3a. Watershed Scale

The Project Team used the four datasets; Flood 2055, Heat Max Temperature 2055, Wind Speed 2055, and Burn Probability 2055, to **identify the most vulnerable areas across the Salkehatchie Watershed.**

Figure 5 shows the results of the vulnerability modeling used to identify vulnerable areas across the Salkehatchie Watershed. The vulnerability scores range from 4.75 (lowest vulnerability) to 41.15 (highest vulnerability) and the final dataset provides complete coverage for the Salkehatchie Watershed. Conducting the assessment at the watershed scale allows the project team to **identify areas most at risk** based on the First Street Foundation data.

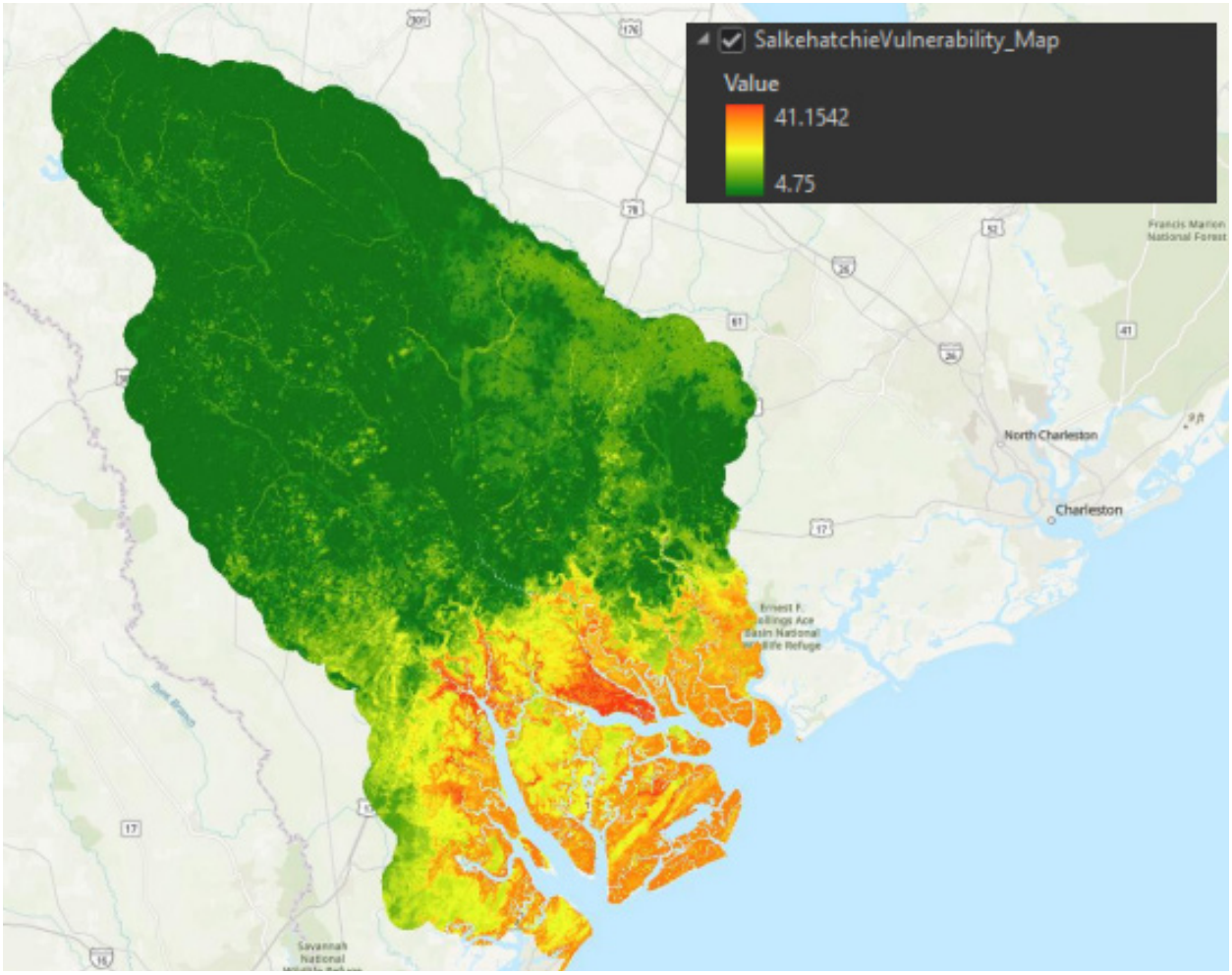


Figure 5: Salkehatchie Vulnerability Model Results

Community Scale

For the community-scale component of the vulnerability assessment, modeling efforts focused on census tracts that encompass the previously identified communities of focus for the South Carolina Resilient Coastal Communities Collaborative Program (SCRCCCP). A total of **34 census tracts were selected** using maps provided by SCOR to ensure accurate representation of the Community Action Teams. Census tracts were grouped according to the communities of focus including Communities of Barnwell County, Communities of Bamberg County, Communities of Allendale, Fairfax & Brunson, Communities of Hampton & Varnville, Communities of Northern Beaufort County, Communities of Jasper County, Town of Yemassee, City of Walterboro, and St. Helena Island (Figure 6).

A spatial vulnerability assessment was conducted for each of the community-scale census tract areas shown in Figure 6. The methodology for the community-scale vulnerability assessment closely follows the approach used in the watershed-scale assessment, including the selection of data layers, scoring procedures, and weighting criteria, ensuring consistency across scales while providing a more granular understanding of vulnerability within each community.

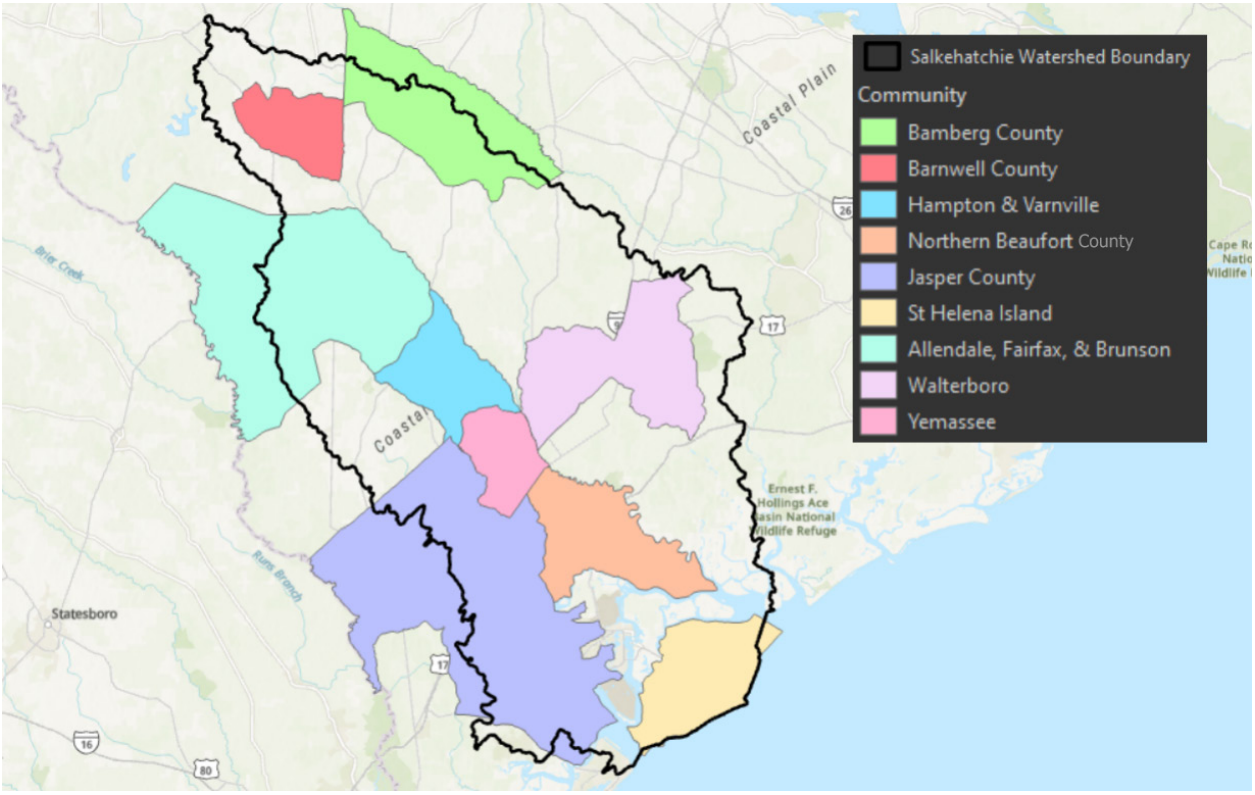


Figure 6: Salkehatchie Watershed and SCRCCCP Study Communities Census Tracts

The community-scale analysis helped:

1 Identify specific **vulnerable areas**

2 Validate **flood concerns** raised during Community Action Team meetings

3 Inform the siting of potential **adaptation recommendations**

4 Determine the **top five most vulnerable areas** in each community where parcel-level analysis was performed.

Figure 7 represents the results of the Vulnerability Assessment for St. Helena Island along with the locations of the highest average vulnerability scores within the St. Helena Island census tracts. The most vulnerable areas in the analysis included the western half of St. Helena Island, Fripp Island, and Pritchards Island. These results are consistent with information collected during the second Community Action Team meeting.

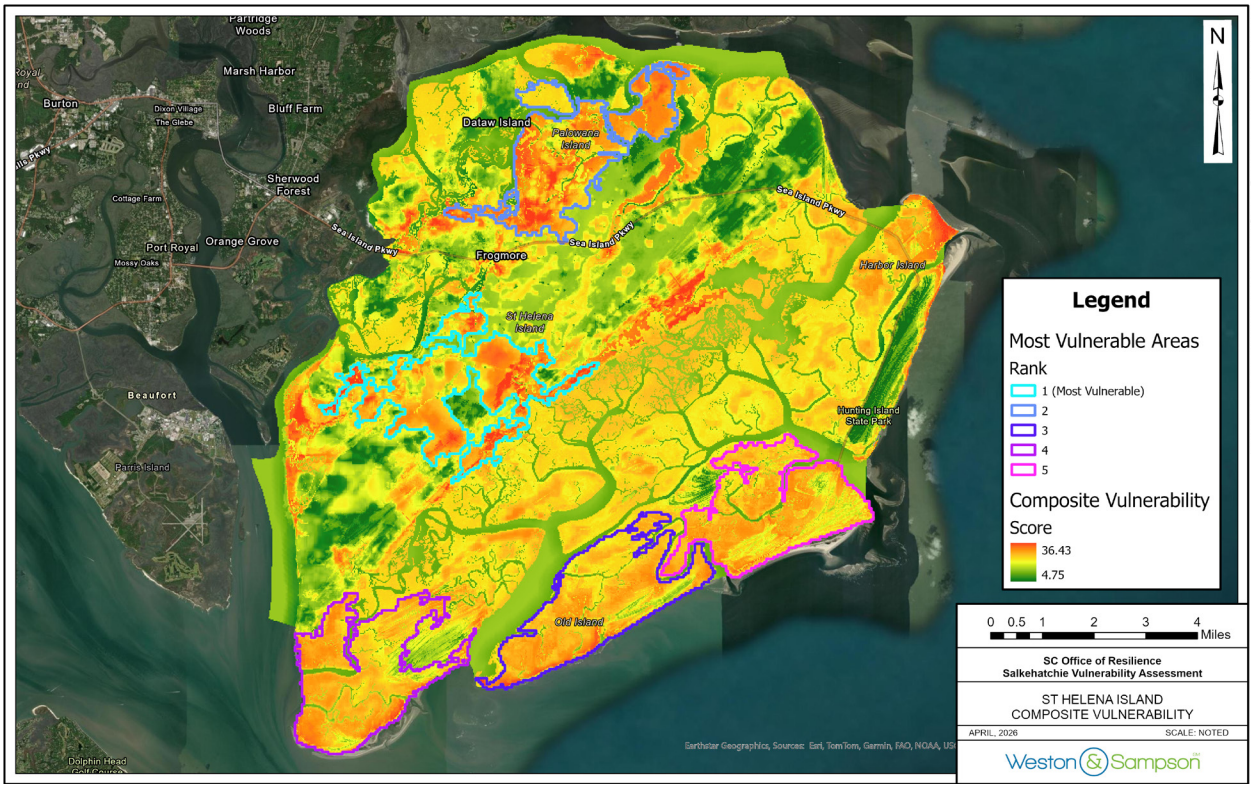


Figure 7: St. Helena Island and Vicinity Vulnerability Model – Most Vulnerable Areas

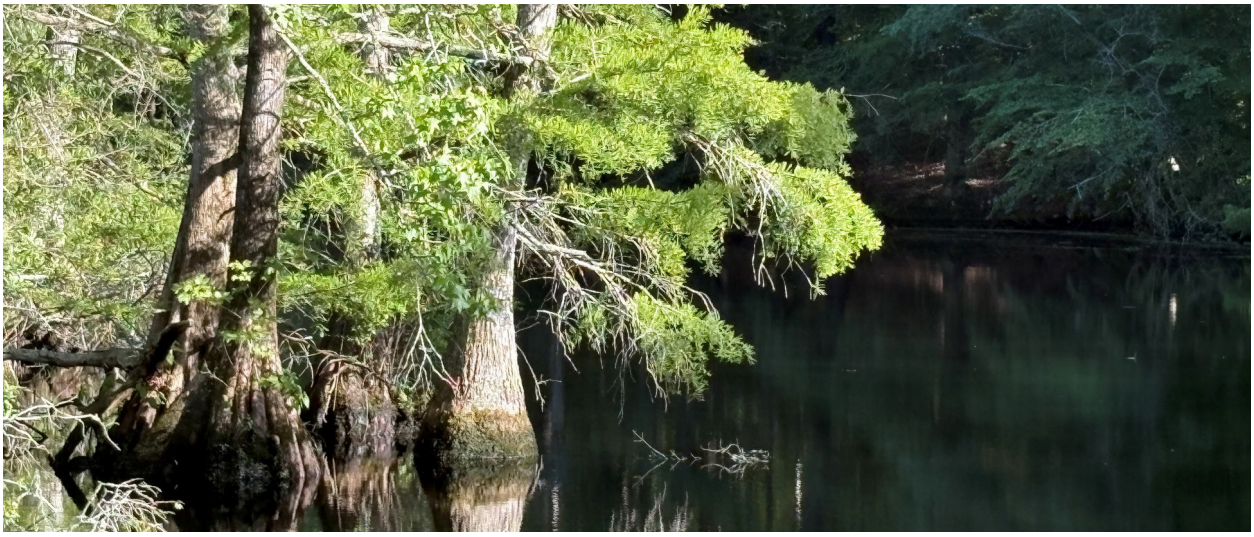
3b. Parcel Scale

The parcel-level vulnerability assessment was conducted for the five most vulnerable areas identified in each community. Parcel-level vulnerability results are not provided in this report to protect the privacy of property owners.

The assessment focused on both near-term (present-day) and future (2055) conditions. By evaluating both present and future conditions, existing vulnerabilities are identified and an understanding is gained of how risks may evolve. To understand parcel level vulnerability, the project team applied a standardized methodology that examined both exposure and sensitivity. When exposure and sensitivity are combined, these two components provide a comprehensive understanding of vulnerability for each parcel within the study communities' most vulnerable areas. Figure 8 defines exposure and sensitivity as it relates to the applied vulnerability scoring formula.

Exposure	X	**Sensitivity**
whether an asset is in an area that will **experience** a given hazard		whether an asset or its functionality will be **damaged** or **disrupted** from exposure to a hazard

Figure 8: Vulnerability Scoring Formula



4. Strategy Siting

4a. Desktop Analysis

Strategy siting was conducted through a desktop analysis at the community level, utilizing community-specific data, feedback from the third Community Action Team meeting, and the community-scale and parcel-scale vulnerability assessments. All data layers referenced were compiled and clipped to each community's study boundary to create a standardized spatial dataset for the analysis. Figure 10 describes the data layers used in the strategy siting analysis.

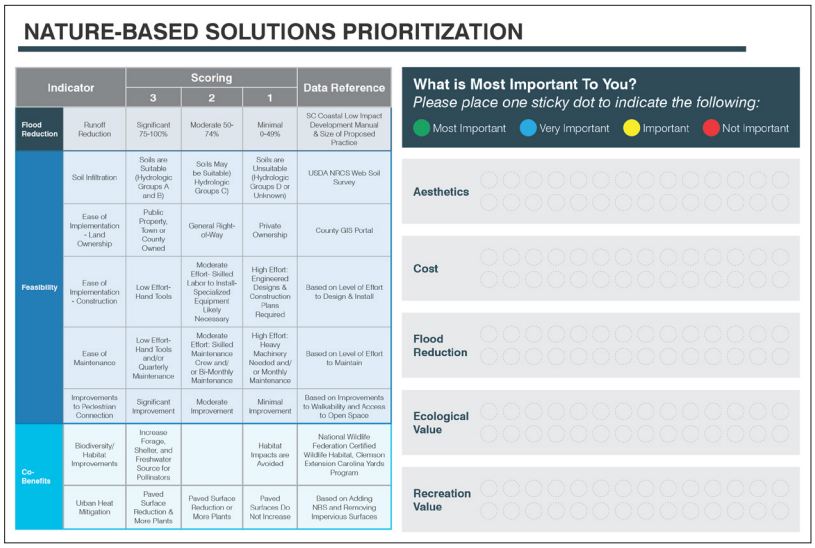


Figure 9: Strategy Prioritization Board Utilized in Community Action Team Meeting Three to Better Understand Community Preference.

