

Resilient Coastal
Communities Program

Planning Handbook



Updated March 2025

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AUGUST 2023

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Topsail Island, NC



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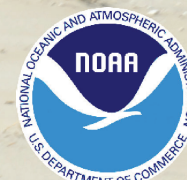
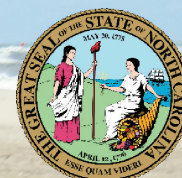
Resilient Coastal
Communities Program

Planning Handbook

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NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCY



List of Acronyms

CAMA	Coastal Area Management Act
CAT	Community Action Team
CHPP	Coastal Habitat Protection Plan
DCM	Division of Coastal Management
DEQ	Department of Environmental Quality
EESI	Environmental and Energy Study Institute
EO80	Executive Order 80
FEMA	Federal Emergency Management Act
MOU	Memorandum of Understanding
NCEM	North Carolina Emergency Management
NCORR	North Carolina Office of Recovery and Resiliency
NGOs	Non-Governmental Organizations
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
RCCP	Resilient Coastal Communities Program
RENA	Resilience Evaluation Needs and Assessment
RISE	Regions Innovating for Strong Economies



How to Use this Handbook

Purpose

The purpose of the NC Resilient Coastal Communities (RCCP) Handbook is to guide contractors and local governments in completing Phases 1 and 2 of the RCCP. Important existing data, tools, and resources are incorporated within the handbook to assist with the process. Additionally, specific program requirements are identified throughout.

Audience

There are several intended audiences for this handbook, including:

1. Contractors offering technical assistance to participating communities
2. Localities selected to receive direct technical assistance services through the RCCP or wishing to complete the requirements of the RCCP by their own means
3. Community Action Team participants

Some sections of this handbook may not be applicable to each audience but are intended to assist with completing program requirements. Local governments wishing to receive credit for previous efforts and/or to complete the requirements of the RCCP by their own means must contact program coordinators to discuss this process.

Program Contacts

Please direct questions related to the Resilient Coastal Communities Program and this handbook to any of the Division of Coastal Management (DCM) contacts below:

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Introduction



Boardwalk crossing over the Currituck Sound in Duck, NC

The [Resilient Coastal Communities' Program](#) (RCCP) is the culmination of coastal resilience efforts in North Carolina over the last several years. Beginning after Hurricane Matthew in 2016, the Division of Coastal Management (DCM) piloted the [Resilience Evaluation and Needs Assessment](#) (RENA). Five coastal communities, including Duck, Edenton, Hatteras Village, Oriental, and Pine Knoll Shores, participated in the pilot program and began assessing their physical and social vulnerabilities to coastal hazards. Through the RENA process, DCM and its partners worked with local governments to map community assets, engage with, and educate the public, identify communities' social and physical vulnerabilities, and explore potential projects to mitigate future impacts from flooding, sea level rise, and other extreme weather events. This process led to several positive outcomes, including a more localized understanding of the impacts of hazards on essential community assets, increased public engagement in the resilience planning process, and the development of additional resources to include in grant applications for proposed resilience projects.

After Hurricane Florence made landfall in 2018, DCM began developing resources for local governments to address the negative impacts of coastal hazards, including the [Coastal Adaptation and Resiliency Website](#) and the [NC Coastal Community Resiliency Guide](#). In addition, Governor Cooper issued [Executive Order 80](#), which called for the development of the [2020 Climate Risk Assessment and Resilience Plan](#), which catalyzed the development of a larger umbrella program, the [Resilient Communities Program](#). This program now houses the RCCP and RISE ([Regions Innovating for Strong Economies and Environment Program](#)). While

the RCCP focuses locally on the 20 coastal counties designated under the Coastal Area Management Act ([CAMA](#)), RISE is administered by the North Carolina Office of Recovery and Resiliency ([NCORR](#)) and approaches resiliency at a larger regional scale.



Figure 1 | Community members participating in RENA process, 2016

Executive Order 80 also called for regional resilience workshops to gather feedback from local governments in developing the NC Climate Risk Assessment and Resilience Plan, two of which DCM organized and hosted in 2019. These workshops provided critical feedback directly from communities about their needs and how North Carolina can support them. A key takeaway was that impacts on communities are being seen and felt more so than ever before, and there is a need for a holistic, forward-looking approach to building resilience in NC. Through this adaptive process, the Division of Coastal Management realized that, as a state, North Carolina had yet to identify shovel-ready projects (i.e., projects that can be expedited via sufficient funding, research, and technical assistance) to compete for federal funding opportunities. Therefore, by developing a formalized planning process, such as the RCCP, the State can better prepare communities to be awarded grant opportunities that otherwise might be inaccessible or difficult to obtain.

Building coastal resilience in a community means ensuring all members and systems within it can better withstand significant environmental disturbances, such as hurricanes and long-term stressors, in ways that help meet community-established goals. Resilience can be defined as increasing a “community’s ability to rebound, positively adapt to, or thrive amidst changing conditions or challenges—including disasters and climate change—and maintain quality of life, healthy growth, durable systems, and conservation of resources for present and future generations ([Colorado’s Resiliency Framework](#)).” However, because every community is unique, there is no one-size-fits-all approach to building resilience. This definition highlights the importance of a community-involved process that identifies the individual needs of a community and develops customized projects which can address them.



Figure 2 | Governor Cooper signing Executive Order 80, 2018

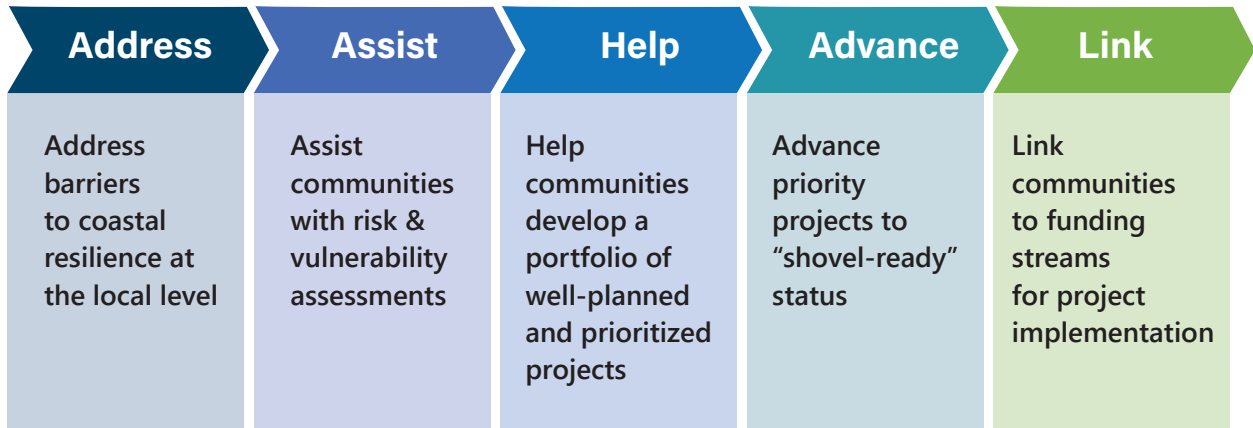
To make North Carolina more resilient to both climate and non-climate-related stressors, such as economic and social threats to human health, Governor Cooper signed [Executive Order 80](#) on October 29, 2018, calling for the integration of climate adaptation and resilience planning into cabinet agency policies, programs, and operations. The order directed the Department of Environmental Quality (DEQ), with the support of other agencies and stakeholders, to prepare the North Carolina Climate Risk Assessment and Resilience Plan to be submitted to the Governor by the Climate Change Interagency Council in March 2020. Executive Order 80 called for state agencies to develop resilience strategies that support communities and sectors of the economy most vulnerable to the effects of climate change. It also aimed to enhance the state government's ability to protect human life, health, property, natural and built infrastructure, cultural resources, and other public and private assets of value to North Carolinians ([North Carolina Climate Risk Assessment and Resilience Plan, 2020](#)).

To begin developing and implementing the RCCP, the Division of Coastal Management received approximately \$830,000 in funding from the North Carolina General Assembly and \$1.1 million from the National Fish and Wildlife Foundation's Emergency Coastal Resilience Fund. The Resilient Coastal Communities Program, which is the first of its kind in the State of North Carolina, is modeled after successful programs in other coastal states, such as Massachusetts' Municipal Vulnerability Preparedness Program, Rhode Island's Municipal Resilience Program, and Florida's Resilient Coastlines Program.

Building more resilient communities requires access to resilience expertise, support for analysis planning, and funding to implement measures that advance long-term resilience. The RCCP aims to address these needs through technical and financial assistance to advance coastal resilience efforts throughout North Carolina's 20 coastal counties. This handbook guides communities, contractors, and program partners through the completion of Phases 1 and 2 of the RCCP.

The first round of Phases 1 and 2 of the RCCP occurred from 2021-2022, with 26 communities and 10 contractors participating. If you would like to review the deliverables from the first round, they can be found on the [RCCP website](#).