The siting process was guided by community-specific strategy preferences and benefit priorities derived from the third Community Action Team meeting feedback and survey results. For St. Helena Island, this meant prioritizing community-preferred practices such as bioswales and living shorelines. **Because flood reduction and ecological value were identified as the community's highest priorities, areas with known flooding and practices with wildlife habitat co-benefits were given particular attention.**

Data Layer	Description	Data Source
Soil Drainage Class	Soil Hydrologic Group (A, B, C, D, A/D, B/D, C/D)	USDA NRCS Web Soil Survey, SSURGO Data
Digital Elevation Model (DEM)	Community specific elevation data	NOAA: Digital Coast LiDAR
Surface Streams (1 acre and 10 acre)	Surface streams derived from community DEM	Community DEM
Parcels	Community specific land ownership data	Beaufort County, Hampton County, Colleton County, Jasper County, Allendale County, Bamberg County, Barnwell County
SCOR Conservation Priorities	Displays SCOR's priority lands for conservation, developed land, water, and already conserved land	South Carolina Office of Resilience (SCOR)
Historic Structures	National Register of Historic Places	SC SHPO
LMI % Block Groups	Displays low-to-moderate income % by block group	HUD
20-year Flood 2025	Present-day flood depth and extent	First Street Foundation
20-year Flood 2055	Future conditions flood depth and extent	First Street Foundation
Locations of Known Flooding	Community point locations derived from Community Action Team meetings	Community Action Team Meetings Two and Three
Top 5 Vulnerable Areas	~5000 acre polygons of the most vulnerable areas in each community	Community-Scale Vulnerability Assessments

Figure 10: Data Layers Used in Strategy Siting During the Desktop Analysis

4b. Site Visits

Following the completion of the strategy siting, the project team conducted **forty-one targeted site visits across the nine study communities** to evaluate the feasibility and implementation of projects identified through the desktop analysis. At each site location, the consultants filled out a standardized field data sheet to document conditions relevant to design, permitting, and implementation of the proposed strategy. The field data sheet captured information pertaining to land ownership, structures on site, paved surfaces, drainage information, vegetation cover, feasibility comments, and site photos.

A completed field data sheet for each project visited on St. Helena Island is included in the appendices.



Figure 12: Site visits to potential project locations provided an opportunity to identify barriers to implementation, property conditions, opportunities, and co-benefits.

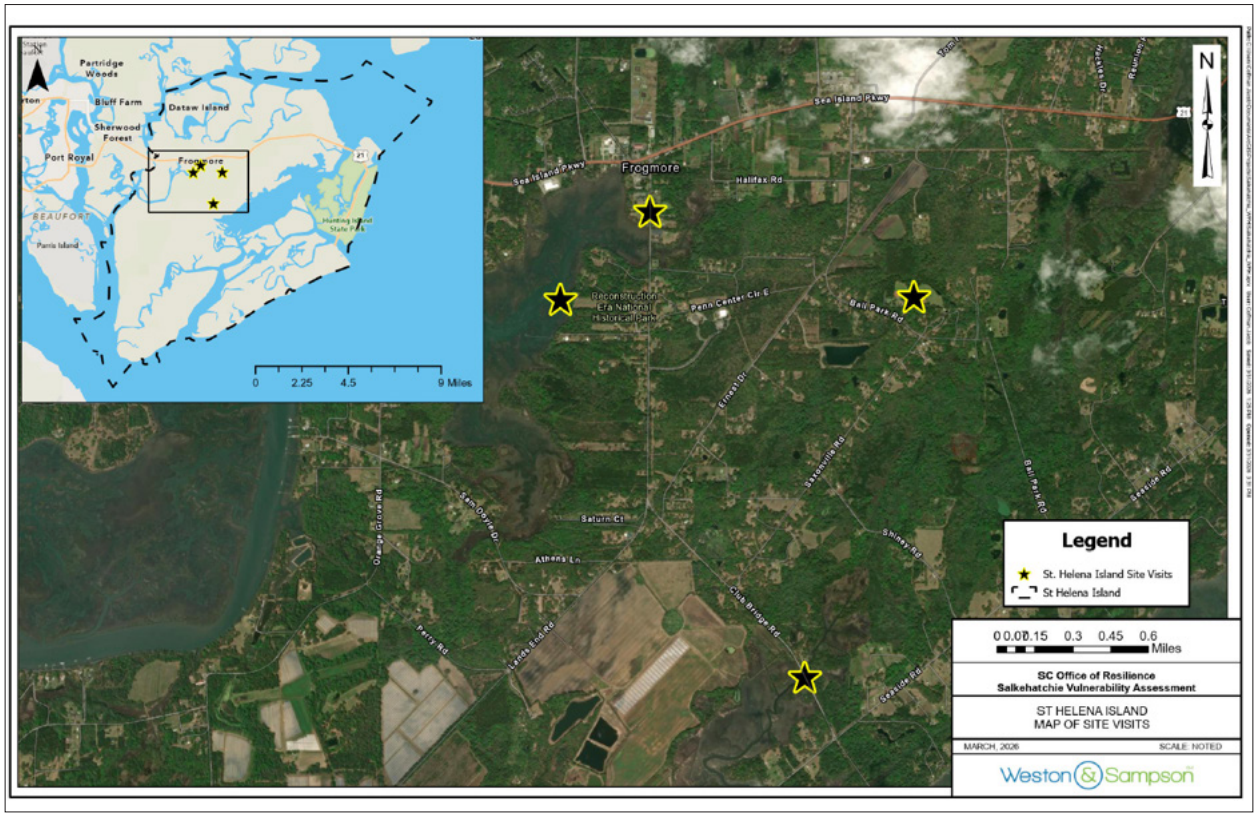


Figure 11: Site Visits Conducted by the Project Team on St. Helena Island

5. Prioritization Matrix

5a. Prioritization Criteria

Prioritization criteria were developed to identify projects that were both feasible to implement and capable of delivering the greatest benefits to each community. A table of the prioritization criteria can be found in the appendices. Criteria were divided into three categories:

Flood Reduction Benefit: This was evaluated using the project's drainage area combined with the runoff reduction rate for each specific strategy, as outlined in the "Low Impact Development in Coastal South Carolina: A Planning and Design Guide."

Feasibility: This category evaluated practical implementation factors, such as land ownership and anticipated maintenance costs.

Co-Benefits: This accounted for the additional advantages a strategy might provide, such as water quality improvements and enhanced wildlife habitat.

Each criterion was scored on a scale from 1 to 3, where 1 represents lower benefit or greater implementation challenges and 3 represents higher benefit or greater ease of implementation. To emphasize the importance of reducing flood risk, the criteria representing flood-reduction benefit and flood exposure (present-day and future) were each weighted by 15. To ensure that both community feedback and consultant field observations were appropriately considered, Community Action Team 4 feedback and consultant opinion scores were each weighted at 10. All remaining criteria were assigned a weight of 5. This weighting structure ensures that **projects advancing flood resilience and reflecting community priorities received the highest consideration.**



5b. Prioritization Results

The prioritization matrix results helped identify the **top two projects in each community.** The top two projects for each community received an order of magnitude cost (high-level cost estimate) that considers all phases of implementation from design to construction. This information is intended to help with grant writing and future capital improvement planning. This order of magnitude cost informaiton is included in the appendices section.

For St. Helena Island, the prioritization matrix highlighted two projects that consistently performed well across all criteria. **The Stormwater Park at Ball Park Road (Wesley E. Felix Park)** had the highest overall score. This project has the potential for high flood-reduction benefits, it is located within current and future flood extents and has potential for multiple co-benefits including water quality improvements and wildlife habitat uplift. **The Living Shoreline at the Penn Center** had the second highest score in the community. This project received a high feasibility score along with the potential for co-benefits benefits including water quality improvements and wildlife habitat uplift.





Figure 13: Participants in Community Action Team meeting four reviewed project sheets to help prioritize projects. The top two projects for each community received an order of magnitude cost estimate.

6. Recommendations Per Community

Opportunity Sheets

Navigating the Project Pages

To guide the development and implementation of resilience actions within the Salkehatchie watershed, a portfolio of potential projects, referred to as strategies, have been summarized in the following pages. Each strategy has been evaluated and presented with a standard set of criteria. These categories provide transparency, enable comparison among strategies, and offer a starting point for conversation with stakeholders who may be involved in advancing the strategy toward implementation. The sections below explain each element and its role in providing key information to support informed decision making.

Type of Strategy The Type of Strategy section simply identifies what project or practice is being described in detail on the sheet.

Strategy Description

The Strategy Description section provides a standard definition of what kind of solution is being proposed. This allows for a shared understanding in case some of the terms are unfamiliar.

Location Description

The Location Description section provides additional information to help identify the site when a specific address is not available. This may include descriptions such as the site being located between two streets or references to names commonly used by the community, such as "the old high school football field." This description helps readers clearly understand the location being referenced.

Narrative

The Narrative section provides a more detailed summary of the proposed project or study including background, scope, and key features. This overview offers a concise snapshot of what the project entails and includes additional context or information that may not fit in with other sections.

Photos

The Photos section includes on-the-ground photos of existing site conditions. Additionally, some sites have renderings or visualizations that illustrate what the site could look like after proposed improvements are implemented. The photos help provide context for those who have not visited the site, while the proposed conditions visuals help those unfamiliar with the strategy better envision how it would appear once installed.

Strategy Location and Map

Location identifies the specific area where the project will be carried out. This could be a site address, neighborhood, corridor, watershed, or broadly county-wide project. Understanding where a project takes place is essential for evaluating its vulnerability context, affected populations, and potential to address locally specific hazards.

Type of Solution

- ☐ Plans, Policies, and Ordinances
- ☑ Nature-based Solutions
- ☐ Infrastructure/Facility Retrofit

The Type of Solution section allows the reader to quickly understand the nature of the proposed approach. This may include a physical project, such as a nature-based solution; a modification to existing infrastructure through a facility or infrastructure retrofit; or a plan or policy intended to guide and support future solutions. Each type of solution plays an important role in supporting overall community resilience.

Supporting Function

- ☐ Flood Mitigation
- ☑ Stormwater Management
- ☐ Conservation Opportunity
- ☐ General Resiliency Advancement
- ☐ Biodiversity Enhancement
- ☐ Floodplain Management
- ☐ Water Quality Improvement
- ☐ Urban Heat Reduction

The Supporting Function section identifies the primary purpose of the strategy by selecting from a defined list of intended outcomes. These selections indicate the benefits the strategy is expected to provide. Categories include flood mitigation, stormwater management, conservation, general resilience, biodiversity, floodplain management, water quality, and urban benefits.

Flood Vulnerability of Location



The Flood Vulnerability of Location section uses flooding data from First Street Foundation (Foundation) to determine how susceptible a site is to flooding. The Foundation's modeling incorporates terrain data, climate projections, historical flood events, and hydraulic simulations to estimate flood elevations for a range of storm events and future time periods. For this analysis, both current (2025) and future (2055) flooding conditions were evaluated using the 20-year storm event (5% annual chance of occurrence). Locations not projected to flood under either scenario were classified as "Low". Sites projected to flood under the future scenario only were classified as "Medium". Locations that were projected to flood under both current and future conditions were classified as "High". An understanding of the flooding conditions at the site can indicate both the need for the strategy and the anticipated success of the strategy.

Anticipated Flood Reduction Benefit



The Anticipated Flood Reduction section estimates the potential reduction in stormwater runoff volume expected from implementing the strategy. The ranges used for these estimates are based off guidance from the "Low Impact Development in Coastal South Carolina: A Planning and Design Guide," which provides typical runoff reduction values for common nature-based solutions. Flood reduction is a key focus of increasing community resilience in the Salkehatchie watershed.

Ease of Implementation



The Ease of Implementation section reflects key factors that may influence how easily a strategy can be carried out, including land ownership and permitting requirements. Strategies rated with a "Low Ease" of implementation generally require multiple permits and are located on private property. In contrast, strategies rated with a "High Ease" of implementation typically require no permits and are located on publicly owned property. Understanding the feasibility of implementation helps set expectations up front and identify potential challenges to address early in the implementation process.

Priority Rating



The Priority Rating section is categorized in "Low," "Medium," and "High" priority rating tiers based on a combination of variety of factors already discussed (flood reduction, cost, permitting) as well as additional factors such as the community's preference, consultant opinion, and co-benefits anticipated (water quality, cultural, habitat). The priority rating category helps decision-makers allocate limited resources efficiently.

Estimated Cost



The Estimated Cost section provides a preliminary projection of the financial investment required to implement. Strategies anticipated to be installed with basic or volunteer labor or consisted of modifications to an existing practice were classified as "Low" while strategies that require engineered designs were classified as "High". Understanding cost early in the process helps assess feasibility, plan budgets, and prioritize investments with fiscal constraints.

St. Helena Island Stormwater Park
Wesley Felix Park

Type of Strategy
Stormwater Park

Strategy Description
A stormwater park is a public park that is intentionally designed to capture, store, treat, and slowly release stormwater runoff while also serving as recreational open space.

Narrative
Converting the area into a stormwater park would create a treatment train approach to manage stormwater runoff onsite. Currently, all stormwater runoff flows to a stormwater pond located behind the baseball field. The Park could be re-designed with a holistic water management perspective. The existing grassed ditches are shallow and could be retrofitted into vegetated bioswales, providing water more opportunity to slow down and spread out. An existing centrally located, low-lying ditch could be converted into a constructed wetland. A riparian buffer around the pond would help filter pollutants, stabilize banks, and enhance habitat. The concession stand's metal roof is well suited for a rainwater harvesting system. The onsite weather station would support monitoring during storm events. Community feedback has been positive, and the project could align with ongoing park expansion and building upgrades already in permitting. The Park is an important demonstration space. County tree fund dollars could support new plantings. Overall, these improvements would strengthen a valuable neighborhood asset.

Location Description
Wesley Felix Park (179 Ball Park Road, Saint Helena Island, SC)

Photos

Existing Conditions



Existing weather station on park light pole



Recently mowed low lying ditch area separating the two baseball fields



Stormwater Pond located in the northeast corner of the park

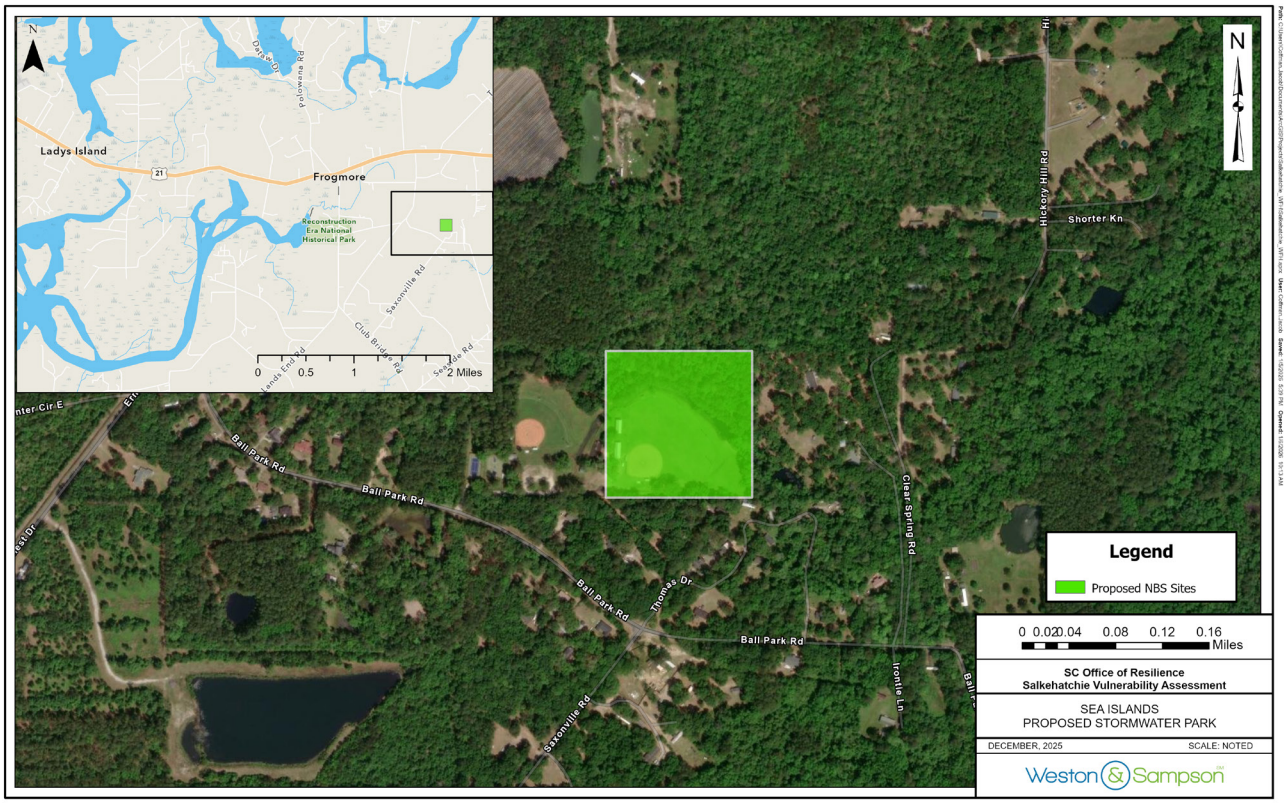
Proposed Improvements



Recently mowed low lying ditch area separating the two baseball fields

Strategy Location and Map

179 Ball Park Road, Saint Helena Island, SC



Type of Solution

- ☐ Plans, Policies, and Ordinances
- ☑ Nature-based Solutions
- ☑ Infrastructure/Facility Retrofit

Supporting Function

- ☐ Flood Mitigation
- ☑ Stormwater Management
- ☐ Conservation Opportunity
- ☐ General Resiliency Advancement
- ☑ Biodiversity Enhancement
- ☐ Floodplain Management
- ☑ Water Quality Improvement
- ☐ Urban Heat Reduction

Flood Vulnerability of Location

High



Anticipated Flood Reduction Benefit

Low | Medium | High

Ease of Implementation

Low Ease | Moderate Ease | High Ease

Estimated Cost

Low | Medium | High

Priority Rating

Low | Medium | High

St. Helena Island Living Shoreline
Penn Center

Type of Strategy
Living Shoreline

Strategy Description
A living shoreline is a nature-based method for stabilizing coastal edges, salt marshes, and estuaries using natural materials. In South Carolina, living shorelines are often an oyster-based approach using materials such as bagged shell, manufactured wire reefs, and oyster castles. Living shorelines can be effective at preventing marsh edge erosion while also enhancing habitat and providing wildlife quality benefits.