Program Objectives



Program Scope

All counties and municipalities within the [CAMA jurisdiction](#) are eligible to apply for the RCCP.

Federal and state-recognized tribes are also eligible to apply.

Phase 1: Community Engagement & Risk/Vulnerability Assessment

Phase 1 of the Resilient Coastal Communities Program includes performing a risk and vulnerability assessment, developing a community action team, and engaging with the public.

Phase 2: Planning, Project Identification, & Prioritization

Phase 2 of the program involves a community- and data-driven process to identify priority actions that can be taken to adapt to short- and long-term hazards.

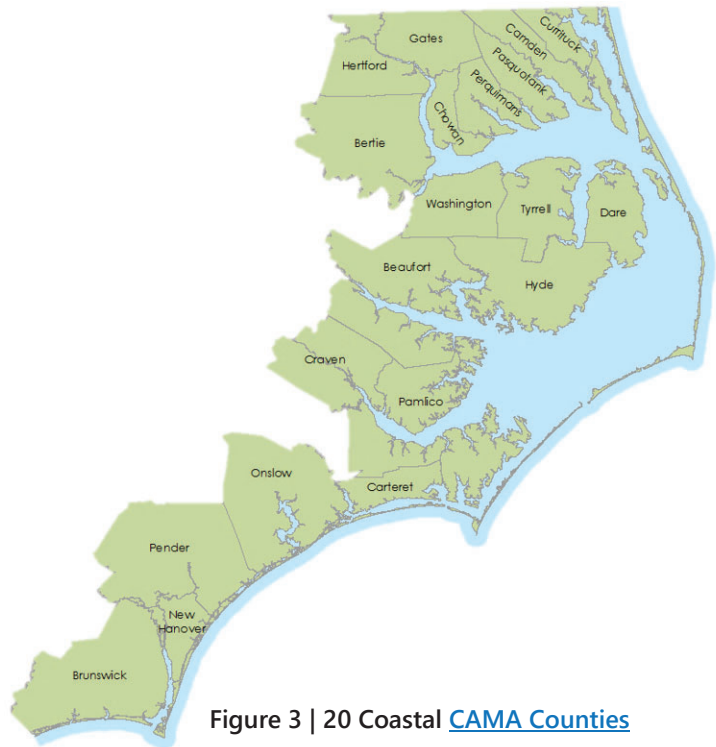


Figure 3 | 20 Coastal [CAMA Counties](#)

Phase 3: Engineering & Design

Phase 3 is the engineering, design, and permitting of the prioritized projects. Competitive grants will be available for communities that successfully completed Phases 1 and 2 to develop projects that are shovel-ready.

Phase 4: Project Implementation

Phase 4 competitive grants will be available for communities that successfully completed Phases 1, 2, and 3 for the implementation of shovel-ready projects.

Phase 1 & 2 Objectives

Participating communities will accomplish the following objectives in Phases 1 and 2:

- Perform a data- and community-driven risk and vulnerability assessment.
- Develop a portfolio of well-planned and prioritized solutions to address risks.

Once communities complete Phases 1 and 2, they become eligible to apply for additional funding via Phase 3 (Engineering & Design) and Phase 4 (Project Implementation). Communities may receive credit towards completing Phases 1 and 2 of the RCCP for previous or ongoing work that aligns with program requirements. Localities wishing to complete the requirements outside of the grant program must work with coordinators to illustrate how their efforts fulfill the requirements outlined in this handbook.

Deliverables

The main deliverable of this effort is called The Resilience Strategy, which includes two major components:

1. **Vulnerability Assessment Report:** Details the quantitative and qualitative assessment(s) performed, which will evaluate the vulnerability of critical assets, natural infrastructure, and vulnerable populations to several hazards, including flooding (rainfall, tidal and riverine), storm surge, sea level rise, and other locally relevant hazards such as wind and erosion.
2. **Project Portfolio:** Outlines a series of options to reduce exposure, reduce sensitivity, and increase adaptive capacity to flooding and other hazards. A combination of structural (i.e., infrastructure) and nonstructural (i.e., policy) approaches should be considered. At least one project should include a natural or nature-based component.

To view examples of final deliverables from the first round of the RCCP, [click here](#).

Additional Context

While the RCCP's priorities primarily address environmental threats to human health and well-being, many of these priorities call for the protection of natural resources which provide ecosystem services that are fundamental to the security of coastal communities. Throughout the development of the RCCP, the Division of Coastal Management has incorporated the guiding principles of the [NC Coastal Habitat Protection Plan \(CHPP\)](#) to ensure the continued protection of coastal resources. As the RCCP continues to grow, we are committed to supporting the priorities of the Department of Environmental Quality and the Coastal Resources Commission.

In many ways, the RCCP is a novel pioneer project, helping to pave the way for similar initiatives at the local and state levels. However, the RCCP also operates alongside another program working diligently to address the negative impacts of climate change and improve the resilience of habitats and communities in North Carolina. Following Hurricane Florence in 2018, the newly formed North Carolina Office of Recovery and Resilience (NCORR) established the [Regions Innovating for Strong Economies and Environment](#) Program (RISE).

RISE aims to support North Carolinians by:

1. Providing coaching and technical assistance to identify priority resilience actions;
2. Developing the North Carolina Resilient Communities Guide, a statewide toolbox of resilience resources; and
3. Hosting regional leadership-training workshops emphasizing the importance of resiliency as a tool for community development.

RISE focuses on many of the same regions targeted by the RCCP and has many overlapping objectives. Thus far, RISE has focused heavily on resource development and technical assistance at a regional scale. However, both programs consistently coordinate to provide the best possible support for North Carolinians.

Before Getting Started

Before you begin Phase 1, it's important that the lead community member and lead contractor meet to discuss expectations, program timeline, and process/scope of work. This will help ensure both parties are on the same page. DCM recommends the community and contractor execute a Memorandum of Understanding (MOU) for Phases 1 and 2.

The following resources should be reviewed before Phase 1:



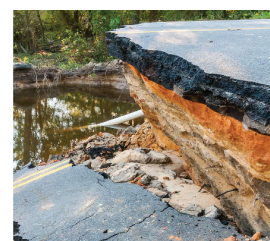
[The Resilient Coastal Communities Program](#) website houses the final deliverables from the first round of phases 1 and 2 of the RCCP, which can be viewed as examples.



[The Coastal Adaptation and Resiliency](#) website provides information on building coastal resilience through hazard forecasting, adaptation examples, and existing data and tools.



[The North Carolina Coastal Community Resiliency Guide](#) provides interactive web applications, mapping tools, explanatory graphics, and PDF documents to help complete the different steps of resiliency planning and implementation.



[Climate Risk and Resiliency Plan](#) describes DEQ's understanding of climate vulnerabilities and risks in NC. It also outlines the Agency's current and planned actions to increase resilience.

PHASE 1



Community Engagement & Risk/Vulnerability Assessment

Phase 1 of the Resilient Coastal Communities Program includes performing a risk and vulnerability assessment, developing a community action team, and engaging with the public.

Step 1

Develop a Community Action Team



The first step in the RCCP process is for each community to create a “Community Action Team” (CAT). This step is critical to ensure success in the program. The CAT for each community will consist of key stakeholders to provide targeted input and champion the effort. As you begin working through this first step of the program, you may find it helpful to also refer to Step 1 in the National Institute of Standards and Technology’s (NIST) [Community Resilience Planning Guide Playbook](#).¹ Here you can find guidance for building a collaborative planning team, establishing leadership, and ensuring community buy-in.



Figure 4 | Town of Pine Knoll Shores CAT Meeting, 2022

Why is a CAT needed for each community?

Building a multi-disciplinary CAT with expertise in planning and community development, natural resource management, climate resilience, hazard mitigation, utility management, engineering, the community’s economy, engaging with vulnerable and underrepresented populations, and nature-based solutions will ensure a more holistic process. Building relationships, trust, and shared understanding among key stakeholders and the community is a foundation for implementing resilience actions.

How will the CAT members be chosen?

The contractor and community will select the CAT members through a review of key stakeholders and priorities in the jurisdiction. It is helpful to consider the members of your community that already have existing knowledge of coastal resiliency and consider what gaps may exist

¹ Additional resources related to the NIST playbook, including companion volumes I and II, can be found [here](#).

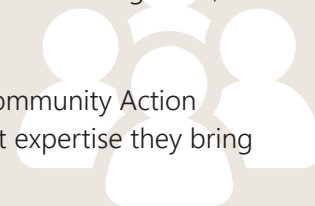
within that group. You should then consider how to fill those gaps so that when making decisions, the entire community is represented to the best of your ability. Some critical questions to ask when selecting members include:

- Who holds community trust or is seen as a leader?
- Who is especially impacted by relevant coastal hazards?
- Who is often underrepresented in decision-making?
- What industries have the greatest ability to help build resilience?
- Who has time and interest to participate?
- Who has knowledge of natural resource management and/or climate change?
- Who has been (or currently is) responsible for community planning and/or policy?

Hopefully, these questions will help to get you started in identifying representative stakeholders to invite to join the CAT. However, it is important to conduct a thorough review of all potential stakeholder groups to ensure that you are not inadvertently missing someone who could be a critical asset to the team. To do this, we suggest using NOAA's [Participant Checklist for Risk and Vulnerability Assessment Discussions](#). This document provides an overview of the stakeholder groups commonly found within a community and provides a template to help you consider what representatives best fits each category.

Step 1 Minimum Requirements

- Develop an inclusive and diverse Community Action Team with at least five members representative of the community and its diverse perspectives.
- Work with the contractor to identify additional community members if there are gaps in the expertise on the CAT (for example, the team lacks someone with natural resource management expertise).
- Appoint one of the CAT members as a "CAT Champion" to lead the CAT team; someone who has the knowledge, expertise, and passion to act as a point person with DCM, the contracting team, and the rest of the CAT team.
- Summarize the process for developing your Community Action Team, including the members chosen and what expertise they bring to the team.



Step 2 Review Existing Plans & Efforts



Building upon past local, regional, and state efforts through the RCCP is a crucial step toward ensuring an integrated approach to resilience that is tailored to the community. After forming your Community Action Team, conduct a review of existing plans, ordinances, policies, and programs to identify what the community has already done that can be incorporated into this process. Begin with an inventory of relevant plans and efforts, then compile information in the following key areas that will be used to inform later steps of this program:

- Vision statements, goals, or objectives related to resilience
- Critical built and natural infrastructure
- Social, economic, and/or environmental vulnerability
- Risk assessments
- Future trends or projections, e.g., climate, land use and development, etc.
- Resilience-related projects or strategies



Surf City Public Meeting, 2021

OTHER EXISTING EFFORTS TO DRAW UPON

Ordinances

Ordinances which overlap with the community's vision and goals, include:

- Unified Development Ordinances
- Zoning or Subdivision Ordinances
- Flood Damage Prevention Ordinances
- Conservation and Hazard Overlays

Regional and Local Plans

Other regional and local plans should also be reviewed to identify overlaps with this initiative, such as:

- CAMA Land Use Plans
- Local and Regional Disaster Preparedness and Recovery Plans
- Capital Improvement Plans
- Economic Development Plans
- Stormwater Management or Watershed Restoration Plans
- Open Space Plans
- Asset Management Plans

Non-regulatory Programs

Non-regulatory programs involving support or services that governments offer to residents, businesses, or others in the community, which may include:

- The FEMA Community Rating System
- Hazard Disclosures
- Land Trusts

Other Local Investments or Policies

Be sure to review any other relevant local investments or policies that are guided by plans and leadership priorities that should also be considered.

Building Upon Hazard Mitigation Plans

Your community's most recent hazard mitigation plan should contain a baseline vulnerability and risk assessment, which can serve as the first reference point for conducting an enhanced assessment that considers additional factors, future conditions, and the local context. Review the local or regional hazard mitigation plan applicable to your community for overlap in the key areas listed above.

■ [2020 Albemarle Regional Hazard Mitigation Plan](#): Chowan, Camden, Perquimans, Pasquotank, Gates, and Hertford Counties

■ [2020 Outer Banks Regional Hazard Mitigation Plan](#): Currituck and Dare Counties

■ [2020 Pamlico Sound Regional Hazard Mitigation Plan](#): Carteret, Craven, Pamlico, and Beaufort Counties

■ [2021 Southeastern North Carolina Regional Hazard Mitigation Plan](#): Brunswick, New Hanover, Onslow and Pender Counties

■ [2021 Northeastern NC Regional Hazard Mitigation Plan](#): Bertie, Hyde, Tyrrell, and Washington Counties



Identify & Fill Data Gaps

Once a review of existing data and information is complete, identify and document the additional data and resources necessary to complete the community's vulnerability and risk assessment, including:

- An inventory of critical assets and natural infrastructure
- Any social vulnerability data
- The best available economic data

Be specific about the information contained within each piece of material that you review. It may be helpful to tabularize the information or present it visually to help identify which documents contain necessary or beneficial information. For example, Figure 5 showcases an overview of documents reviewed for the Town of Hertford in 2021.

REVIEW OF EXISTING LOCAL AND REGIONAL EFFORTS

SWCA reviewed existing local and regional plans, ordinances, policies, and programs to identify resilience strategies already in place, previously identified assets, previously identified coastal hazards, and potential resilience projects to inform the RCCP process. Results of this review are summarized below in Table 2.

Table 2. Existing Documents Reviewed for the Town of Hertford

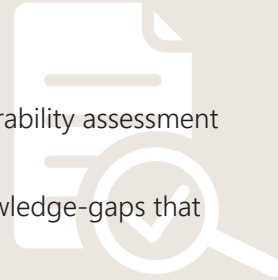
Document Name (Year)	Asset Locations	Information Gleaned		
		Hazard Information	Potential Resilience Projects	Resilience Strategies Already in Place
<u>Hertford Riverfront and Community Plan (2021)</u>	•		•	
<u>Albemarle Region Hazard Mitigation Plan Update (2020)</u>	•	•	•	•
<u>NC State Resilience Plan (2020)</u>				•
<u>Town Council Brief (5/13/2019)</u>			•	
<u>Town Capital Improvement Plan (2019)</u>			•	
<u>State of North Carolina Hazard Mitigation Plan (2018)</u>				•
<u>Hurricane Matthew Resilient Redevelopment Plan - Perquimans County (2017)</u>			•	•
<u>Albemarle Region Hazard Mitigation Plan (2016)</u>	•	•		•
<u>CAMA Land Use Plan - Perquimans County (2005-2006); amended 2017</u>			•	•

Figure 5 | A tabularized view of existing local and regional efforts in the Town of Hertford, as presented in the Town of Hertford Resilience Strategy, which can be found [here](#).

In the above example, the information included in each document, or the lack thereof, is easily accessible and can be used to identify information that may be useful when conducting current and future vulnerability assessments. The objective should be to provide a comprehensive list of previous efforts and existing plans, and to review and compare each to identify knowledge-gaps. Another reason why these assessments are helpful is to compile a record of what has already been done, so that work isn't needlessly repeated.

Step 2 Minimum Requirements

- Review existing local and regional resources, focusing on the following areas of overlap:
 - Inventory of critical assets
 - Sea level rise projections
 - Risk assessments
 - Resilience-related projects
- Identify and fill data and information gaps for vulnerability assessment inputs
- Identify and list (or visually represent) any data/knowledge-gaps that exist



Step 3

Set Vision and Goals



Enhancing community resilience should be driven by local values and priorities. Your team and the stakeholders involved need to develop a **community-specific vision** and **set of goals** based on your review of existing plans and efforts. This process will help to establish the local context for this program and guide subsequent steps. In addition to the information gathered and reviews in Step 2, your community vision and goals may draw from existing sources of information such as:

- Previously identified goals or vision statements developed by the community as part of other planning or budget processes.
- Natural hazard events such as hurricanes, or trends such as increased flooding frequency.
- Community demographics such as particularly vulnerable or disadvantaged populations.

Vision

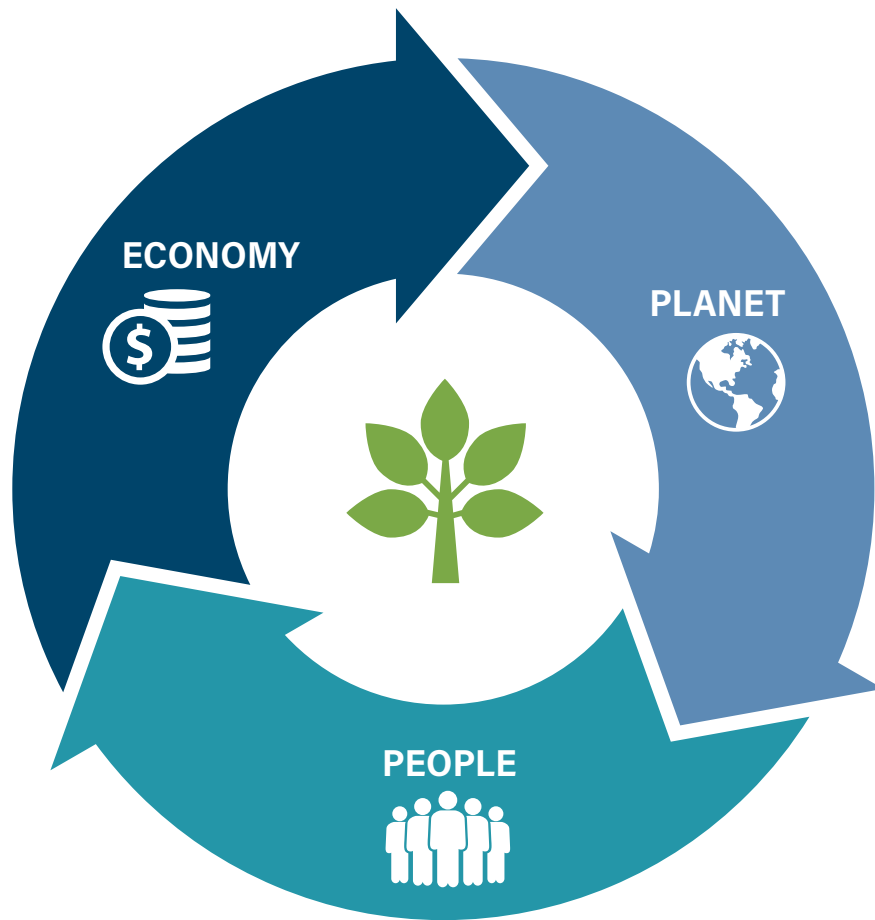
The vision is an aspirational statement for where the community wants to be in the future (e.g., in the next 10 or more years), particularly in relation to coastal hazards.² For example:

“To plan for a community ready to actively prepare for increasing coastal hazards while promoting accessibility, economic welfare, and high quality of life for residents.”