Narrative
A living shoreline could be installed at the historic Penn Center along the marsh edge to support the long term health of the salt marsh. Because the site already exhibits natural oyster recruitment, an oyster based living shoreline approach is well suited for these conditions. Once the living shoreline is established, salt marsh vegetation can be planted to enhance benefits and serve as a salt marsh restoration. The living shoreline would also function as a demonstration site. Visitors to the Penn Center could easily view the project from the dock, where interpretive signage is already in place highlighting sea level rise and threats to the salt marsh. In addition, an upland erosional escarpment, approximately 1–2 feet high, has formed where stormwater flows down the driveway towards the marsh. Adding a vegetative buffer at the marsh edge, combined with a living shoreline would help to reduce further erosion.

The project has strong community support, with multiple opportunities for engagement such as involving student volunteers through the "From Seeds to Shoreline" program. This project can also help to protect the historic "Retreat Cottage," a culturally significant structure currently at risk due to ongoing erosion. Furthermore, the project aligns closely with the Beaufort County Comprehensive Plan and complements ongoing collaborative efforts supported by The Nature Conservancy (TNC) grant programs.

Location Description
The Penn Center (31 Holland Ct, Saint Helena Island, SC)

Photos
Existing Conditions



Dock at the Penn Center as seen from the parking area



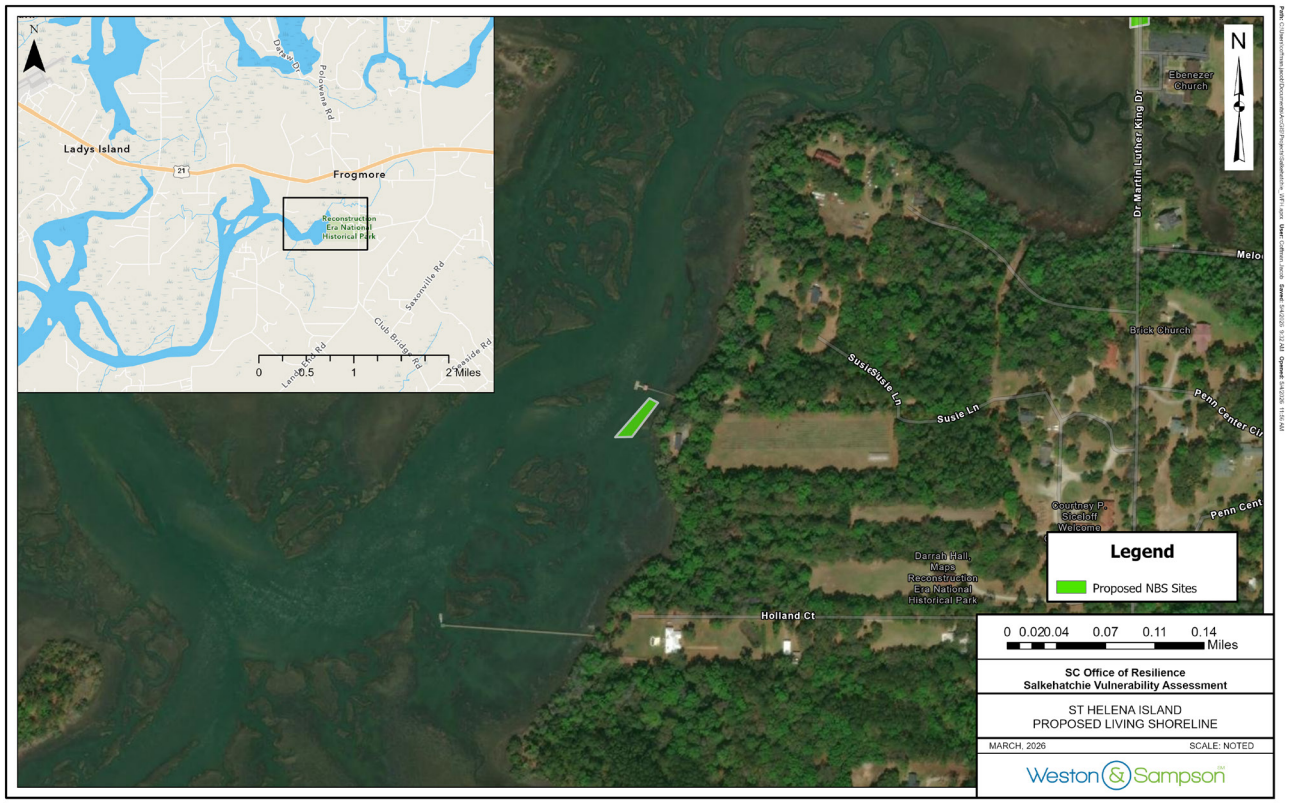
Dock at the Penn Center as seen from the shoreline area



Shoreline area south of the existing dock

Strategy Location and Map

31 Holland Ct, Saint Helena Island, SC



Type of Solution

- ☐ Plans, Policies, and Ordinances
- ☑ Nature-based Solutions
- ☐ Infrastructure/Facility Retrofit

Supporting Function

- ☑ Flood Mitigation
- ☑ Stormwater Management
- ☐ Conservation Opportunity
- ☑ General Resiliency Advancement
- ☑ Biodiversity Enhancement
- ☐ Floodplain Management
- ☑ Water Quality Improvement
- ☐ Urban Heat Reduction

Flood Vulnerability of Location

Low



Anticipated Flood Reduction Benefit

Low | Medium | High

Ease of Implementation

Low Ease | Moderate Ease | High Ease

Estimated Cost

Low | Medium | High

Priority Rating

Low | Medium | High

St. Helena Island Bioswale
Ditch Maintenance at Saint Joseph's Church

Type of Strategy
Bioswale

Strategy Description
A bioswale is a vegetated channel that slows and treats stormwater runoff, often along parking lots or property edges. A bioswale is similar to a bioretention cell in that the design includes engineered soils and vegetation, but different as bioswales focus on conveyance of stormwater runoff typically as part of a centralized drainage system.

Narrative
The site's drainage ditch require maintenance, which is a key community priority to reduce flooding. Existing salt tolerant vegetation indicates tidal influence in the ditch. The ditch could be converted into bioswales with planted side slopes to improve filtration and bank stability while maintaining an open channel for base flow. Widening and staging the ditch would also increase storage capacity. Any plantings added should be salt tolerant.

Location Description
32 Dr. MLK Blvd, St. Joseph's/Bethesda Church

Photos
Existing Conditions



Flume from Ebenezer Baptist Church Parking lot into roadside ditch on the east side of Dr. MLK Blvd. Connection between flume and ditch shows signs of overgrowth and the need for maintenance



Debris in the roadside ditch on the east side of Dr. MLK Blvd



Corrugated plastic pipe and salt tolerant vegetation

Strategy Location and Map

31 Holland Ct, Saint Helena Island, SC



Type of Solution

- ☐ Plans, Policies, and Ordinances
- ☑ Nature-based Solutions
- ☑ Infrastructure/Facility Retrofit

Supporting Function

- ☑ Flood Mitigation
- ☑ Stormwater Management
- ☐ Conservation Opportunity
- ☐ General Resiliency Advancement
- ☑ Biodiversity Enhancement
- ☐ Floodplain Management
- ☑ Water Quality Improvement
- ☐ Urban Heat Reduction

Flood Vulnerability of Location

High



Anticipated Flood Reduction Benefit

Low | Medium | High

Ease of Implementation

Low Ease | Moderate Ease | High Ease

Estimated Cost

Low | Medium | High

Priority Rating

Low | Medium | High

Conservation and Riparian Buffer Mapping
Salkehatchie Watershed-Scale

Type of Strategy
Conservation Mapping

Strategy Description
A Conservation and Riparian Buffer Mapping Plan is a planning level effort that uses spatial analysis and stakeholder input to identify, evaluate, and prioritize undeveloped lands and riparian corridors that are suitable for conservation. The plan relies on existing data sources and mapping tools to understand current land use, ecological value, floodplain function, and connectivity across the watershed. The resulting maps and datasets seek to provide a watershed-wide framework to guide future conservation priorities, support funding decisions, and inform local planning.

Narrative
This strategy proposes the development of a Conservation and Riparian Buffer Mapping Plan to identify and prioritize land conservation opportunities throughout the Salkehatchie Watershed. The project could establish a Salkehatchie Conservation Committee (SCC) and engage local governments, conservation professionals, non-profit organizations, and community members to guide the development of a watershed-wide conservation and riparian buffer mapping plan, ensuring that criteria and resulting maps reflect local knowledge and community-defined values. Using available state and regional data, a series of spatial analyses can be completed to inventory existing open space, evaluate undeveloped and available parcels, and identify priority riparian buffer areas that support flood resilience and watershed health. A complementary funding analysis can evaluate conservation funding programs and realistic funding strategies to support conservation goals identified through the mapping effort. The final Land Protection Vision Plan will synthesize these findings into a 25 year blueprint, providing communities and state partners with clear, data driven guidance to support future conservation planning and investment.

Location Description
Watershed-scale.

Photos

Existing Conditions



A few habitat types of the Salkehatchie Watershed: Bottomland Hardwoods



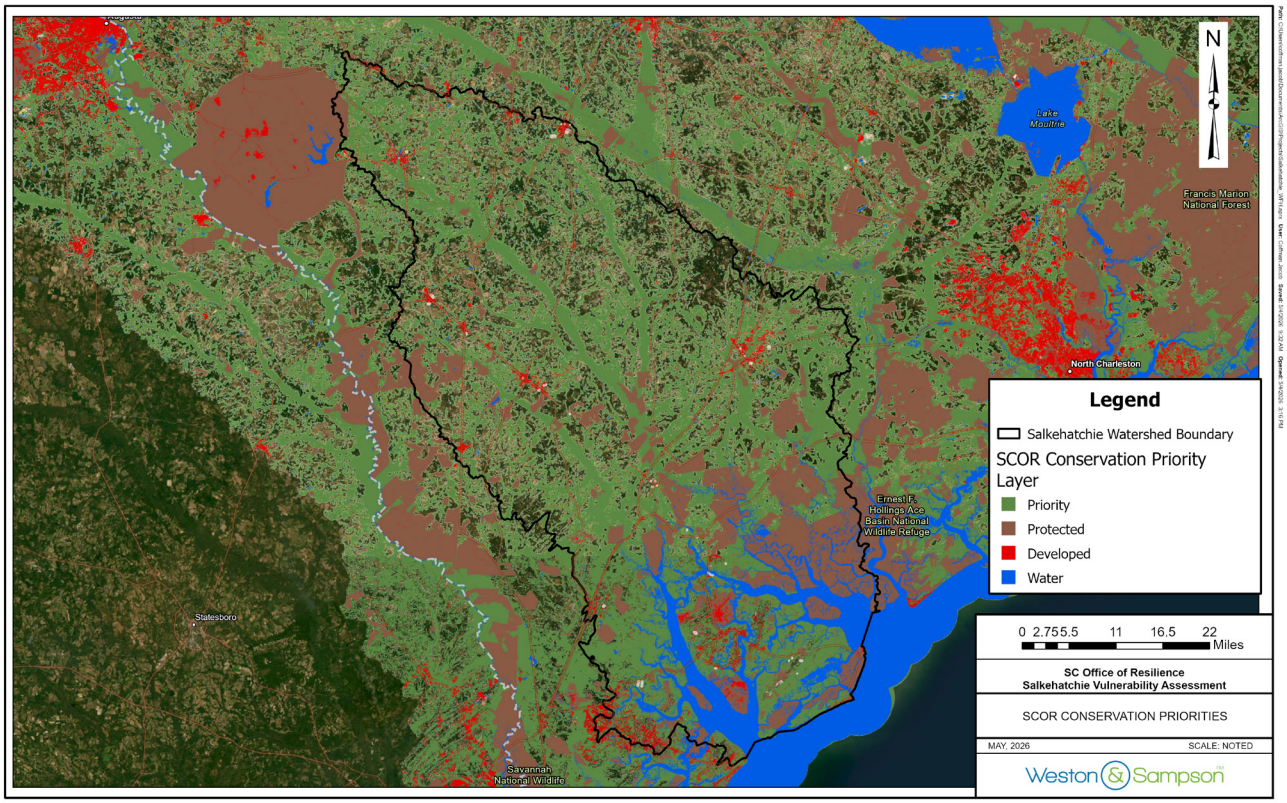
Longleaf Pine Savannas



Tidal Wetlands

Strategy Location and Map

Salkehatchie Watershed



Type of Solution

- ☐ Nature-based Solutions
- ☑ Plans, Policies, and Ordinances
- ☐ Infrastructure/Facility Retrofit

Supporting Function

- ☑ Flood Mitigation
- ☑ Stormwater Management
- ☑ Conservation Opportunity
- ☑ General Resiliency Advancement
- ☑ Biodiversity Enhancement
- ☑ Floodplain Management
- ☑ Water Quality Improvement
- ☑ Urban Heat Reduction

Flood Vulnerability of Location

High



Anticipated Flood Reduction Benefit

Low | Medium | High

Ease of Implementation

Low Ease | Moderate Ease | High Ease

Estimated Cost

Low | Medium | High

Priority Rating

Low | Medium | High

Hydrologic & Hydraulic (H&H) Study
Salkehatchie Watershed-Scale

Type of Strategy
H&H Study

Strategy Description
A watershed-wide stormwater model, also referred to as a hydrologic and hydraulic (H&H) study, is a comprehensive analysis of how rainfall, runoff, and floodwaters move through an entire watershed system. This type of study evaluates surface and sub-surface drainage, streams, rivers, bridges, culverts, and other infrastructure to understand how the watershed currently functions and how it may respond to future conditions such as increased development or more intense rainfall. The resulting model serves as a planning and decision-making tool to identify flood risks, prioritize infrastructure improvements, support future detailed H&H analyses, and coordinate stormwater management across multiple jurisdictions.

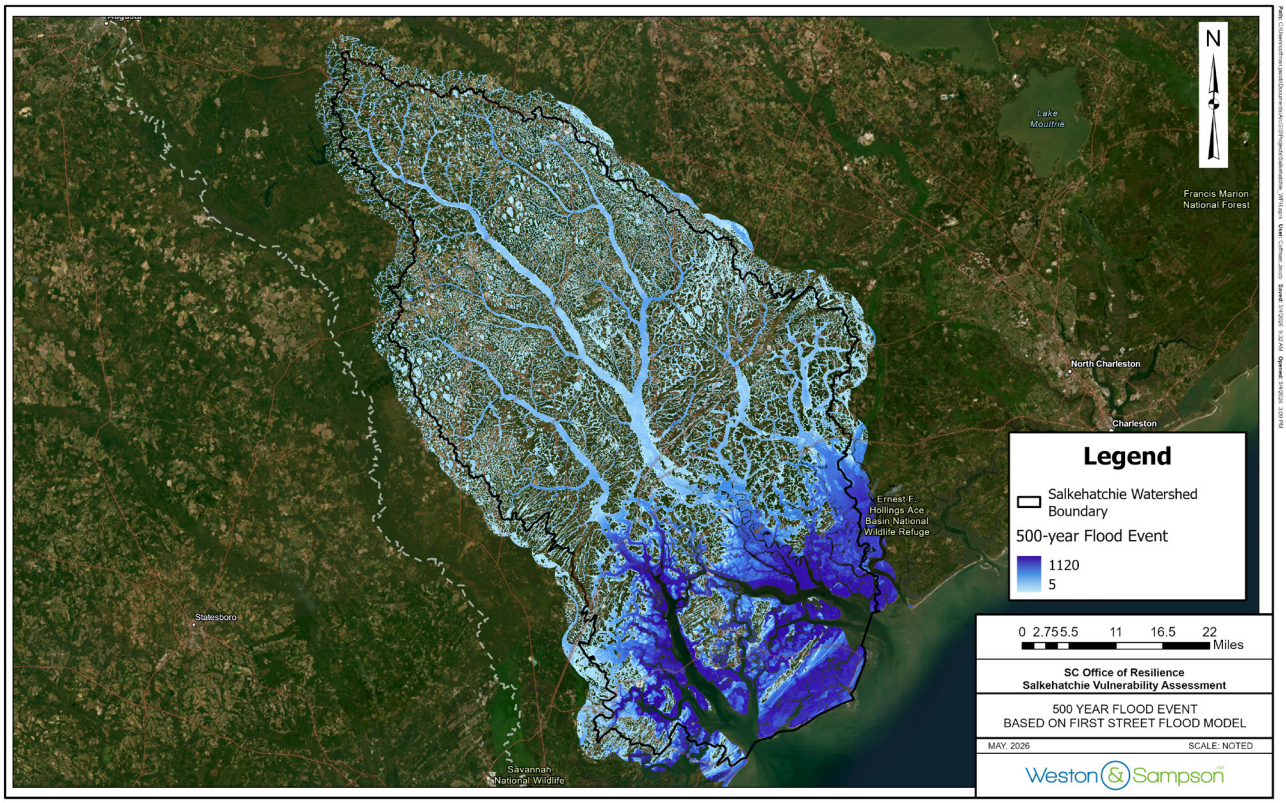
Narrative
This strategy proposes a 1D watershed-wide stormwater model for the Salkehatchie Watershed to improve understanding of hydrologic and hydraulic conditions at a watershed scale. The study can develop a comprehensive watershed model that evaluates current and future flood risks and identifies vulnerable infrastructure such as roadways, bridges, culverts, and evacuation routes. The initial model can be calibrated using existing FEMA H&H models and refined through stakeholder engagement and information gathered during the Salkehatchie Watershed Vulnerability Assessment.

The model is intended to serve as a flexible, long-term planning tool that can be updated over time as communities inventory drainage systems or complete their own stormwater or H&H studies. As local investments are made, higher-resolution 2D modeling can be incorporated in areas where additional detail is needed, allowing communities to evaluate localized flooding while understanding watershed-scale impacts. Ultimately, this effort will support coordinated decision-making and help prioritize flood mitigation and infrastructure improvements at the state, county, and local levels throughout the watershed.

Location Description
Watershed-scale.

Strategy Location and Map

Salkehatchie Watershed



Type of Solution

- ☐ Nature-based Solutions
- ☑ Plans, Policies, and Ordinances
- ☑ Infrastructure/Facility Retrofit

Supporting Function

- ☑ Flood Mitigation
- ☑ Stormwater Management
- ☐ Conservation Opportunity
- ☑ General Resiliency Advancement
- ☐ Biodiversity Enhancement
- ☑ Floodplain Management
- ☐ Water Quality Improvement
- ☐ Urban Heat Reduction

Anticipated Flood Reduction Benefit

Low | Medium | High

Ease of Implementation

Low Ease | Moderate Ease | High Ease

Estimated Cost

Low | Medium | High

Flood Vulnerability of Location

High



Priority Rating

Low | Medium | High

7. Next Steps

7a. Grant Opportunities & Funding

The vulnerability analysis and community engagement process for St. Helena Island identified several critical resilience challenges. To transition these identified strategies into projects, the following grant funding opportunities could be considered. Furthermore, consideration of incorporating SCRCCCP prioritized projects into future planning efforts, such as the Beaufort County Hazard Mitigation Plan, will be beneficial in support of future funding initiatives.

Coastal Resilience & Cultural Preservation

National Fish and Wildlife Foundation (NFWF) – National Coastal Resilience Fund (NCRF): NFWF is a funding mechanism for large-scale coastal habitat restoration. These funds could be targeted to implement living shorelines and marsh restoration projects that buffer tidal flooding along vulnerable corridors like HWY 21 while protecting culturally significant areas and estuarine ecosystems.

NOAA Transformation Habitat Restoration and Coastal Resilience Grants: The National Oceanic and Atmospheric Administration (NOAA) administers this annual program to fund projects that deliver transformative benefits to coastal communities and Tribes nationwide. Competitive applications clearly demonstrate measurable gains for fisheries, contribute to the recovery of threatened and endangered species, and enhance the resilience of coastal ecosystems and communities to climate change. Funded efforts may include reconnecting rivers to historic floodplains, coral outplanting to rebuild reefs, constructing living shorelines to reduce erosion and sea level rise impacts, and similar nature-based solutions.

The Nature Conservancy (TNC) Living Shorelines Community Assistance Program (CAP): Funded through a NOAA grant in partnership with the SC Office of Resilience, this program is designed specifically to overcome the financial and technical hurdles of shoreline protection. TNC's CAP provides fully funded design, permitting, and construction of living shorelines at zero cost to eligible property owners. This is the ideal mechanism for private landowners, culturally significant sites, and under-resourced neighborhoods on St. Helena Island experiencing active erosion who need targeted, site-specific natural coastal protection.

Critical Infrastructure

FEMA Hazard Mitigation Grant Program (HMGP): Administered through the SC Emergency Management Division (SCEMD), these funds are specifically designated for hazard mitigation infrastructure. HMGP is a funding mechanism that could be used to retrofit the island's aging, shallow stormwater infrastructure, elevate frequently flooded causeways, and harden critical evacuation routes to withstand rising sea levels.

SC Rural Infrastructure Authority (RIA) Grants: RIA provides critical funding for public utility and stormwater infrastructure. The County and local utilities could target RIA grants to address the widespread septic and drainage failures by studying the feasibility of decentralized wastewater solutions or pump station upgrades in persistently inundated neighborhoods.

Water Quality & Agricultural Resilience

USDA NRCS Environmental Quality Incentives Program (EQIP) & PL-566: To support the local farmers impacted by saltwater intrusion and hurricane damage, local agricultural extensions could leverage USDA programs. EQIP can assist individual farmers in implementing on-farm nature-based solutions to manage runoff, while PL-566 can fund larger, watershed-scale drainage improvements.

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Resilience Hubs are facilities designed to support residents of a community before, during, and after natural disasters and emergencies.

SCDES Section 319(h) Nonpoint Source Grants: A primary funding mechanism for addressing nonpoint source pollution caused by agricultural runoff and failing septic systems overwhelmed by heavy rainfall. Section 319 funds can be utilized to implement septic tank repair programs or install nature-based solutions to filter runoff before it enters waterways. (Note: Accessing these construction funds requires an EPA-approved 9-Element Watershed Based Plan in areas with either groundwater or surface water protection zones).

7b. Resilience Hubs

Resilience Hubs are facilities designed to support residents of a community before, during, and after natural disasters and emergenciies. These facilities provide back-up power, air conditioning, and shelter, but also give the opportunity for community networks to **collaborate and bolster local resilience.** Resilience Hubs can be established community gathering areas such as schools, libraries, or community centers. These facilities can also be scalable, starting as a community center that evolves to include elements such as back-up solar power, dry-floodproofing, overnight shelter, and staff trained in emergency response. Ideally, the locations of Resilience Hubs provide easy access for residents in the facility's service area during an event and are resilient to natural disasters (i.e. elevated, outside of the 100-Year flood plain, flood-proofed, etc.).

Core Functions

Resilience hubs have several core functions before, during, and after a natural disaster. **These functions include:**

- Information & Communications
- Community Services
- Emergency Support
- Recovery, and Coordination

Prior to a natural disaster, the Resilience Hub can function as a **reliable source of information** on the event, help residents find resources for emergency alert systems and recovery resources, provide internet access to residents to communicate with family members and, provide refuge prior to evacuation before the natural disaster occurs. Additionally, the Resilience Hub provides **community services** throughout the year including workforce training, workshops, and space for gathering and organizing community groups. This provides a deeper connection within the community and can help residents find information on disaster preparedness and climate awareness.

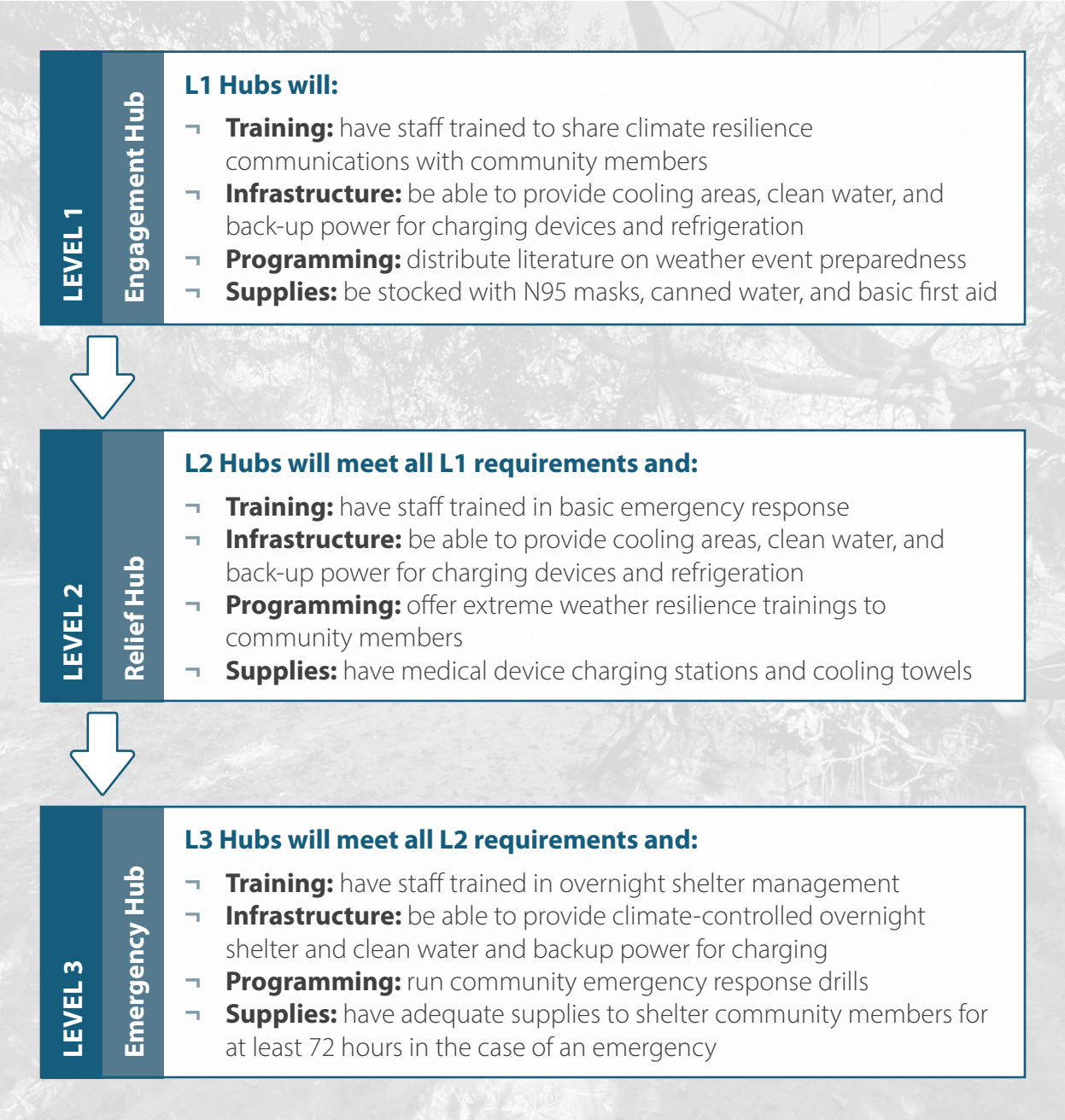


Figure 14: Diagram depicting the three levels of the resilience hub model (Gonzaga University Institute of Climate, Water, and the Environment, 2025). Graphic inspired by the Spokane Community Resilience Hub Network and the Institute for Climate, Water, and the Environment



During an event, the Resilience Hub will provide **emergency support for residents.** This includes safe shelter during extreme weather conditions like hurricanes, heat waves, or flooding. The facility should have back-up power to support charging devices or powering medical equipment. Finally, the facility provides food, water, first-aid, and other critical supplies during natural disasters for those affected.

In support of recovery efforts, the Resilience Hub can function as a **central point of distribution for supplies post-disaster.** These facilities can also help connect residents to resources for insurance, housing, and financial assistance in partnership with local, state, and federal agencies.

The Urban Sustainability Directors Network (USDN, 2019) provides further guidance on developing Resilience Hubs, which informs the development of these facilities. This is referred to as a living document that will be updated as new information becomes available. Additional resources such as the Spokane Community Resilience Hub Network and Gonzaga University Institute for Climate, Water, and Environment provide further information on Resilience Hubs and the different levels of Resilience Hubs based on the services they provide (Figure 14).

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Resilience Hubs are practical solutions that turn existing community gathering locations into trusted sources of information, programs and training before natural disasters, lifelines during natural disasters, and support networks post-disaster. By identifying existing community centers, libraries, places of worship, or community gathering locations, communities in the Salkehatchie watershed can begin to identify locations to establish their own Resilience Hubs.

Starting with basic services, the **hubs can be retrofitted to increase their resilience to natural disasters and provide additional services over time** as new sources of funding become available and the community identifies key services for their respective Resilience Hub. Over time, these various Community Resilience Hubs may form a network to share resources, develop partnerships, and collaborate with neighboring communities with a shared goal of increasing resilience to natural disasters.

Implementation

As one of the recommendations for the communities within the Salkehatchie Watershed, establishing Resilience Hubs comes from a few important considerations for implementation. One key aspect of identifying appropriate locations for Resilience Hubs is a **Vulnerability Assessment within the community** to identify areas with the most extreme exposure to climate hazards such as extreme heat, flooding, and high wind. At the same time, social vulnerability and adaptive capacity of neighborhoods should also be considered in siting these facilities to provide support where it is needed. With the information generated by the Salkehatchie SCRCCCP Watershed Plan, the parcel-level and community-level vulnerability assessment already conducted provides ample information to begin working with communities to identify locations for Resilience Hubs

After identifying potential locations within the communities, it will be critical to **establish a project team** to engage community members in the design and implementation of these facilities. This will help to integrate the Resilience Hub in local emergency management plans and to establish partnerships with local government, non-profit organizations, and utility providers.

7c. Participation in Salkehatchie Working Group

Community Action Team members and stakeholders from state, regional and local entities with knowledge and expertise related to flooding, natural hazard mitigation, planning, and resilience were invited to be part of a **Watershed Advisory Group** to give input on watershed scale strategies and review the Salkehatchie Watershed Plan. A virtual meeting was held on February 12, 2026 and a survey was sent out to gather input.

Group members will determine goals and future meeting frequency. This group may decide to form subcommittees for the upper half of the Watershed and the lower half of the Watershed. **There are several working groups** currently working on resilience, stormwater policy, and flood reduction strategies in Beaufort County and the Lowcountry Council of Governments (COG) region including the Southern Lowcountry Regional Board (SoLoCo) and the Southern Lowcountry Resilience Collaborative (SLRC).

7d. Conclusion

The creation of this Community Portfolio represents a comprehensive, community-driven effort developed under the South Carolina Resilient Coastal Communities Collaborative Program (SCRCCCP). The SCRCCCP was designed to support communities across the

Salkehatchie River Basin in developing locally informed and prioritized strategies and projects that are anticipated to reduce flooding impacts and improve resilience to natural hazards and environmental change. To accomplish this, the Project Team conducted multi-scale vulnerability assessments at the watershed, community, and parcel levels to clearly identify specific vulnerabilities and risks from natural hazards facing the community. The vulnerability analysis was also informed by robust community engagement through Community Action Team meetings, public surveys, field site visits and consultant assessments ensuring that each proposed project was supported by the community it is meant to serve. By actively listening to residents and thoroughly documenting their concerns about infrastructure, natural hazards, and flood-prone areas, the Project Team has produced **results that are both technically sound and relevant locally.**

The result of this effort is a practical roadmap for action. Detailed individual opportunity sheets outline a suite of targeted, flood-reduction and resilience projects that reflect community-preferred strategies and are ready for funding and implementation. Rough order of-magnitude cost estimates for the highest-ranked projects provide the specific information needed to pursue competitive grant opportunities and inform municipal capital improvement planning.

This document is one of nine Community Portfolios that have been combined into a comprehensive, basin-wide Salkehatchie Watershed Resilience Plan. By maintaining the momentum established from this planning effort and by continuing to strengthen collaboration and partnerships within the watershed, the community can continue to identify pathways towards implementation, ensuring a vibrant, safe, and resilient future for generations to come.