Goals

Specific, measurable goals will help the community identify steps that can be taken to achieve the vision. Resilience goals can relate to preparedness, recovery, community engagement, construction, restoration, etc. If a community resilience vision and goals do not already exist, the Community Action Team should prepare a draft for leadership and public review.

² For additional information, the [Justice Institute of British Columbia](#) has developed a [guided resource](#) for creating a vision statement.



The community goals should reflect the [triple-bottom-line](#) approach to resilience, which goes beyond traditional hazard mitigation and disaster recovery to emphasize a holistic strategy considering social, environmental, and economic factors. Ideally, considering these factors equally will increase resilience, cost savings, and benefits for all stakeholders involved.

For example, consider these goals, adapted from a resilience strategy developed by SWCA, a contractor that participated during Round 1 of the RCCP in 2021:

1. Update the community Land Use Plan and include resilience [recommendations](#)
2. Address recurring flooding issues in [roadways](#)
3. Address recurring agricultural drainage and town flooding [issues](#)
4. Protect and restore wetlands and headwaters, including via local/county [ordinances](#)

Step 3 Minimum Requirements

- Develop a community resilience vision statement
- Develop a list of locally driven goals for this effort



Step 4

Develop a Community Engagement Strategy



Getting from resilience planning to implementation requires jointly created ideas, buy-in, and commitment from a diverse group of stakeholders. A stakeholder can be any person or group of people whom a project, policy, organization, or institution impacts. Often, identifying and engaging with stakeholders allows natural resource, land-use, and policy planners to tailor-fit their initiatives or programs to the specific needs of a community. When developing a plan to address stakeholder engagement, several categories of stakeholders should be considered:

Table 1. Categories of Stakeholders Adapted from NOAA's [Introduction to Stakeholder Participation](#)

Stakeholder Category	Description	Examples
People who live, work, play, or worship at or near a resource	Those whose everyday lives and well-being are directly connected to a resource or issue. These stakeholders should be invited to participate because their lives may be substantially impacted.	Residents, resource users, businesses, community/civic organizations, interest groups, nongovernmental organizations (NGOs), government, Native American tribes, and the media
People interested in the resource, its users, its use, or its non-use	Those who assign values to a resource and are concerned about the way that resources are used. This group includes those who extract value from resources, as well as those more interested in conserving or protecting resources. This group should be invited to participate because of their sheer interest in the resource or issue.	Businesses, resource users, interest groups and NGOs, community/civic organizations, government, and Native American tribes
People interested in the decision-making process	Those deeply interested in the legal and procedural aspects of an issue. This group includes those who want to ensure that all relevant policies and procedures are observed in reaching a decision. They should be involved because of their attention to procedural detail and their ability to derail a process or litigate final decisions.	Interest groups and NGOs, government, the media, residents, and Native American tribes
People who are financially invested in the resource	Those whose money is directly or indirectly used to fund resource management through taxes, fees, and other means. This group wants to ensure that money is spent wisely and should be invited to participate because the government is accountable for how it spends public dollars.	Residents, resource users, businesses, and government
Representatives or those who are legally responsible for managing public resources	Those who have the legal authority and obligation to manage natural resources. Members of this group want to ensure the best final decision is reached and should be invited to participate because it is their duty.	Government



Hertford County Commissioners Meeting, 2021

Additionally, inclusivity in the planning process, particularly by involving members of **vulnerable and historically underrepresented communities**, is crucial to account for a diverse range of perspectives. Vulnerable communities include people who are considered socially vulnerable to climate impacts, such as communities of color, children and seniors, low-income communities, people with disabilities, pregnant people, people with Limited English Proficiency (LEP), people impacted by the social determinants of health, and other historically disadvantaged populations identified by the [American Public Health Association](#).

Vulnerable populations often fare the worse in the face of climate hazards and may be especially susceptible to natural disasters and civil emergencies. These populations may have limited means to cope with climate stressors or coastal hazards and thus may also be disproportionately impacted by storm damage, coastal flooding, and other dangers, such as unequal access to resources or critical infrastructure in times of need.

The following characteristics can help to identify vulnerable populations in your community:

- Economically disadvantaged
- Racial and ethnic minorities
- Elderly or limited mobility
- Chronically ill or having high sensitivity to heat, air quality, or vector-borne pathogens
- Substandard or subsidized housing
- Historically underrepresented in community decision-making
- Socially marginalized
- Environmentally vulnerable
- Lacking access to technology or standard means of communications
- Geographically isolated
- Non-English speaking

To ensure participation from a diverse array of public stakeholders, a community engagement strategy must be developed to outline a plan for engaging with your community while incorporating the

principles of justice, equity, diversity, and inclusion in their climate adaptation planning. Your community engagement strategy will ensure the following:

- Equitable representation and outcomes for marginalized communities and vulnerable populations.
- Building trust, relationships, and diverse partnerships within communities.
- Providing feedback and validation of the Vulnerability Assessment (Phase 1, Step 6) developed by the Community Action Team.
- Assisting with prioritizing projects for Phases 3 and 4 of the RCCP.

These outcomes will benefit you as you conduct your Risk and Vulnerability Assessments (Phase 1, Step 6) and move into Phase 2.

The public engagement process is as valuable as the deliverable(s) produced. Engaging stakeholders can foster new or enhanced relationships, learning, and connections. Raising awareness about the vulnerabilities specific to a community often spurs interest in supporting efforts to reduce those risks and vulnerabilities. Thus, your team may need to adapt your community engagement strategy throughout the process as you collect and synthesize information or receive feedback about different activities.



Cape Carteret Community Outreach, 2021

While there is no single way to create and employ a community engagement strategy, there are some considerations that can help guide you through the process. Depending on the specifics of your community, it will be necessary to tailor your strategy to fit your specific needs. Listed below are some preliminary considerations that can be used to get the ball rolling. However, be sure to also navigate the additional examples and resources provided.

Key Community Engagement Considerations:

1. Ensure activities are accessible and inclusive of all demographics within your community.
 - Involve vulnerable populations and historically underrepresented members of the community.
 - Identify and incorporate trusted, neighborhood-level leaders, to help organize and design additional outreach.
 - Dedicate specific space and time to discussing what strategies will contribute to equitable outcomes for all residents, regardless of their socio-demographics.
 - Consider going to different groups in the community, rather than relying on those members of the community to approach you or engage with the process on their own.
 - Consider time restraints, such as work, school, or childcare that might interfere with the community's ability to attend meetings or participate in the process.
 - Explain how their participation will help contribute to the larger community's vision for success and resilience.
2. Consider State and local restrictions that may be in effect.
 - E.g., ensure virtual participation for stakeholders who may not have access due to assembly restrictions related to COVID-19.
3. Host an open house or workshop to present your team's initial set of potential adaptation strategies and ask for input, comments, and additional ideas using different forms of media.
4. Brainstorm activities that go beyond simply informing or consulting with the community about resilience.
5. **Involve stakeholders directly** in mapping activities that identify vulnerable populations, infrastructure, or natural resources.
 - Invite community members to participate in field trips to discuss or address areas of concern.
 - Consider live polling, surveys, interactive websites, news media, leveraging social media interaction, etc.
6. Highlight costs of inaction or potential risks with continuing to conduct "business as usual."
 - What potential opportunity costs are associated with taking one approach over another?