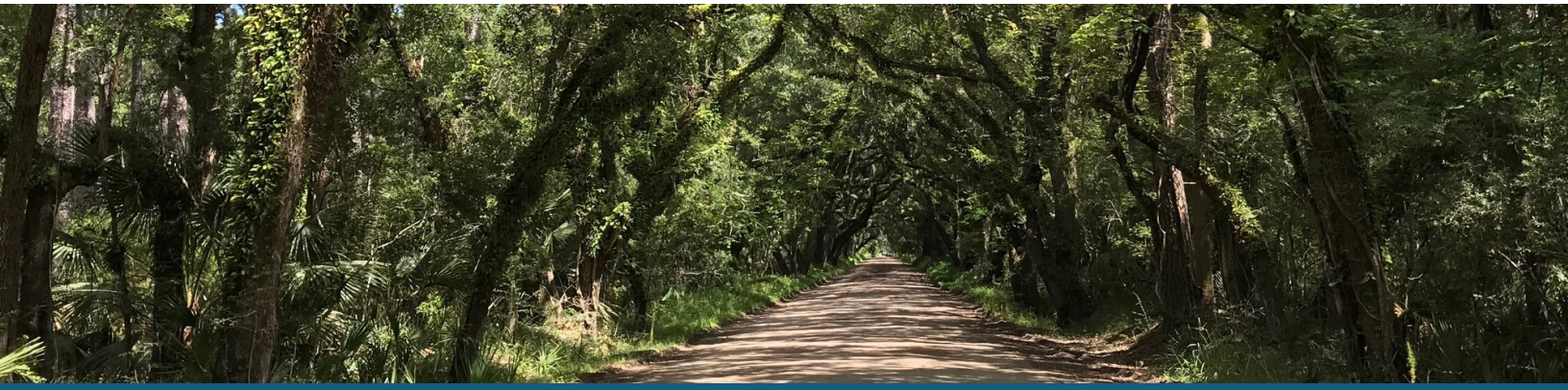
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This community-driven process would not have been possible without the **dedication, time, and deep local expertise of the Community Action Team members** as their insights and consistent participation were integral at every step of this project. While this portfolio outlines immediate next steps, building resilience is a continuous and adaptive process.











Appendix A

Survey Results

This Salkehatchie Community Survey was distributed in paper form and virtually through flyers and email to communities throughout the Salkehatchie Watershed with the help of Community Action Team members and local libraries. 166 responses were returned to SCOR.

Salkehatchie Community Survey

Thank you for taking time to answer the 10 questions below. The South Carolina Office of Resilience and S.C. Sea Grant Consortium are seeking input from government officials and community members in the Salkehatchie Watershed about their experiences with flooding and other hazards to learn more about the risks, vulnerabilities, and needs of the communities in the region to be able to assist with connection to resources to build more resilient communities. The Salkehatchie River Basin includes all or portions of 7 counties: Allendale, Bamberg, Barnwell, Beaufort, Colleton, Hampton, and Jasper. We appreciate your input.

Please email **Salkehatchie@scor.sc.gov** with any questions.

Disclaimer: This survey will be used for general analytical purposes to identify and assess potential risks from future disasters in your area and to implement flood mitigation and resilience measures across South Carolina's watershed basins. Your responses are voluntary and will be identified by area only and shall not be identified by individual; the responses will be compiled together and analyzed as a whole.

When you submit this form, it will not automatically collect your details like name and email address unless you provide it yourself.

Community Questions

1. Which Community do you live/work in?

2. What are your roles in the community? (Citizen, Farmer, Government Official, Community Organization Leader, Business Owner, Retiree, Volunteer)?

3. Which natural hazards are of greatest concern to your community & how often? (frequently, occasionally, rarely, never)? Examples: flood, wind, drought, heat, severe thunderstorm, tropical storm/hurricane impacts (other than flooding or flooding as a result of), tornados, wildfire, winter weather, earthquake, other:

	Frequently	Occasionally	Rarely	Never
Flooding	◯	◯	◯	◯
Wind	◯	◯	◯	◯
Drought	◯	◯	◯	◯
Heat	◯	◯	◯	◯
Thunderstorm	◯	◯	◯	◯
Hurricane/Tropical Storm	◯	◯	◯	◯
Tornado	◯	◯	◯	◯
Wildfire	◯	◯	◯	◯
Winter Weather	◯	◯	◯	◯
Earthquake	◯	◯	◯	◯
Other	◯	◯	◯	◯

4. Which types of flooding do you experience in your community? Check all that occur:

	Frequently	Occasionally	Rarely	Never
Flash: intense/long rain events	◯	◯	◯	◯
Stormwater: lack of drainage	◯	◯	◯	◯
Coastal: Storm Surge	◯	◯	◯	◯
Coastal: High Tide	◯	◯	◯	◯
Riverine: river/pond overflow	◯	◯	◯	◯
Hurricane/ Tropical Storm	◯	◯	◯	◯
Dam Breach: failure	◯	◯	◯	◯
Compound: multiple factors	◯	◯	◯	◯
Other	◯	◯	◯	◯

5. Where does flooding occur in your community?

6. What is impacted and/or damaged by flooding in your community?

- [ ] Homes
- [ ] Agriculture
- [ ] Businesses
- [ ] Roads
- [ ] Emergency/Evacuation Routes
- [ ] Hospitals
- [ ] Vehicles
- [ ] Equipment
- [ ] Solid Waste Sites
- [ ] Industrial Sites
- [ ] Cultural Sites
- [ ] Habitat
- [ ] Septic Systems
- [ ] Other

7. Are there other concerns or long-term environmental changes/issues that your community has or is experiencing? Examples: Water quality, higher temperatures, land use change, population change, habitat loss, tree health, invasive species, mosquitos, etc.

8. What are your community's top priorities and biggest needs related to natural hazards and building resilience?

9. What kind of assistance would be most helpful to your community?

10. Is there anything else that you would like to share related to resilience, flooding, and other hazards in your community?

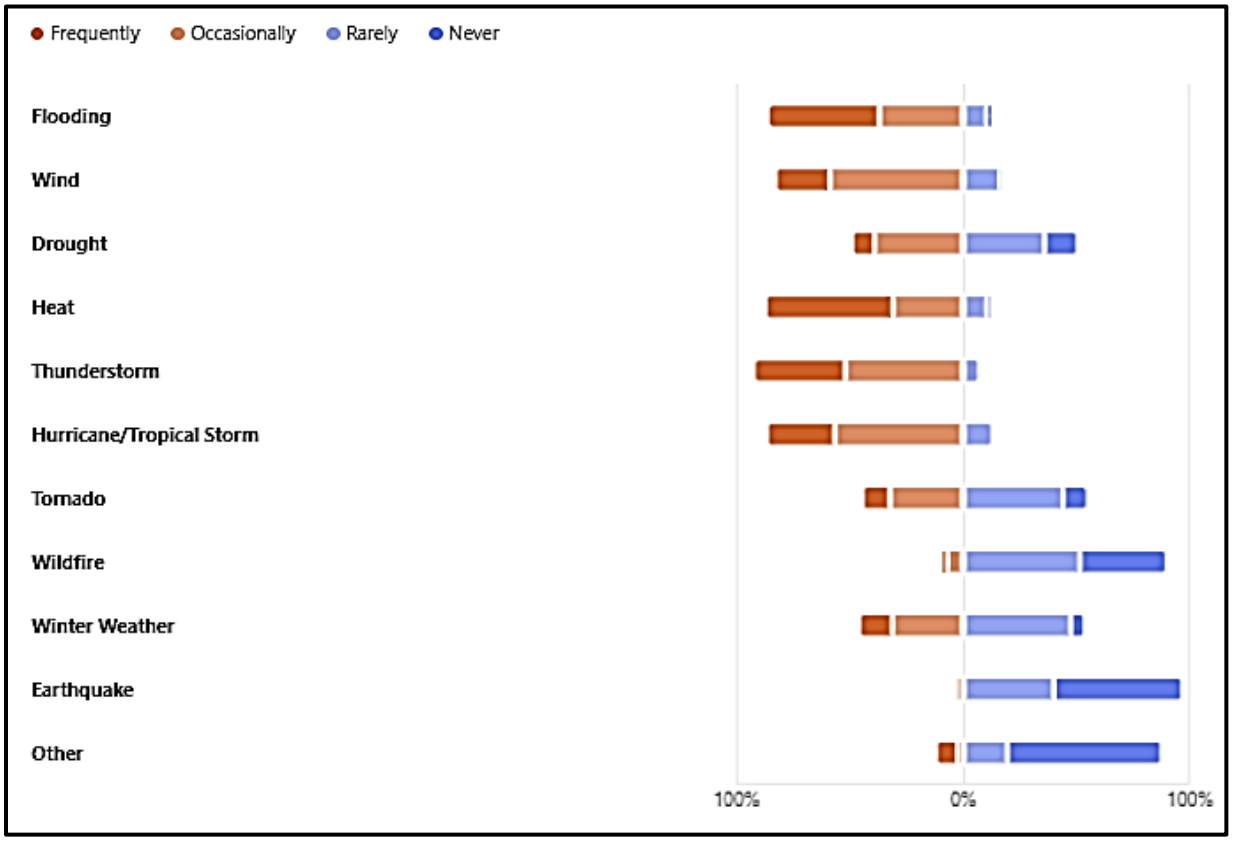
11. If you would like someone with the South Carolina Office of Resilience's Watershed-Based Planning Program to reach out to you to discuss assistance with resilience planning, community needs, identifying funding opportunities, and more, please provide your email here:

You may also complete this optional Statewide flooding survey to share details about specific locations of flooding your community. View the dashboard to see a live report of survey responses collected so far.

SCOR Flooding Experience Survey
https://survey123.arcgis.com/share/58d1be8df8004aaaae917395d2a9a2a3

SCOR Public Flooding Survey Response Dashboard
https://www.arcgis.com/apps/dashboards/6972b4799d7542fbb755adf9a9330cd4#

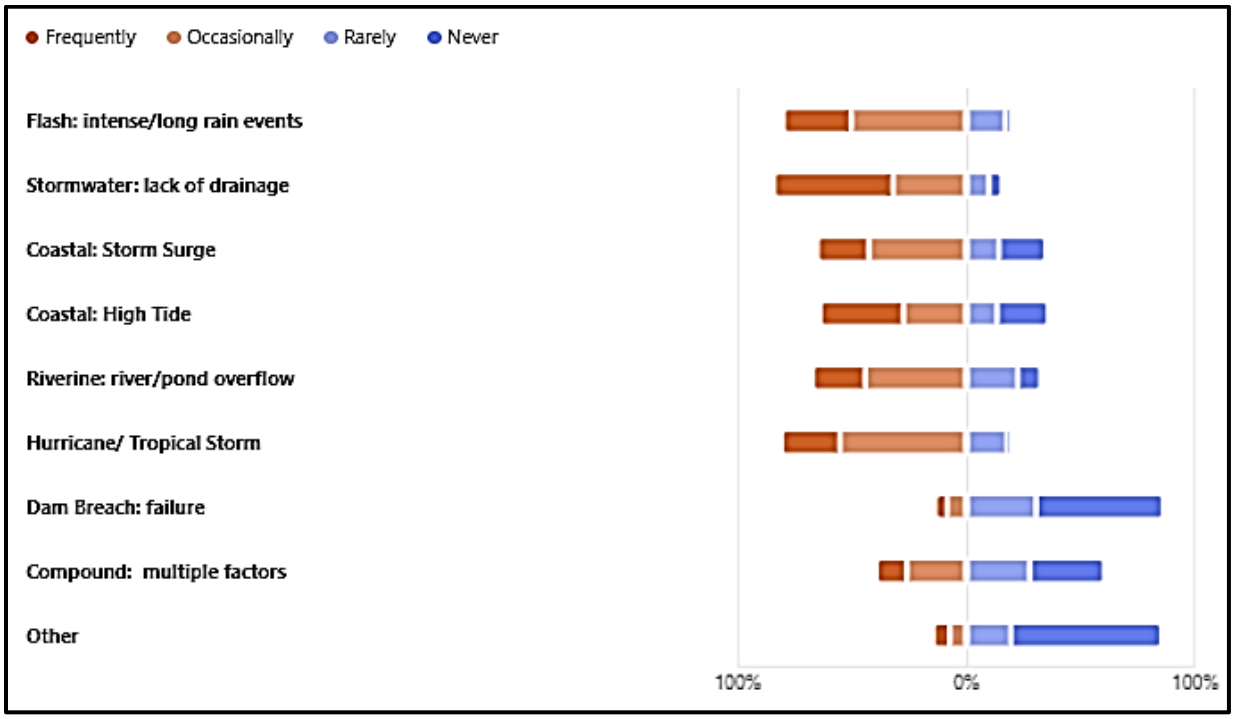
The natural hazards reported by respondents to be of greatest concern were: Heat, Flooding, Thunderstorm, Hurricane, and Wind



Heat		Flooding		Wind	
Frequently	56.6%	Frequently	49.7%	Frequently	24.3%
Occasionally	30.9%	Occasionally	36.9%	Occasionally	58.8%
Rarely	10.3%	Rarely	10.2%	Rarely	16.2%
Never	2.2%	Never	3.2%	Never	0.7%

Thunderstorm		Hurricane/Tropical Storm	
Frequently	40.7%	Frequently	30.3%
Occasionally	52%	Occasionally	56.6%
Rarely	7.3%	Rarely	13.2%

Flooding from "Stormwater: lack of drainage" was reported to be the most frequent type of flooding followed by "Coastal: High Tide", "Flash: intense/long rain events", Hurricane/Tropical Storm", and "Coastal: Storm Surge".



Stormwater: lack of drainage	
Frequently	52.3%
Occasionally	32%
Rarely	9.8%
Never	5.9%

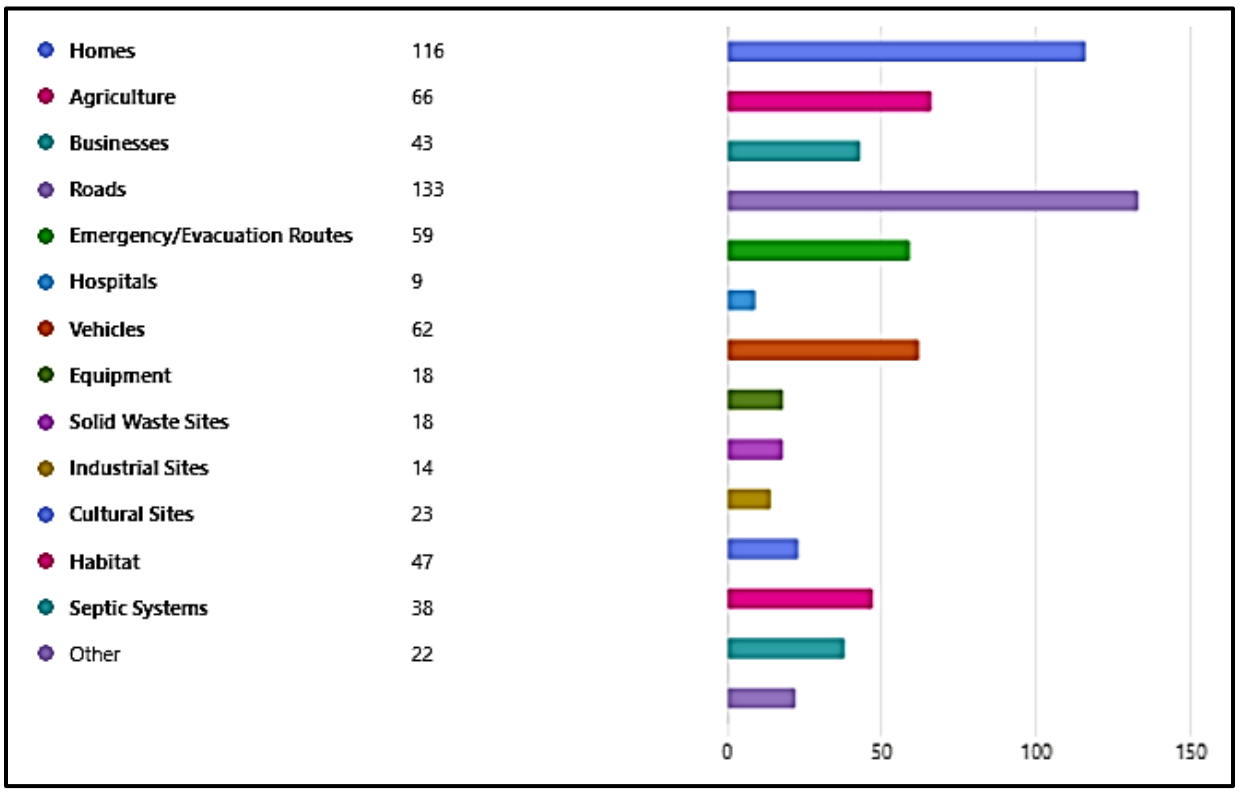
Coastal: High Tide	
Frequently	36.6%
Occasionally	27.5%
Rarely	13.4%
Never	22.5%

Flash: intense rain events	
Frequently	29.8%
Occasionally	50.4%
Rarely	17%
Never	2.8%

Hurricane/Tropical Storm	
Frequently	25.7%
Occasionally	55.3%
Rarely	17.8%
Never	1.3%

Coastal: Storm Surge	
Frequently	22.7%
Occasionally	42.6%
Rarely	14.2%
Never	20.6%

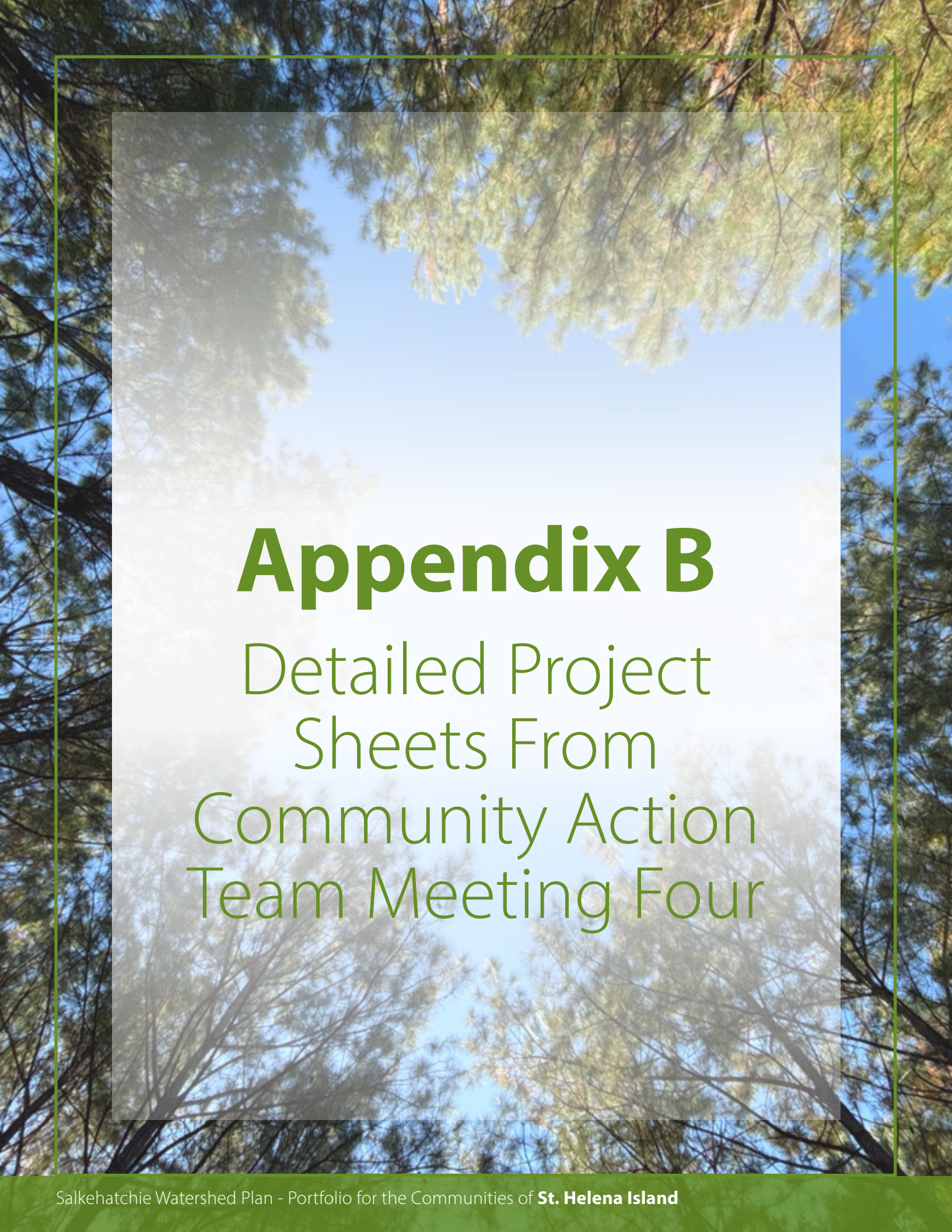
Survey respondents reported many impacts from flooding. Roads, Homes, Agriculture, Vehicles, and Evacuation routes topped the list.



Other concerns and long-term environmental changes that were shared include:

- **Land use change**
- **Rapid development**
- **Habitat loss**
- **Tree health**
- **Higher temperatures**
- **Water quality**
- **High intensity rain events**
- **Sea level rise**
- **Pollution**
- **Mosquitos**

Assistance community members responded would be helpful includes funding, infrastructure repair, better stormwater management, flood mitigation, ditch cleaning/maintenance, drainage, septic repair and replacement, road and bridge repair, and replacement of old pipes.



Appendix B

Detailed Project Sheets From Community Action Team Meeting Four

Salkehatchie Project Sheet

Community: Saint Helena Island

Potential Adaptation Strategy: Stormwater Park (Constructed wetland in between ball fields and improved drainage towards the back of the property)

Address: Wesley Felix Park (Ball Park Road)

Parcel ownership: ☐Private ☒Public (Town/City, County, State) ☐Other: Click or tap here to enter text.

Rainfall in past 24 hrs (CoCoRaHS): No Rain

Structure(s) on site: ☒ Yes ☐ No

Describe structure(s): 2 baseball fields, 3 buildings (concessions, bathrooms), 2 playground areas, basketball court, tennis court, weather station.

Description of paved surfaces on site: Click or tap here to enter text.

Existing vegetation (all that apply): ☒Woods ☒Shrubs ☒Dirt ☒Grass

Estimated tree canopy cover: 25% but more towards the back of the park

Presence of standing water: ☒ Yes ☐No

Drainage on site (all that apply): ☒Grassed Ditches ☒ Stormwater Pipes/Culverts ☐Stormwater Ponds ☒Inlets ☐Curbs ☐Other: Click or tap here to enter text.

Drainage infrastructure notes (diameter, dimension, material, condition): Major drainage infrastructure includes a stormwater pond located at the back of the park, all features appear to drain towards this pond via ditches, swales (small 12” concrete pipes connect swales), drop inlets/pipe, and potentially a bioswale that was recently mowed down at the time of our visit.

Comments/Observations: Given the available space and how the drainage system is laid out, a treatment train approach would work well at this site. The existing bioswale/bioretention area—currently a low spot with vegetation that has recently been mowed—could be upgraded into either a constructed wetland or a more intentionally designed bioretention system with water control structures. The stormwater pond could also be improved by adding a riparian buffer and shorescaping to help filter pollutants, stabilize the shoreline, and provide wildlife habitat. Rainwater harvesting is possible from the concession stand’s metal roof, though a plan for how the collected water would be

used would need to be developed. The treatment train would function as follows: small swales throughout the property would be improved and directed to flow into a larger constructed wetland located in the central area. Catch basins could also be routed to this constructed wetland. The wetland would then discharge into the existing stormwater pond. The on-site weather station is a valuable asset and could be used to track rainfall and monitor how well the system performs during storm events.

Photos (structures, paved surfaces, standing water, vegetation, drainage):



1. Existing weather station on park light pole.



2. Stormwater pond located in the northeast corner of the park



3. Recently mowed grassed ditch separating the two baseball fields.



4. Proposed conditions of stormwater pond (above).

Salkehatchie Project Sheet

Community: Saint Helena Island

Potential Adaptation Strategy: Culvert Upsizing / Erosion Control

Address: Club Bridge Road

Parcel ownership: ☐Private ☒Public (Town/City, County, State) ☐Other: Click or tap here to enter text.

Rainfall in past 24 hrs (CoCoRaHS): No Rain

Structure(s) on site: ☒ Yes ☐ No

Describe structure(s): Culverts (2 x 36" reinforced concrete pipe), Club Bridge Road

Description of paved surfaces on site: Fair Condition, signs of slumping on shoulder above pipe/signs of infiltration and failure.

Existing vegetation (all that apply): ☐Woods ☐Shrubs ☒Dirt ☒Grass

Estimated tree canopy cover: 0%

Presence of standing water: ☒ Yes ☐No

Drainage on site (all that apply): ☐Grassed Ditches ☒ Stormwater Pipes/Culverts ☐Stormwater Ponds ☐Inlets ☐Curbs ☐Other: Click or tap here to enter text.

Drainage infrastructure notes (diameter, dimension, material, condition): 2 x 36" reinforced concrete pipes. Larger culvert needed.

Comments/Observations: This area is flooding because water can't move through the road crossing the way it should. A big issue is that oysters have built up and are blocking the flow. In the marsh, sea ox-eye daisy is growing, which usually means the marsh surface is higher than normal. The marsh looks heavily eroded with water pooling and getting stuck instead of draining. The blockage is causing both upstream and downstream impacts, including major erosion and marsh loss. In some spots, the marsh edge has a steep drop-off about 3 to 3.5 feet tall. To fix the problem, better water movement is needed. Possible solutions include installing a larger culvert—something like a 5-by-3-foot box culvert—stabilizing the banks using living shoreline methods, and restoring damaged marsh areas. Oyster growth in this area is strong, which will need to be considered in any design.

Photos (structures, paved surfaces, standing water, vegetation, drainage):



1. East side of Club Bridge Road showing ~3-foot-high escarpment and oyster recruitment.



2. Oyster recruitment on the East side of Club Bridge Road.



3. West side of Club Bridge Road showing fallen tree and ~3-foot-high escarpment.

Salkehatchie Project Sheet

Community: Saint Helena Island

Potential Adaptation Strategy: Living Shoreline Suitability Analysis

Address: Community-wide

Parcel ownership: ☐Private ☒Public (Town/City, County, State) ☐Other: Click or tap here to enter text.

Rainfall in past 24 hrs (CoCoRaHS): NA

Structure(s) on site: ☒ Yes ☐ No

Describe structure(s): Docks, revetments, bulkheads are common features in the focus area.

Description of paved surfaces on site: Bridges or boat ramps may be adjacent to project areas.

Existing vegetation (all that apply): ☐Woods ☐Shrubs ☐Dirt ☒Salt Marsh & Tidal Creeks

Estimated tree canopy cover: Variable

Presence of standing water: ☒ Yes ☐No

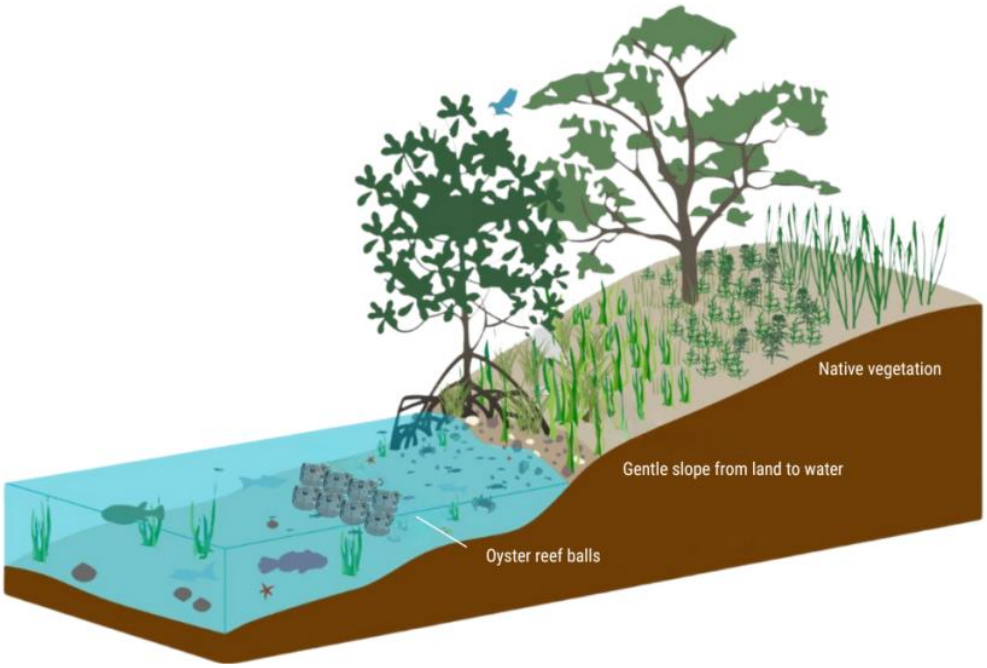
Drainage on site (all that apply): ☐Grassed Ditches ☐ Stormwater Pipes/Culverts ☐Stormwater Ponds ☐Inlets ☐Curbs ☒Other: Stormwater system outfalls may exist in project areas.

Drainage infrastructure notes (diameter, dimension, material, condition): NA

Comments/Observations: Living shorelines are a method of stabilizing the shoreline including the marsh edge and uplands. Living shorelines are encouraged in the estuary as an alternative to or in support of traditional hardened erosion control structures such as bulkheads or rip rap. Living shorelines may be placed adjacent to traditional stabilization techniques. Living shoreline methods involve planting of native vegetation and/or the installation of green infrastructure such as oyster shell, that promote the health and growth of the native ecosystems (www.clemson.edu/extension/living-shorelines). Living shorelines can provide benefits that improve water quality, stabilize shorelines, provide habitat for fish and other aquatic species, and more.

A living shoreline suitability analysis would use the The Nature Conservancy Living Shorelines application as well as other data to perform a desktop analysis that would help to inform site identification and prioritization for living shoreline implementation. This analysis would provide community specific best practices for living shorelines including design considerations to increase long-term success.

Supportive Graphics:



Source: Ocean Research and Conservation Association Inc. (ORCA)



Source: The Nature Conservancy Living Shorelines Application App



Source: The Nature Conservancy Living Shorelines Application App

Salkehatchie Project Sheet

Community: Saint Helena Island

Potential Adaptation Strategy: Living Shoreline, Vegetative Buffer

Address: Penn Center

Parcel ownership: ☒Private ☐Public (Town/City, County, State) ☐Other: Click or tap here to enter text.

Rainfall in past 24 hrs (CoCoRaHS): No Rain

Structure(s) on site: ☒ Yes ☐ No

Describe structure(s): Dock, revetment

Description of paved surfaces on site: None, dirt road and dirt parking area

Existing vegetation (all that apply): ☒Woods ☒Shrubs ☒Dirt ☐Grass

Estimated tree canopy cover: 50%

Presence of standing water: ☒ Yes ☐No

Drainage on site (all that apply): ☐Grassed Ditches ☐ Stormwater Pipes/Culverts ☐Stormwater Ponds ☐Inlets ☐Curbs ☐Other: Click or tap here to enter text.

Drainage infrastructure notes (diameter, dimension, material, condition): None.

Comments/Observations: Stormwater runoff is currently flowing down the driveway and into the marsh. Because the driveway sits higher than the marsh, the water is picking up speed as it flows downhill, which is causing erosion along the bank. The eroded escarpment is about 1–2 feet high. Adding a vegetated buffer along the edge of the driveway and marsh would help slow the runoff and stabilize the eroding bank. A living shoreline could also be installed along the marsh edge to support marsh health and reduce marsh edge erosion. This site would work well as a demonstration project, especially since visitors can view the shoreline from the existing dock. Interpretive signage about sea-level rise is already in place, which would complement the demonstration. Oyster recruitment in the area is strong, so an oyster-based living shoreline is an appropriate and effective option.

Photos (structures, paved surfaces, standing water, vegetation, drainage):



1. Dock as seen from parking area, site of proposed vegetative buffer.



2. Existing interpretive signage on the end of the dock.



3. Area south of the dock (left), site of proposed living shoreline (right).

Salkehatchie Project Sheet

Community: Saint Helena Island

Potential Adaptation Strategy: Ditch Maintenance, Culvert Upsizing/Improvement

Address: 32 Dr. MLK Blvd (Bethesda Church)

Parcel ownership: ☐Private ☒Public (Town/City, County, State) ☐Other: Click or tap here to enter text.

Rainfall in past 24 hrs (CoCoRaHS): No Rain

Structure(s) on site: ☒ Yes ☐ No

Describe structure(s): Multiple church buildings, associated parking lots, MLK Blvd with adjacent ditches and drainage infrastructure.

Description of paved surfaces on site: Fair Condition. Cracking in private parking lots (asphalt).

Existing vegetation (all that apply): ☐Woods ☒Shrubs ☒Dirt ☐Grass

Estimated tree canopy cover: 50% near ditches

Presence of standing water: ☐ Yes ☒No

Drainage on site (all that apply): ☒Grassed Ditches ☒ Stormwater Pipes/Culverts

☐Stormwater Ponds ☐Inlets ☐Curbs ☐Other:

Drainage infrastructure notes (diameter, dimension, material, condition): Grassed ditches with corrugated plastic pipe in some places, alongside concrete culverts.

Comments/Observations: The ditches in this area require maintenance. The presence of salt-tolerant vegetation and abundant sea ox-eye daisy indicates that tidal flow is reaching the ditch. There is an opportunity to improve the system by converting the existing ditch into a bioswale, with planted side slopes to filter runoff and stabilize the banks, while maintaining an open channel at the base for conveyance. The ditch could also be widened and tiered to increase water storage capacity. In some locations, driveways lack culverts entirely, further restricting flow. Routine maintenance and structural improvements are needed to restore proper hydrology.

Photos (structures, paved surfaces, standing water, vegetation, drainage):



1. Flume from Ebenezer Baptist Church parking lot into roadside ditch on the east side of Dr. MLK Blvd. Connection between flume and ditch shows signs of overgrowth and the need for maintenance.