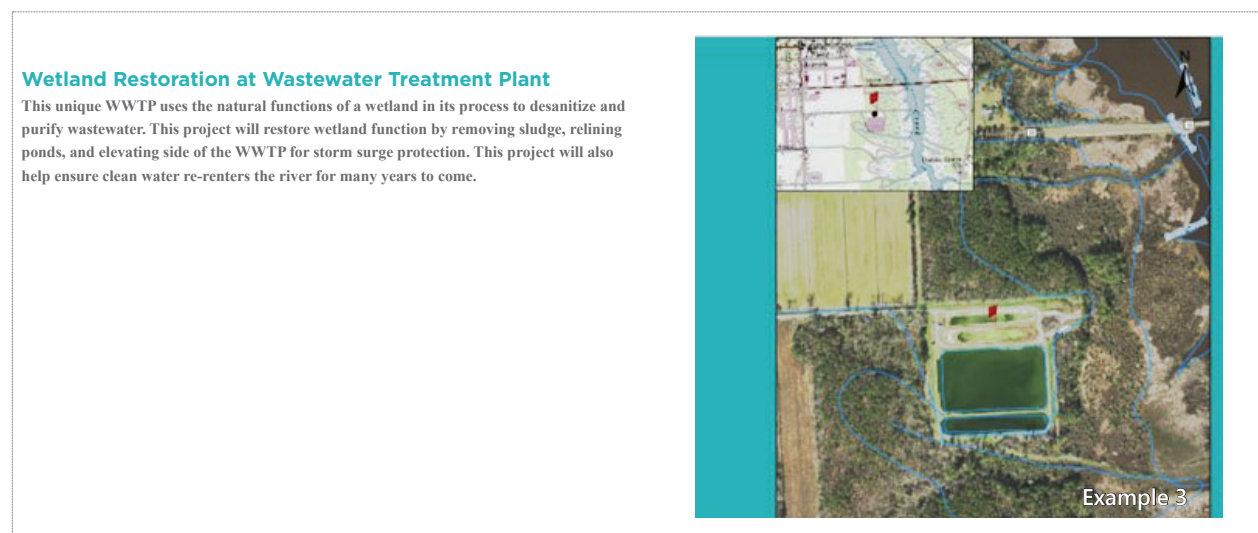
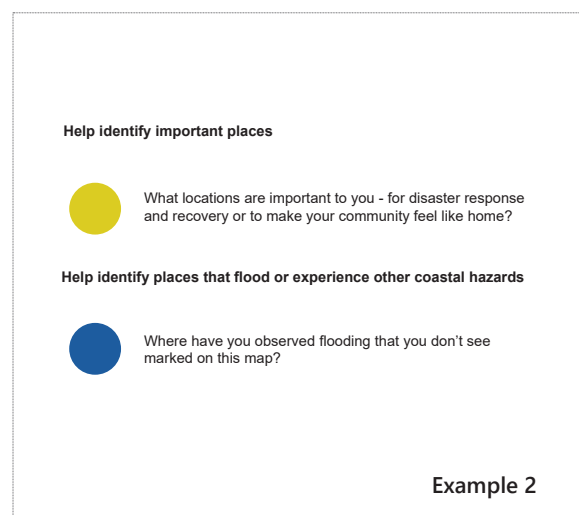
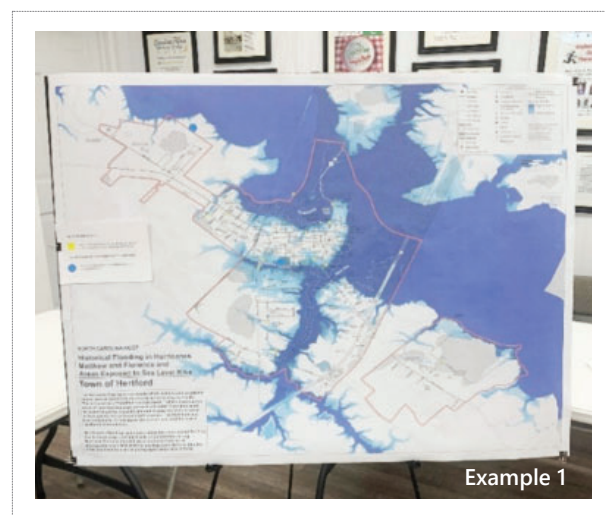
Examples Of Effective Engagement Strategies:

Below are examples of elements from previous community engagement strategies that may be worth considering as you build your own. There are many scientific tools, models, and assessments, such as the Federal Emergency Management Agency's (FEMA) [Resilience Analysis & Planning Tool](#) (RAPT) or the

Council on Environmental Quality's (CEQ) [Climate and Economic Justice Screening Tool](#) that you may want to use when engaging with the community. However, it is advisable to think about new ways in which you can creatively engage with the community to supplement these tools and help to uncover nuances that might otherwise be overlooked.

For example, when conducting community meetings in Hertford, North Carolina, SWCA Environmental Consultants asked community members to help map important infrastructure that was critical for disaster response. This information was overlayed on a map of flood risk and exposure (*Examples 1 & 2*). This participatory process helped to create detailed maps that incorporated both quantitative scientific modeling and qualitative community input to map vulnerability and identify potential resilience projects.

Another example, implemented by many previous participants, but typified by RK&K Civil Engineering, was [story mapping](#) (*Example 3*). Story maps allow for different types of information, like GIS maps, statistics, instructions, quotes, or even anecdotes, to be displayed in an interactive format that allows for ease of access among stakeholders, contractors, planners, and resource managers alike.



Example 1. This community mapping activity initiated by SWCA identified critical assets and areas in need of assistance or additional consideration. *Example 2.* Community representatives were asked to identify areas that held personal significance or that may have been overlooked by hazard/vulnerability modeling. *Example 3.* A screenshot from [RK&K's Story Map](#) showcasing a potential project site in the town of Aurora, North Carolina.

While it will be up to you how you decide to move forward with your community engagement strategy, the goal is to create a robust, deep-rooted plan that will not only fulfill the program requirements but greatly benefit the community in need. In addition to these examples, below are listed some additional possibilities for your consideration.

Table 2. Engagement Opportunities Adapted from NOAA's [Common Stakeholder Participation Techniques](#)

Method	Description
Charrette	An intense, multi-day effort to design something or solve a problem. There are multiple versions of the charrette, most of which include a design team that attempts to translate public input into a form that could be implemented, for example, a new policy, zoning regulations, or building design.
Field trip	Trips to specific locations are organized so that participants can match their mental images to real, on-the-ground conditions. Participants may be asked to express their reactions verbally or in writing.
Focus group	Small discussion group led by a facilitator who draws out in-depth stakeholder input on specific questions. Normally, several focus groups are held, and participants can be chosen randomly or to approximate a subset of the community.
Hotline	Widely advertised telephone number that directs callers to someone in an agency who can answer caller questions and collect input.
Internet	Dialogue between agencies and stakeholders using Internet technology such as chatrooms, online bulletin boards, e-mail, and web conferencing.
Interview	Face-to-face or telephone interaction with stakeholders conducted by the agency or by a third-party representative.
Poll or survey	Written or oral lists of questions to solicit community impressions about issues at a specific moment in time. Polls and surveys can be administered in person or via the telephone or the Internet.
Public hearing	A formal, single meeting where stakeholders present official statements and positions, and those ideas are recorded into a formal record for delivery to the agency.
Public meeting	A large public comment meeting where the participants stay together throughout the meeting and make comments to the entire audience. Public meetings are less formal than public hearings.
Retreat	A concentrated yet informal meeting away from the typical work setting that emphasizes social interaction as well as discussion of issues.
Workshop	Small stakeholder gatherings, typically fewer than 25 people, designed to complete a specific assignment in a short time.

Additional Information

Having provided an overview of some of the most important things to consider when developing a diverse and inclusive community engagement strategy, there are some additional resources that you may find beneficial. We recommend reviewing the following documents in detail:

- <https://www.communityresiliencebuilding.com/crbworkshopguide>
- <https://coast.noaa.gov/data/digitalcoast/pdf/stakeholder-participation.pdf>

Be sure to closely review the essential elements of identifying and analyzing stakeholders, improving stakeholder participation, and evaluating stakeholder participation in practice. With these tools in hand, your stakeholder engagement strategy will be sure to meet all the needs of your community, as well as the Resilient Coastal Communities Program.

Step 4 Minimum Requirements

- Develop a stakeholder engagement strategy for involving community members during the following steps in this program:
 - Risk and Vulnerability Assessment (Phase 1 Step 6)
 - Project Development (Phase 2)
- Develop an approach for targeted outreach to vulnerable and historically underrepresented members of the community



Step 5 Identify and Map Critical Assets, Natural Infrastructure, and Socially Vulnerable Populations



For this step, the contractor will map the required minimum critical assets and relevant natural infrastructure within the community. This process requires close cooperation with the Community Action Team (CAT) to identify locally specific critical assets, such as hospitals and government buildings, and natural infrastructure, such as wetlands and dunes, to include in the risk and vulnerability assessment. Mapping of critical assets and natural infrastructure should be completed using [ArcGIS online](#).

Natural infrastructure, such as wetlands, forests, beaches, dunes, rivers, and floodplains, are existing natural assets that provide ecosystem services, such as helping to buffer, retain, and absorb flood waters. Identifying these resources and discussing their value to the community or their interactions (i.e., overlap) with identified hazards provides a valuable opportunity to discuss resiliency strategies that protect, restore, and enhance these areas.

To begin this process, you must locate and map all the required critical assets and natural infrastructure (Figure 6, Page 29), then work with the CAT to identify any additional locally significant assets or infrastructure with cultural, ecological, public health, social, and/or economic value to the community. It is important to remember that many local assets and infrastructure may not be listed on traditional maps but can be identified as essential by community members.

Your team should use the FEMA [Community Lifelines Framework](#) to identify assets that provide fundamental services for the community. FEMA defines a **community lifeline** as an asset that “enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security.” This framework is a good starting point for considering which critical assets to include in your Risk and Vulnerability Assessment.”

Additionally, the [NC Natural Heritage Program’s Biodiversity and Wildlife Habitat Assessment](#) and the [Wildlife Resources Commission’s Green Growth Toolbox](#) are helpful resources for identifying and mapping natural infrastructure and discussing resiliency actions related to natural infrastructure.

Whom to involve in this step:

Staff or community stakeholders with knowledge of major infrastructure assets; non-profit or government entities that manage natural resources or community-identified significant places.

Some questions to consider when identifying assets:

1. Are the assets:
 - critical for the continuity of daily operations?
 - central to economic functioning and vitality?
 - integral to social services?
 - critical for life and safety?
 - irreplaceable if damaged or destroyed?
2. Do the assets have a history of damage from natural hazards?
3. What places and natural areas are important to the community’s heritage?
4. How do the community’s vision and goals from Step 3 relate to these built and natural assets?
5. How much information is available on each asset to guide your assessment? Which assets lack enough data to do a meaningful assessment?



Figure 6 | Required Critical Assets to Map

Gather and organize data for each asset chosen using the following template:

Asset ID	Asset Type	Asset Name	Location	Ownership	Estimated Value	Exposure (Ex. Previously Flooded or Precipitation*)	Exposure (Ex. Current Floodplain)
Number	E.g., government facilities, roadway, natural infrastructure, schools, etc.	Town Hall	X, Y	Private or public	If available	(Y/N) *edit based upon flood hazards relevant to the community	(Y/N)

Social Vulnerability

Assessing the vulnerability of populations and social systems is a key component to building holistic resilience in a community. People who are considered socially vulnerable to climate impacts include communities of color, children and seniors, low-income communities, people with disabilities, pregnant people, people with Limited English Proficiency (LEP), people impacted by the social determinants of health, populations identified by the American Public Health Association, and other historically disadvantaged peoples. Contractors should utilize the [CDC's Social Vulnerability Index \(SVI\)](#) and [FEMA's Resilience Analysis and Planning Tool \(RAPT\)](#) to access important community data and analysis tools. You can also use any other relevant data sources to identify socially vulnerable populations for consideration throughout this planning process.

The CDC's SVI uses U.S. Census Data to rank census tracts based on 15 social factors. It groups them into four related themes:

1. Socioeconomic status
2. Household composition
3. Race/ethnicity/language
4. Housing/transportation

Contractors should engage with the CAT to ground truth data related to the index and supplement it with local knowledge and information. Social vulnerability data gathered and mapped in this step should inform the community engagement strategy, vulnerability assessment, and project identification, selection, and prioritization. For further guidance on how to use this resource, check out these [FAQs](#).

Step 5 Minimum Requirements

- Map critical assets, areas of social vulnerability, and natural infrastructure identified by the Community Action Team using ArcGIS.



Step 6 Conduct Risk & Vulnerability Assessment



To build long-term resilience to current and future impacts of coastal hazards and a changing climate, communities need to know who and what is vulnerable to maximize resources and minimize future risks. A key component of this effort is the risk and vulnerability assessment, which evaluates risks to a community's people, critical assets, natural infrastructure, and ecosystems from coastal and climate hazards such as flooding, storm surge, and sea level rise. This assessment serves as the foundation for determining what actions to take and where they should be targeted in the next steps of this process.

As discussed in Step 2, local or regional hazard mitigation plans will serve as the basis for this program's risk and vulnerability assessment. Each community's natural hazards and event histories are typically documented in its hazard mitigation plans. However, they often need more information about the climate and non-climate stressors affecting them. Program participants will build upon the risk assessments in these plans by incorporating climatic risk factors to create an enhanced, more localized assessment with actionable data. If communities have already gone beyond the assessment performed in their hazard mitigation plan, those resources may also be utilized in this process.

6a *Difference Between Hazard Mitigation Plans & Resilience Planning*

Hazard mitigation planning plays an important role in building resilience by helping communities prepare for and minimize impacts on people and the built environment from the hazards they may experience. However, these efforts typically base their understanding of risk on sources that rely on data and information from past climate and historical events. The RCCP risk and vulnerability assessment will build upon this foundation to consider how a changing climate is expected to affect the future frequency, intensity, and duration of hazards and stressors that increase risk. The RCCP will also assess how hazards impact communities beyond the built environment, including socioeconomically vulnerable populations, ecosystems, and other natural and cultural resources. Establishing this robust foundation of factual data is critical to supporting planning and decision-making moving forward.



Storm damaged fishing pier, Hatteras Island, Outer Banks

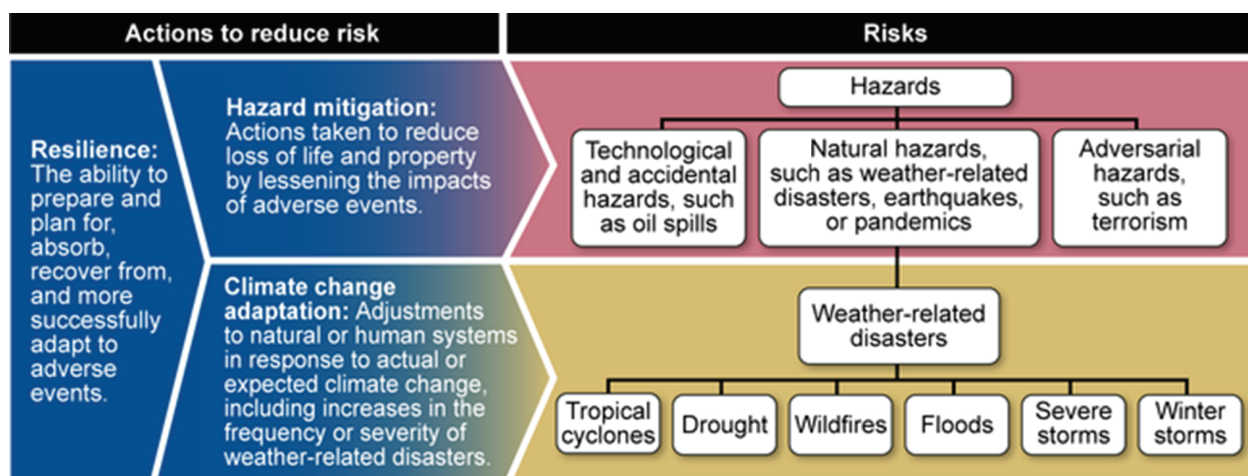


Figure 7 | Source: GAO analysis of Presidential Policy Directive 8, previous GAO work, and National Oceanic and Atmospheric Administration data. | GAO-16-454

Risk & Vulnerability Assessment Process:

1. Identify and Map the Hazards Assess Vulnerability
2. Estimate Risk

Identify and Map the Hazards

Coastal communities face varying levels of risk from coastal hazards and non-climate stressors that can exacerbate short- and long-term impacts. In this step, your team will identify and map potential hazards and stressors from past experiences, current trends, and future changes to understand how community assets may be threatened. Start by reviewing the baseline risk assessment in your community's most recent local or regional hazard mitigation plan to extract hazard types, event histories, and other relevant data and information. Then, identify any gaps necessary to complete the risk and vulnerability assessment. Gaps could include both quantitative data from trusted sources and qualitative information from community knowledge and experience.

Following a review of the hazard mitigation risk assessment, the contractor will then identify and, where feasible, map the geographic extent of current and future hazards and stressors relevant to the planning area. To accomplish this, teams should reference existing studies, reports, and plans, including local and regional hazard mitigation plans, the [2020 NC Climate Risk Assessment and Resilience Plan](#), and data referenced in this Handbook's appendices. Other potentially relevant resources include event-based records such as NOAA's post-event imagery for Hurricane Matthew, Florence, and Dorian or satellite-derived flood data from Hurricanes Matthew and Florence. Input from the CAT and other local and regional stakeholders should also be utilized to identify any additional locally relevant hazards to include in the risk and vulnerability assessment.