2. Debris in the roadside ditch on the east side of Dr. MLK Blvd.



3. Corrugated plastic pipe and salt tolerant vegetation.



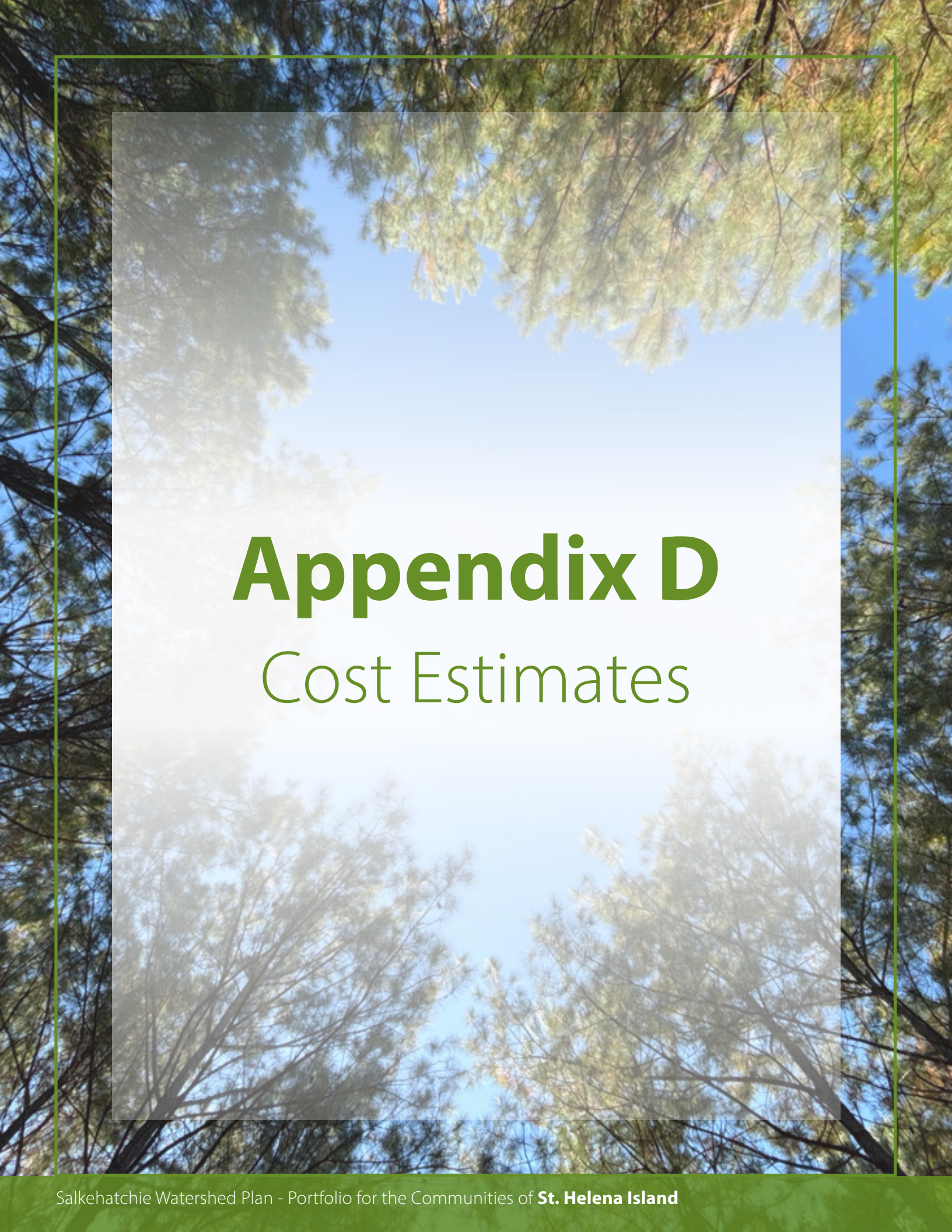
Appendix C

Prioritization Criteria

Prioritization Criteria for Ranking Adaptation Strategies

Indicator		Scoring			Weight	Data Reference
		3 (Best)	**2**	**1** (Least)		
Flood Reduction	Function of Area of Practice and Runoff Reduction Rates*	**Top 1/3** calculated flood reduction	**Middle 1/3** calculated flood reduction	**Bottom 1/3** calculated flood reduction	15	SC Coastal Low Impact Development Manual
Feasibility	Flooding – Current (2025) and Future (2055)	Located in **both** the 2025 and 2055 5% (20 yr) Flood	Located in **either** 2025 or 2055 5% (20 yr) Flood	Located in **neither** the 2025 or 2055 5% (20 yr) Flood	15	2025 and 2055 5% (20 yr) Flood (First Street Foundation)
	CAT 4 Project Preference	**Top 1/3** Composite Impact and Feasibility Scores	**Middle 1/3** Composite Impact and Feasibility Scores	**Bottom 1/3** Composite Impact and Feasibility Scores	10	CAT 4 Meetings
	Consultant Opinion	High Feasibility and Impact (**No foreseen hurdles**)		Low Feasibility or Impact (**Significant hurdles identified**)	10	Consultant Team Meeting
	Cost (see Table below)	**Low Effort:** Existing Practice or Unskilled/ Volunteer Labor	**Moderate Effort:** Skilled Labor to Install- Specialized Equipment Likely Necessary	**High Effort:** Engineered Designs and Construction Plans Required	5	Based on Level of Effort to Design and Install
	Permitting	**No Land Disturbance** Permitting or **Outside of SCDOT ROW**	**SCDOT ROW**	Section **401/404, CZC** Authorization, **Conservation** Areas	5	GIS Parcels
	Land Ownership	**Public Property:** Town or County Owned		**Private Property**	5	GIS Parcels

Indicator		Scoring			Weight	Data Reference
		3 (Best)	**2**	**1** (Least)		
Feasibility	Operations and Maintenance (see Table below)	**Low Effort:** Hand Tools and/or Quarterly Maintenance	**Moderate Effort:** Skilled Maintenance Crew and/or Bi-Monthly Maintenance	**High Effort:** Heavy Machinery Needed and/or Monthly Maintenance	5	Based on Level of Effort to Maintain
	Soil Infiltration Rate	Soils are **Suitable** (Hydrologic Group A)	Soils **may be Suitable** (Hydrologic Groups B and C)	Soils are **Unsuitable** (Hydrologic Groups A/D, B/D, C/D, D, or Unknown)	5	USDA NRCS, Web Soil Survey
Co-Benefits	Priority Populations Benefitted (LMI%)	LMI: > 51%		LMI: < 51%	5	HUD LMI Block Groups
	Urban Heat Mitigation/ Pedestrian	Paved Surface Reduction **and** Increased Plantings	Paved Surface Reduction **or** Increased Plantings	Paved Surfaces are not Reduced **Nor** are Plantings Increased	5	Based on Adding NBS and Removing Paved Surfaces
	Cultural	**Located** at Nationally Registered Historic Place		**Not Located** Nationally Registered Historic Place	5	SC SHPO
	Water Quality (see table below)	95 – 100 % of Total Suspended Solids Removed	80 – 94 % of Total Suspended Solids Removed	0 – 79 % of Total Suspended Solids Removed	5	SC Coastal Low Impact Development Manual
	Biodiversity/ Habitat (see table below)	**Increases** forage, shelter, **and** freshwater source for pollinators	**Either** increases forage, shelter, **or** freshwater source for pollinators	Habitat **not improved** during NBS project	5	NWF's Certified Wildlife Habitat
				TOTAL	**100**	



Appendix D

Cost Estimates

Order of Magnitude Cost (High-Level Cost Estimate) for:

St. Helena Island Stormwater Park

Type of Strategy: Bioswale, Constructed Wetland, Stormwater Pond Vegetated Buffer, Rain Barrel/Cistern

Community: St. Helena Island

Strategy Address/Location:

Wesley Felix Park (179 Ball Park Road, Saint Helena Island, SC)

Date of Estimate: 3/16/2026



1. Conceptual layout for Wesley Felix Park on St. Helena Island. Dark green = constructed wetland (~15,000 SF), light green= bioswale (~300 LF), pink = vegetated buffer around stormwater pond (~400 LF)

Planning and Design

- Project Management:
    - Description- Coordinate with the Owner on the proposed schedule, project progress, deliverables, and budget for the project duration. Meet on a bi-weekly basis to provide updates on budget, progress on deliverables, gain feedback, and discuss needs. Provide monthly invoices that include an estimate of percent complete and percent spent, and an estimate of hours spent during the prior month as well as hours spent to date.
    - Assumptions- Project is billed as lump sum. Regardless of billing arrangement, project management deliverables will remain consistent and

include regular communication and opportunities for the Owner to provide feedback on design.

- Surveying & Geotechnical:
    - One pre-construction survey is needed and should be provided as PDF and CAD files.
    - Pre-construction survey must include:
        - Property corners and property lines for subject parcel
        - Edge of pavement, centerline and edge of DOT right-of-way on adjacent roadway, paths and edge of pavement for intersecting streets for project extents
        - Existing structures (concession stands, fencing, weather station, signs, etc.)
        - Existing utilities
        - Utility easements or right of ways
        - Drainage infrastructure (including inlets, outfalls, catch basins)
        - Stormwater pond bathymetry (grades, contours, and depth), water surface elevation at time of survey, locations and elevations of inflow and outflow structures
        - Topography of low-lying ditch areas
        - Wetland delineation
    - Geotechnical investigation to characterize subsurface soil conditions across the constructed wetland footprint
    - Assumptions – 811 shall be called prior to excavation.
- Permitting:
    - Description- wetland delineation and package to USACE for no permit required. Vegetated Buffer may interfere with adjacent wetlands but no excavation/fill. Coordination with the City/County.
    - Assumptions- disturbed area will remain under 1 acre, no SCDES permit will be required. USACE permit will not be required as no excavation or fill in adjacent wetlands, a package will need to be submitted to USACE which includes site plans, project narrative, and maps of adjacent sensitive areas.
- Engineering:
    - Conduct desktop analysis, perform stormwater H&H calculations, and one site visit to collect information necessary to produce 30% design.
    - Conduct one additional site visit to collect additional information necessary to produce 90% design. The Owner will have the opportunity to provide feedback and revisions at 30% and 90% design.

- Produce 90% engineering stamped designs for submittal to the Owner. The 90% design will need to include all information required for permitting to include but is not limited to:
    - Site plans showing plan and profile of bioswales, constructed wetland, and riparian buffer. Plans will show limits of disturbance, sediment and erosion control, property boundaries, existing wetlands, extents of baseball fields, structures on site, trees, connecting existing drainage infrastructure.
    - Details and notes for bioswales, constructed wetland, and stormwater pond vegetated buffer including a grading plan, soil layers, ponding depths, and planting plans.
    - Specifications for staging materials and equipment. Specifications for ingress and egress to property, construction entrances and sediment and erosion control.
    - Specifications for demolition and removal of existing dirt, and debris.
- Assumptions- The engineered drawings will provide sufficient detail, including dimensions of proposed practices, and necessary materials to develop specifications for project construction.

Table 1. Planning and Design Costs

Item	Description	Quantity	Unit Cost ($)	Total ($)
Project Management	▪ *Weekly/bi-weekly progress update meetings* ▪ *Monthly billing*	*1*	7,500	7,500
Survey	▪ *Pre-construction survey*	*1*	3,500	3,500
Geotechnical	▪ *3 borings*	*3*	6,000	18,000
Permitting	▪ *USACE package for letter of no permit required* ▪ *One round of comment implementation*	*1*	5,000	5,000
Engineering	▪ *Site Visits/Field Investigation* ▪ *30% Design* ▪ *90% Design*	*1*	50,000	50,000
Subtotal Planning and Design				**84,000**

Construction and Implementation

- Site Preparation:
    - Constructed wetland:
        - Sediment and erosion control - Silt fence and other Best Management Practices to be installed during construction.
        - Excavation for 15,000 SF footprint to a maximum depth of 4 feet within the low-lying area between baseball fields. Excavated material suitable for reuse will be placed as compacted structural fill in perimeter berms, interior cell dividers, and weir foundations. Prior to bulk excavation, approximately 6 inches of organic topsoil will be stripped, stockpiled, and respread over upland disturbed areas and planted buffer zones following grading.
    - Stormwater Pond Vegetated Buffer:
        - Prepare pond perimeter spanning 25 LF in width for vegetated buffer plantings. Area shall extend outward from the maximum water surface elevation of the pond. Existing trees shall remain.
    - Bioswale:
        - Excavate 24-36” in depth based on design and haul off materials, 3:1 side slopes, and grading for positive drainage.
    - Assumptions- installation of practices shall be done in a timely manner so no materials will need to be stored on site, 811 shall be called to locate existing utilities ahead of digging. Unit prices for excavation include haul.
- Soil Amendments:
    - Bioswale:
        - Volume needed to allow for 4” of non-mushroom compost along bottom width and side slopes, 4” of double or triple shredded hardwood mulch along bottom width and side slopes.
        - Assumptions- no underdrains, minimum 6” ponding depth. Costs include delivery
    - Vegetated Buffer:
        - Volume needs to allow for 3” of mulch around base of shrubs to conserve moisture and suppress weeds
    - Constructed wetland:
        - Assumptions- Constructed wetland area has C/D soils so no amendments needed
- Planting:
    - Constructed wetland:

        - Plantings installed by hand per planting plan. Plant stock shall be healthy and vigorous native species
        - Planting plan shall specify a mix of emergent and forested wetland vegetation. “Bioretention plug” plants shall be used to promote vigorous root growth (i.e., 5” deep containers with root volumes equal to a 4” pot).
        - Assumptions- plants are available and purchased from a local nursery. Costs assume 90% coverage of proposed square footage. Costs include delivery.
    - Bioswale:
        - Plantings installed by hand per planting plan.
        - Plantings are native and provide wildlife benefits and can withstand dry and wet conditions
        - Assumptions – plants are available and purchased from a local nursery. Costs include delivery.
    - Vegetated Buffer:
        - Plantings are 1’ apart along interior perimeter of existing stormwater pond, each plant is 4” and shall be staked in
        - Avoid species that require full shade, or are prone to wind damage
        - Assumptions – proprietary product used for cost estimate (wetland carpet by Charleston aquatics, comes in 3’ wide by 15’ sections) which includes delivery and installation
- Structural Elements:
    - Constructed wetland
        - Water will exit the constructed wetland through a low-flow outlet structure and discharge into the existing drainage ditches along the tree line on the north side of the property which convey runoff to the existing stormwater pond. The control structure will be a HDPE or precast concrete riser with fixed crest weir to maintain normal pool elevation. An outlet pipe through an embankment will convey flows to existing drainage ditches. Discharge will be stabilized with a riprap apron to dissipate flow energy and prevent scour.
        - riprap or stone for constructed wetland inlet/outlets, filter fabric for lining banks or berms
        - Assumptions - Outlet control structure elevation must be coordinated with the hydraulic grade line of the receiving stream. Outlet pipe unit price includes trench excavation and backfill.
    - Vegetated Buffer

- Landscape stakes for securing riparian buffer
  - Assumptions- Costs include all materials as well as installation costs.

Note: All items include delivery and installation where applicable.

Table 2. Construction and Implementation Costs

Item/Description	Unit	Quantity	Unit Cost ($)	Total ($)
Constructed Wetland ~ 15,000 SF				
Site Preparation - excavation and grading	*CY*	*1,000*	50	50,000
Sediment and erosion control – super silt fence	*LF*	*700*	9	6,300
Structural fill	*CY*	*44*	85	3,740
Topsoil stockpile and respread	*CY*	*350*	17	5,950
Control Structure/Riser with weir	*EA*	*1*	2,000	2,000
Outlet pipe	*LF*	*25*	100	2,500
Riprap apron	*SY*	*4*	80	320
Flashboard Riser/ Stop Logs	*EA*	*1*	5,000	5,000
Headwall/ Endwall-Outlet End (to bioswale)	*EA*	*1*	3,000	3,000
Planting-Shrubs	*EA*	*70*	60	4,200
Planting-herbaceous seed	*SY*	*600*	8	4,800
Educational Signage	*EA*	*1*	1,500	1,500
			Subtotal Rain Garden	**96,310**
Vegetated Buffer ~ 400 LF				
Landscape Stakes	*LS*	*1*	35	35
Double or triple shredded hardwood mulch	*2 CF*	*150*	7	1,050
Vegetated Buffer planting 'wetland carpet' (includes site preparation & installation)	*15 LF*	*27*	320	8,640
			Subtotal Vegetated Buffer	**9,500**
Bioswale ~300 LF				
Bioswale plantings	*SF*	*11,000*	3	33,000
Site preparation – excavation 24-36"	*CY*	*1,000*	50	50,000
Double or triple shredded hardwood mulch	*2 CF*	*1,833*	7	12,831
Non-Mushroom Compost	*2 CF*	*1,833*	12	21,996
			Subtotal Bioswale	**117,827**
Rain Barrel				
Rain Barrel	*EA*	*1*	2,500	2,500

Subtotal Rain Barrel	**2,500**
Subtotal Construction and Implementation	**226,137**
Construction Oversight (20%)	**45,227**
Contingency (30%) *	**93,041**
GRAND TOTAL Planning, Design, Construction, and Implementation	**448,406**

*Contingency allows for budget to address any unforeseen risks or uncertainties with the project that may arise.