At this stage of the process, the risk and vulnerability assessment should consider the following:

- Additional locally relevant hazards that present immediate and long-term concerns (look at Table 1 below for the minimum requirements for evaluating hazards)

- Non-climate stressors that can affect natural hazard events and impact the community. For communities where sea level rise isn't a large future flood risk factor, contractors and communities can indicate previously flooded areas or low-lying areas to characterize future flood risk exposure. For example, consider how SWCA Consultants used data from low-lying areas to capture future precipitation risk in the Technical Appendix.
- Hazard maps to be overlaid with critical assets and natural infrastructure (as identified in Step 5)

Table 3: Potential Hazards and Non-Climate Stressors

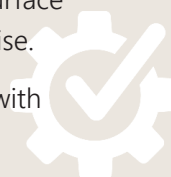
POTENTIAL HAZARDS	NON-CLIMATE STRESSORS
<ul style="list-style-type: none"> ▶ Sea level rise ▶ Flooding (rainfall, tidal, and riverine) ▶ Damaging storms, tornadoes, and winds ▶ Storm surge ▶ Shoreline erosion ▶ Drought, Heat Waves, and Wildfire 	<ul style="list-style-type: none"> ▶ Aging or potentially undersized infrastructure ▶ Population dynamics ▶ Economic shifts ▶ Increased subsidence ▶ Altered drainage patterns ▶ Land cover change (i.e., increased development and impervious surface area)

Identifying Potential Hazards & Non-climate Stressors

- [2020 North Carolina Climate Science Report](#)
- [NC Flood Inundation Mapping and Alert Network](#) (NC Floodplain Mapping Program)
- [USGS Coastal Vulnerability Index](#)

Step 6a Minimum Requirements

- Review local or regional hazard mitigation plans, extract data and information, and identify any gaps to fill
- Identify hazards and stressors to include in the risk and vulnerability assessment. At a minimum, they must include flooding (rainfall, tidal, and riverine), storm surge, and 30-year sea level rise projection. NCEM's plus one-foot Water Surface Elevation can serve as a proxy for 30 years of sea level rise.
- Map the geographic extent of the hazards and overlay with community assets identified in Step 5.



6b Assess Vulnerability

At this part of the process, the assessment will evaluate the extent to which a community's assets are vulnerable to current and future impacts, as identified in step 6A. This assessment serves as the foundation for selecting and prioritizing projects in Phase 2 of this process. The vulnerability of critical assets, natural infrastructure, or populations to a hazard is a function of exposure, sensitivity, and adaptive capacity.

VULNERABILITY EQUATION

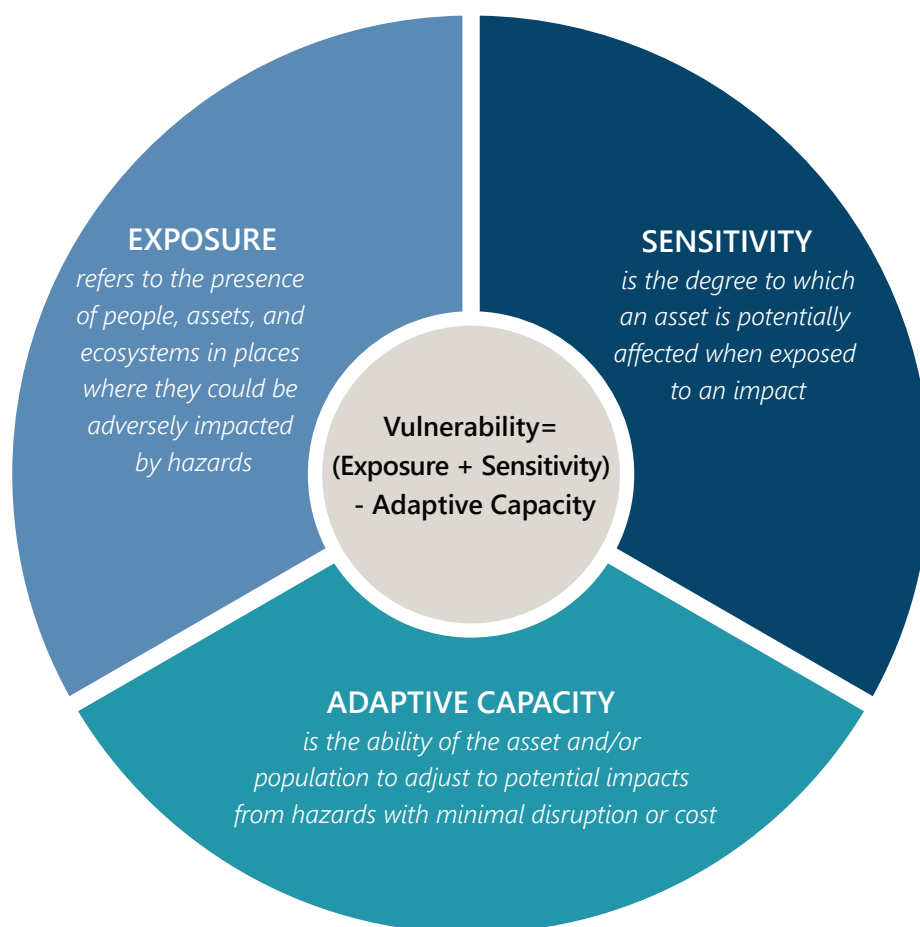


Figure 8 | The vulnerability equation used to derive community vulnerability to climate and non-climate related hazards.

Determine Cumulative Vulnerability

With help from the CAT, the contractor will define thresholds and criteria that will be used to score assets as low, medium, or high for each vulnerability metric. The contractor will then develop a vulnerability index that uses thresholds to assess vulnerability. The CAT will provide input on these thresholds and then help with some of the scoring of each asset's exposure, sensitivity, and adaptive capacity to combined hazards, to determine the cumulative vulnerability of critical assets and natural infrastructure. Within the vulnerability equation, exposure and sensitivity are objective factors, and adaptive capacity is a subjective factor that should be evaluated using both objective criteria and CAT input.

- **Exposure:** Use the asset and hazard maps to determine the overlap between asset locations and hazard impact areas and assign thresholds to categorize overall hazard exposure as low, medium, or high. Rank from 0-3.
- **Sensitivity:** Evaluate the degree to which an asset is cumulatively impacted by hazards by assigning a percent threshold and/or indicating a low, medium, or high need for that asset within the community. Rank from 0-3.
- **Adaptive Capacity:** Utilize objective criteria and CAT input to assess an asset's ability to adapt to all hazards cumulatively. Factors to evaluate could include social vulnerability, the feasibility of relocation, the ability to retrofit, possible alternatives, and other considerations relevant to the community. Rank from 0-3.

After assigning scores within each of the three-vulnerability metrics, calculate the cumulative vulnerability score using the vulnerability equation and organize in the template below:

Asset ID	Exposure Score 0-3	Sensitivity Score 0-3	Adaptive Capacity Score 0-3	Vulnerability Score 0-6
Asset name	0= no exposure 1= Low 2= Medium 3= High	0= no sensitivity 1= Low 2= Medium 3= High	0= no adaptive capacity 1= Low 2= Medium 3= High	0-2= Low 3-4= Medium 5-6= High
Vulnerability Score = (Exposure Score + Sensitivity Score) - Adaptive Capacity Score				

HELPFUL TOOLS

1. **Assess Vulnerability & Risk - U.S. Climate Resilience Toolkit:**
<https://toolkit.climate.gov/steps-to-resilience/assess-vulnerability-risk>
2. **Sea-Level Rise Vulnerability Assessment Tools and Resources:**
https://floridadep.gov/sites/default/files/SLR-VA-tools-extended_1.pdf
3. **Guide to Community Climate Vulnerability Assessments:**
<https://www.nrdc.org/sites/default/files/guide-community-climate-vulnerability-assessments-report.pdf>
4. **How to conduct a climate change risk assessment:**
<https://coastadapt.com.au/how-to-pages/how-to-conduct-a-climate-change-risk-assessment>

Step 6b Minimum Requirements

- Define thresholds and criteria that will be used to classify vulnerability of critical assets as low, medium, or high for each vulnerability metric.
- Estimate cumulative vulnerability of critical assets and natural infrastructure using vulnerability index.



6c Estimate Risk

Understanding the financial loss communities experience when hazards occur is critical in determining what level(s) of risk call for immediate action. Use the risk assessment from your community's hazard mitigation plan to extract building values and other data on critical facilities necessary to estimate the risk to the community assets identified through this process. Where feasible, the contractor and CAT should consider supplementing or updating this information with more recent and locally relevant data. Table 4 below provides a template for quantitatively estimating risk, including characterizing assets by sector, identifying the number of vulnerable critical assets within that sector, and estimating the cost of damages.

Outcomes of the vulnerability assessment and risk estimates will be used to engage with the CAT in determining where there is an acceptable level of risk and where strategies should be considered to reduce that risk and improve resilience. You should not only consider built environment assets, such as vulnerable infrastructure, but also locations of vulnerable populations, resources, and ecosystems that may inform focus areas and neighborhood-scale strategies in Phase 2.