Maintenance

- Plant Maintenance:
    - Description- plants planted on uplands will need to watered 1 time per day after planting for two weeks. Irrigate 1 time per week during the heat of summer if no rainfall. Both upland and wetland plants will need to be monitored and dead or dying vegetation removed in winter. Remove vegetation due to overcrowding in late summer. All vegetated practices, weeding should occur 1 time per month or 4 times per year minimum.
    - Assumptions- Town or City staff/landscapers will oversee maintenance
- Erosion Repair:
    - Powerblock – cleaning of system minimum 4 times/year by pressure washer, street sweeper, or regenerative vacuum truck
    - Rain Garden/ Bioswale – bimonthly maintenance as needed to include: reshaping and regrading as needed, spot mulch application to maintain 3" layer of mulch, removal of trash, sediment, debris and replace with clean stone as needed.
    - Assumptions- Town or City staff/landscapers will oversee maintenance

Table 3. Maintenance Effort Per Year

Item	Unit	Quantity
Plant Maintenance	*Hrs*	96 (8 staff hours per month)
Erosion repair	*Hrs*	48 (8 staff hours every other month)

Order of Magnitude Cost (High-Level Cost Estimate) for:

St. Helena Living Shoreline

Type of Strategy: Living Shoreline

Community: St. Helena Island

Strategy Address/Location: Penn Center (31 Holland Ct, Saina Helena Island, SC)

Date of Estimate: 3/16/2026

Planning and Design

- Project Management:
  - Coordinate with the Owner on the proposed schedule, project progress, deliverables, and budget for the project duration. Meet on a bi-weekly basis to provide updates on budget, progress on deliverables, gain feedback, and discuss needs. Provide monthly invoices that include an estimate of percent complete and percent spent, and an estimate of hours spent during the prior month as well as hours spent to date.
  - Assumptions- Project is billed as lump sum. Regardless of billing arrangement, project management deliverables will remain consistent and include regular communication and opportunities for the Owner to provide feedback on design.
- Survey:
  - Two surveys are needed and include a pre-construction survey and as-built that are provided as PDF and CAD files.
  - Pre-construction survey must include:
    - Property corners and property lines for subject parcel
    - Existing structures, roads (including edge of pavement, centerline, curb and gutter), paths, revetments
    - Existing utilities
    - Utility easements or rights of ways
    - Drainage infrastructure (including inlets, outfalls, catch basins)
    - SCDES BCM line and wetland area
    - Edge of marsh grass
  - As-built survey will document the placement and dimensions of the living shoreline post construction.
  - Assumptions- This estimate assumes a boat is not needed to access the shoreline.

- Permitting:
  - Coordinate the designation of Critical Area through the South Carolina Department of Environmental Services (SCDES) for the project site. Provide onsite coordination with the surveyor to produce the survey plat for SCDES signature.
  - Participate in pre-application meetings with the Owner and regulatory agencies. Prepare necessary information for presentation to regulatory agencies during pre-application meetings.
  - Once 90% design has been completed, work with the Owner to obtain regulatory permits necessary for project implementation as directed by US Army Corps of Engineers, and the SCDES. Permit packages will be prepared and submitted for project site. Coordinate communication throughout the permitting process with the Owner and regulatory agencies.
  - Assumptions:
    - Pre-application meetings with regulatory agencies may be conducted virtually.

- Engineering:
  - Conduct desktop analysis and one site visit to collect information necessary to produce 30% design.
  - Conduct one (1) additional site visit to collect additional information necessary to produce the 90% design. The Owner will have the opportunity to provide feedback and revisions at 30% and 90% design.
  - Produce 90% stamped designs for submittal to permitting agencies. The 90% design will need to include all information required for permitting to include but is not limited to:
    - Site plans to include marsh width, grass to grass details (water body width), mean low water (MLW), mean high water (MHW), tidal pattern, project latitude and longitude, project dimensions, SCDES BCM Critical Area Line, and notes on data sources and other pertinent information.
    - Include consideration of shoreline characteristics along neighboring properties and ensure no negative effects to the shoreline outside of the project footprint.
    - Project Sheets to include plan and cross section-view details that include details on placement of materials within the project area and specifications on living shoreline materials. Notes will need to be included that provide details on material preparation.

  - Assumptions:
    - The engineered drawings will provide sufficient detail, including proposed living shoreline structure dimensions, and necessary materials, to develop specifications for project construction.

- Any structures used to attenuate wave energy or stabilize shoreline sediments must be constructed of material that will 1) remain in place, 2) provide attachment substrate for spat and habitat opportunities for other marine life, 3) be able to be installed manually by hand.
- Any living shoreline structures may be emergent at times, warning safety signage will be installed on living shoreline segments in accordance with U.S. Army Corps of Engineers and the U.S. Coast Guard. The Owner will coordinate sign acquisition.

Table 4. Planning and Design Costs

Item	Description	Quantity	Unit Cost ($)	Total ($)
Project Management	▪ Weekly/bi-weekly progress update meetings ▪ Monthly billing	*1*	7,500	7,500
Surveying	▪ Pre-construction survey ▪ As-built survey	*2*	3,500	7,000
Permitting	▪ Critical Area Delineation and Survey Coordination ▪ Pre-Application Meetings ▪ Permit Application Package	1	7,500	7,500
Engineering	▪ Site Visits/Field Investigation ▪ 30% Design ▪ 90% Design	1	15,000	15,000
			Subtotal Planning and Design	**37,000**

Construction and Implementation

- Site Preparation:
  - Description- no clearing or grading is necessary for living shoreline installation. Site assessment is needed pre installation to assure the living shoreline installation will not impact any newly recruited oysters or salt marsh vegetation.
- Planting:
  - Description- Native marsh grass plantings may occur post living shoreline installation. This is typically recommended to take place one to two years post installation. Therefore, plantings are not incorporated in this cost estimate.
- Structural Elements:
  - Description- Oyster castles are hardened structures that recruit oysters and protect the marsh edge from boat wake and wave energy. Oyster castles are

heavier than other living shoreline products regularly used in coastal South Carolina; therefore, require a firmer substrate. Manufactured Wire Reefs (MWRs) are the most affordable option as materials are readily available. MWRs can be constructed ahead of installation and placed on soft sediment as MWRs are the lightest of the approaches. Bagged shells have traditionally been the most widely used living shoreline approach in coastal South Carolina. The shell materials attract oysters for recruitment. Oysters grow on the bagged shell and create an oyster reef. Sometimes bagged shells are placed on a wooden pallet if the sediment is soft.

- Assumptions- Any shell material used in a living shoreline should be quarantined for 6 months prior to installation.

The following materials and installation cost breakdown is assuming the living shoreline is 200 linear feet in length. An appropriate size for the site that provides demonstration opportunities and shoreline erosion benefits and habitat enhancement.

Note: All items include delivery and installation where applicable.

Table 5. Construction and Implementation Costs

Item	Unit	Quantity	Unit Cost ($)	Total ($)
200 Linear Feet total (50 LF oyster castle, 100 LF bagged shell, 50 LF MWRs)				
Site Preparation	*One pre-installation site visit*	*1*	1,000	1,000
Structural Elements	*MWR*	*14*	350	4,900
	Oyster Castle	*400*	25	10,000
	Bagged Shells	*800*	25	20,000
Installation	*100 LF*	2	7,500	15,000
Subtotal Construction and Implementation				**50,900**
Construction Oversight (20%)				**10,180**
Contingency (30%) *				**26,370**
GRAND TOTAL Planning, Design, Construction, and Implementation				**124,450**

*Contingency allows for budget to address any unforeseen risks or uncertainties with the project that may arise.

Maintenance

- Post Construction Monitoring
  - Description- For six months post construction the living shoreline will need to be monitored. Typically, this monitoring is completed by the property owner and therefore is no additional cost.

    - Assumptions-Monitoring is completed by property owner.
- Post Storm Event System Repair:
    - Description- Cost is variable based on damage. Ideally, minimal damage occurs to living shoreline post storm event. At a minimum the living shoreline should be monitored post storm event to access if damage is present.

Table 6. Maintenance Effort Per Year

Item	**Unit**	**Quantity**
Post Construction Monitoring	*Hrs*	8 (year 1)
Post Storm Event System Repair	*Hrs*	8 (variable based on storm events)

Order of Magnitude Cost (High-Level Cost Estimate) for:

Salkehatchie Watershed Conservation/Riparian Buffer Mapping

Community: Salkehatchie Watershed-Scale

Date of Estimate: 3/31/2026

Planning and Design

- Project Coordination and Stakeholder Engagement:
    - Description- project coordination, creation of the Salkehatchie Conservation Committee (SCC), engagement with the SCC, stakeholder engagement
    - Assumptions-
        - 1 kickoff meeting with the client, 12 internal team coordination meetings, budget management, scope and schedule oversight
        - SCC will include relevant, qualified stakeholders such as representatives from local government staff and local land conservation professionals to guide and inform the process. Coordination, material development, and facilitation of up to four meetings with the SCC to collect input on key milestones. At least two SCC engagement sessions will be held in-person.
        - Coordination, material development, and facilitation of up to ten in-person public engagement sessions at each community within the Salkehatchie watershed. Creation of one digital survey to be distributed to the public. Synthesized analysis of public survey data
        - Staff involved: project manager and technical/design professionals
- Spatial Analysis
    - Description- Data collection from sources deemed necessary to assist in identification and prioritization of undeveloped and available parcels, Inventory of existing open space and analysis to identify open space suitable for protection, Development of prioritization criteria to evaluate open space opportunities, geospatial analysis of land conservation opportunities though incorporation of prioritization criteria and production of maps to demonstrate areas of focus for land conservation efforts and aid in parcel selection
    - Assumptions –

        - Data sources are available and accessible from sources such as the South Carolina conservation bank, South Carolina Office of Resilience, etc.
        - A series of maps will be produced at each step of the spatial analysis that will guide discussion among SCC, input from SCC will be incorporated in each step of the analysis
        - ESRI ArcGIS geodatabase will be created to produce the spatial analysis
        - Staff involved: project manager, senior technical/design professional, technical/design professional, junior technical/design professional, GIS professional
- Funding Analysis
    - Description – comprehensive review of similar land protection funding programs in the southeast and the associated administrative frameworks, Funding recommendations will be produced that estimate the cost of meeting the conservation goals as established by the SCC. The analysis will identify and assess the potential for a range of funding strategies that are realistic and that would substantially increase public funding to address parks, recreation, and conservation needs. Presentation to the client of key research findings
    - Assumptions-
        - Funding resource recommendations will include grants, loans, and options from federal, state, local, and private sources
        - Funding review will include examining the revenue-raising capacity, the fiscal impact to government budgets, and/or taxpayers of the local property tax needed to back general obligation bonds
        - Staff involved: project manager, senior technical/regulatory professional, technical/regulatory professional, junior technical/regulatory professional
- Land Protection Vision Plan –
    - Description - Draft plan development based on information gained from previous tasks to develop a comprehensive plan that will identify land protection opportunities, a forecast of land protection needs, and an analysis of the funding pathways necessary to meet the land conservation goals as defined by the SCC, final plan development with input from the SCC and client on the draft comprehensive plan, presentations to the SCC of final land protection vision plan
    - Assumptions –

- Land protection goals of the final land protection vision plan will be on a 25 year future timeline
- Staff involved: project manager and technical/design professionals

Table 1. Estimate of Cost

Item	Unit	Quantity	Total ($)
Project Coordination and Stakeholder Engagement	*LS*	*1*	45,000
Spatial Analysis	*LS*	*1*	30,000
Funding Analysis	*LS*	*1*	30,000
Land Conservation Vision Plan	*LS*	*1*	30,000
Contingency (30%) *			**40,500**
GRAND TOTAL			**175,500**

*Contingency allows for budget to address any unforeseen risks or uncertainties with the project that may arise.

Order of Magnitude Cost (High-Level Cost Estimate) for:

Salkehatchie Watershed Hydrologic & Hydraulic (H&H) Study

Community: Salkehatchie Watershed-scale

Date of Estimate: 3/31/2026

Overarching Assumptions

The goal of this study is to develop a better understanding of the hydrologic conditions within the Salkehatchie Watershed. The study's aim is to develop a model that can be used as a tool to evaluate present and future flood risks at the watershed-scale while also forming the basis of a master model, which can later be updated to include detailed 2D models of communities within the watershed. This initial model will be calibrated using existing available HEC-RAS models in the watershed and will be validated through stakeholder engagement and information collected through the Salkehatchie Watershed Vulnerability Assessment.

This watershed-wide model will identify critical infrastructure (roadways, evacuation routes, bridges, culverts, etc.) that are vulnerable to flooding in the present day and in the future, which will help the SC Office of Resilience and the communities within the Salkehatchie watershed to prioritize projects at the state and County level. Additionally, this model is intended to be updated as communities within the watershed begin inventorying their own drainage systems and developing their own H&H studies or stormwater master plans. As communities begin investing in stormwater infrastructure solutions, they can be added to this model as high-resolution 2D zones to provide additional detail around communities where it is needed. This model can serve as a resource to communities in their own H&H modeling efforts to help with model calibration and validation as well.

Ultimately, the development of this model will help provide a better understanding of Hydraulic & Hydrologic conditions in the watershed and will immediately inform potential projects at the State and County level within the watershed by identifying undersized culverts and bridge crossings. As funding becomes available and other communities begin inventorying and/or developing their own stormwater models, this model can be used as a master watershed model to house the model of each community and help determine upstream and downstream impacts for larger-scale projects.

Model Development

- Project Management:
    - Description- Project Management, Kick-off Meeting with Client and Project Team and Public Meetings & Engagement
    - Assumptions-
        - Quarterly Report Meetings (6 virtual meetings)
        - Kick-off Meeting with client (1 virtual meeting)
        - Stakeholder Engagement Meeting Materials and Planning
        - Staff involved- project manager, senior technical/design professional, technical/design professional, junior technical/design professional, and GIS professional
- Field Investigation and Survey:
    - Description- Spot elevations for critical infrastructure (bridges, culverts, roads, etc.)
    - Assumptions-
        - Only State and County stormwater infrastructure assets will be modeled as part of this project
        - Survey will be limited to spot elevations on critical assets, as needed
        - Staff involved- senior technical/design professional, technical/design professional, junior technical/design professional, and GIS professional
- Data Collection:
    - Description – Review of Existing Reports, FEMA Hydraulic Models, FEMA Flood Insurance Studies and Claims, SCDOT As-builts, Water Level Sensors, and Riverine Gauges. The team will also compile existing data for landcover, soils, drainage complaints, and topography.
    - Assumptions –
        - Hydraulic models (i.e. FEMA HEC-RAS) are available and accessible throughout the watershed
        - 1 virtual meeting with client to review data collection
        - *1 site visit which includes installation of a riverine gauge on the upstream side of the culvert crossing (optional)*
        - *$1,250 for riverine gauge equipment (assuming level logger and supplies to construct well) (optional)*
        - Staff involved- project manager, senior technical/design professional, technical/design professional, junior technical/design professional, and GIS professional

- Model Development:

    - Description- Gather stakeholder information (Survey123/ArcGIS StoryMap); Review of base mapping to use for hydrology & hydraulic design (soils, topography, drainage areas, etc.) and select appropriate design storms for model scenarios; Develop Existing and Future Conditions (2050) H&H Models
    - Assumptions –
        - 1 meeting with client to review stakeholder information, basemaps of model elements, and to select appropriate design storm events for existing and future conditions scenarios
        - Scenarios will include one existing conditions model and one future conditions model
        - Technical report will be produced
        - 1 virtual meeting with client to review model results
        - Staff involved- project manager, senior technical/design professional, technical/design professional, junior technical/design professional, and GIS professional
- Model Calibration/Validation:
    - Description- Stakeholder engagement to ground truth model results; Capture additional areas prone to flooding and inconsistencies in model results; Identify up to ten (10) recommended strategies for flood mitigation.
    - Assumptions-
        - Model validation will include comparison of results to at locations where existing H&H Models are present (i.e. HEC-RAS)
        - 1 engagement event in each community (10 total) to identify additional areas of concern and validate model results
        - Staff involved: project manager, senior technical/design professional, technical/design professional, and junior technical/design professional
- Proposed Conditions Model:
    - Description- Model ten (10) recommended strategies to determine potential for flood mitigation; Conduct Benefit-Cost Analysis (BCA) on 10 recommended strategies
    - Assumptions-
        - 10 recommended strategies will be assessed using the existing and future conditions models
        - A formal BCA will be conducted for each of the ten (10) projects

- Final Report:

- Description- Development of final report consisting of project goals and objectives, summarization of field investigations, and literature review; Assessment of results of BCA and ranking of ten (10) improvement projects.
- Assumptions-
  - Recommendations will be made for 10 improvement projects
  - Projects will be ranked by BCA score

Table 2. Cost Estimates

Item	Unit	Quantity	Total ($)
Project Management	*LS*	*1*	20,000
Field Investigation and Survey	*LS*	*1*	40,000
Data Collection	*LS*	*1*	55,000
Model Development	*LS*	*1*	110,000
Model Calibration/Validation	*LS*	*1*	40,000
Proposed Conditions Model	*LS*	*1*	65,000
Final Report	*LS*	*1*	45,000
Contingency (30%) *			**112,500**
GRAND TOTAL			**487,500**

*Contingency allows for budget to address any unforeseen risks or uncertainties with the project that may arise.