Table 4: A quantitative tool for asset risk-estimation

Sector	Number of Critical Assets, People or Areas at Risk	Asset Value
E.g., Government facilities, Utilities, Roads	19	\$X,000,000
E.g., Low-Income Community/	150 people	\$X,000,000
E.g., Natural Infrastructure, Parks	1,000 acres	\$X,000,000

Step 6c Minimum Requirements

- Gather supplemental data as needed past what the hazard mitigation plan provides
- Estimate risk of the critical assets identified by using the sample table provided, or a similar table



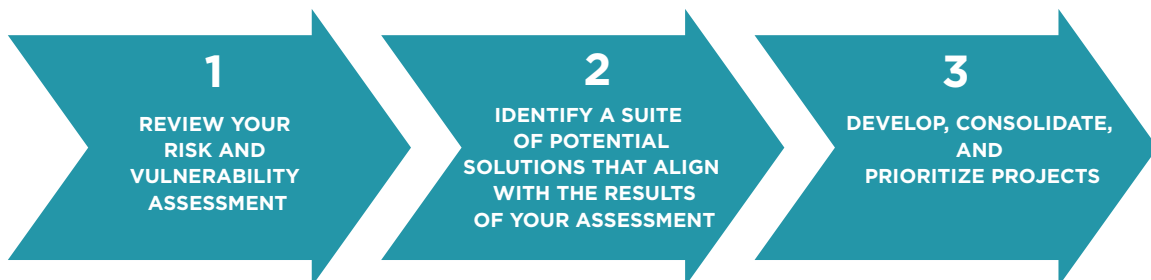
PHASE 2



Planning, Project Identification, and Prioritization

In Phase 2, the contractor will work with the Community Action Team and community members to identify, plan, and prioritize a combination of policy, nonstructural, structural, and hybrid actions, including natural and nature-based solutions (NNBS). These potential resilience projects will then be organized within a project portfolio. This portfolio should be based on the vulnerability assessment conducted in Phase 1, Step 6. For example, the most critical asset identified within the community should, ideally, be associated with a project included in the portfolio.

PHASE 2 INCLUDES THE FOLLOWING KEY STEPS:



As you work through this step of the program, we suggest referring to the [Community Resilience Building Workshop Guide](#) (Section D). Here you can find a detailed guide for identifying and prioritizing community projects in three categories (infrastructural, societal, and environmental), as well as analyzing these projects using their provided Risk Matrix.

Step 1 Identify a Suite of Potential Solutions



There is no “silver bullet” for building coastal resilience. Instead, each community must find the right mix of **structural** (infrastructure) and **nonstructural** (policy-related) approaches, including nature-based solutions, to proactively address vulnerabilities. In doing so, you can help improve the health and well-being of communities while better preparing them for natural disasters and other climate-related impacts. As you develop this suite of potential solutions, your team will compile these options into a resilience project portfolio.

Projects that aim to increase a community’s resilience must build the capacity of that community to prepare for and respond to coastal hazards. The Federal Emergency Management Agency ([FEMA](#)) notes that there are several principles that capacity-building projects can use to help align their objectives with the needs of resilient communities. These principles are widely applicable and generally serve as a guiding mantra during project identification.

- [Projects] should support essential community functions that are critical for absorbing, rebounding from, and adapting to hazards:
- They should facilitate hazard-focused community preparedness, risk management, and mitigation actions that reduce long-term vulnerabilities; and
- They should enable post-disaster community recovery and redevelopment that integrates specific community-based resilience objectives.

In line with these foundational principles, the [Environmental and Energy Study Institute \(EESI\)](#) suggests several ways that programs aimed at building resilience in coastal communities can ensure the capacity to absorb, rebound, and adapt to coastal hazards. Projects that improve capacity in the following areas will be likely to increase community resilience effectively:

Implement nature-based solutions:	Restoring or emulating nature to increase human, ecosystem, and infrastructure resilience to climate impacts. These solutions often result in environmental, economic, and social co-benefits, including carbon sequestration—a key tool in mitigating greenhouse gas emissions. Nature-based solutions include both green and natural infrastructure. Green infrastructure projects combine structural infrastructure with nature-based solutions to create hybrid systems that improve resilience to climate impacts (i.e., permeable pavement or bioswales). Natural infrastructure projects use existing or rebuilt natural landscapes (e.g., forests, floodplains, and wetlands) to increase resilience to climate impacts.
Provide co-benefits:	Adaptation and resilience programs and projects that also reduce greenhouse gas emissions. For example, restoring and conserving wetlands protects inland development from storm surge while sequestering carbon.

Build Capacity:	Projects that invest in building the skills, leadership, processes, and resources at the local/community level to empower communities to make informed decisions on adaptation and resilience. For example, funding a program that trains community members to be leaders in climate adaptation planning in their region.
Share Knowledge:	The exchange of information, research, and expertise within and between communities, governments, and other entities. Knowledge includes multiple knowledge systems, such as traditional ecological knowledge. For example, knowledge sharing might involve building up information around managed retreat.
Provide Training:	Programs to enhance an individual or group's knowledge, skills, or accreditation on a particular topic. For example, ensuring local engineers have specific training on using nature-based solutions.

* Adapted from the [2020 EESI Coastal Resilience Report](#).

The projects you pick for your portfolio should include options targeting traditional 'hard' infrastructure, incorporate 'soft' nature-based solutions, and develop 'hybrid' solutions that include both hard and soft components and policy solutions. **Each portfolio should include at least one nature-based solution.** Remember to adjust your potential projects to fit the specifics of the community and the potential budget. Some nature-based solutions can be extensive and thus may need to be scaled down to serve the community's needs. In addition to nature-based solutions, other projects might include investment in additional research, focused resource planning, or restructuring existing ordinances or policy frameworks.

As you identify potential projects, strive to capture a suite of innovative solutions that can be used for applying for other funding programs or to be self-funded as high-priority actions critical to the integrity of the community.

As you consider various strategies and interventions, refer to the areas you identified as most vulnerable or most at risk during your Phase 1 Risk and Vulnerability Assessment. Grounding your project portfolio in your work will be essential in addressing your community's particular needs.

As you identify potential projects, strive to capture a suite of innovative solutions that can be used for applying for other funding programs or to be self-funded as high-priority actions critical to the integrity of the community.

In addition to the above information and the [Community Resilience Building Workshop Guide](#), it may be beneficial to review the National Institute of Standards and Technology's (NIST) [Community Resilience Planning Guide](#), which suggests a broad range of structural (infrastructure-related) and non-structural (policy-related) solutions. The guide also emphasizes the importance of using community-based ideas and information to explore a wide range of solutions and potential strategies.

Additional resources that can assist you with the development process can be found in the Technical Appendix.

Drilling Down by Topic

After your team broadly identifies potential adaptation strategies, communities may need to dig deeper into specific topics like those below for additional project development guidance.

Natural/Nature-based and Hybrid Solutions

Natural/nature-based solutions (NNBS) incorporate sustainable planning, design, engineering, and natural resource management into the built environment to improve adaptation and resilience. NNBS identify ecosystem services, like the improvements to water quality provided by wetlands, and weaves them into infrastructure projects that address resilience, like incorporating bioswales into urban landscapes. These types of projects offer monetary benefits (e.g., increased property value, protection against storm damage, and green jobs) and non-monetary benefits (e.g., improved recreational spaces, cleaner water, improved coastlines, and carbon sequestration).

Additionally, projects that use natural or nature-based concepts have more flexibility in grant funding. By incorporating nature-based solutions, your projects may qualify for funding that emphasizes the importance of resilience and of incorporating nature-based solutions. For example, grant funding from the National Fish and Wildlife Foundation (NFWF) made North Carolina's RCCP program possible.

For more information on the implementation and funding of nature-based solutions, please review FEMA's 2023 guide to [Building Community Resilience with Nature-Based Solutions](#).

Floodplain/Stormwater Management

Flooding is North Carolina's most common (and costly) natural hazard threat. Consider both nonstructural (policy-related) and structural flood mitigation and stormwater management measures during project development. Consider the following possibilities, highlighting the different types of projects that can address policy or infrastructure-related solutions to coastal flooding.

FLOOD/STORMWATER MANAGEMENT PROJECT EXAMPLES

Flood Damage Prevention Ordinance

- **Description:** Designed to minimize public and private losses due to flood conditions within flood-prone areas by restricting or prohibiting uses, controlling alteration of the floodplain, channels, or natural barriers, controlling filing, grading, dredging, or other development that may increase erosion or flood damage
- **Resilience Connection:** Can account for future floodplain conditions affected by climate change impacts and increased development. Higher regulatory standards, such as higher “freeboard” requirements, can ensure structures are safely built above water levels common during flooding events.

Open Space and Recreation Plan

- **Description:** Open recreational spaces, such as parks, that have been developed to protect and enhance community access and use of resources while incorporating green infrastructure.
- **Resilience Connection:** Can absorb and store water with coastal open spaces (such as wetlands and marsh) and act as erosion and buffers for wave energy. Equitable access to open spaces/ recreation can lead to better public health outcomes thereby reducing vulnerability. May tie into flood buyout or future transfer of development rights.

Elevating Critical Components

- **Description:** Unlike entire buildings or structures, elevating critical components like HVAC, electrical panels, and backup generators can ensure key assets (e.g., pump station or other) aren’t completely compromised during a flood. A higher design flood elevation standard may be appropriate for critical facilities rather than for single-family homes.
- **Resilience Connection:** If lost or damaged, critical components of infrastructure may limit access to healthcare facilities, endanger basic functional needs, and make recovery more difficult. Protecting these resources is important to ensuring community resilience.

For a complete list of examples including floodplain management and more, please download the Resilience Strategies Poster located in the Technical Appendix (Phase 2, Step 1).



NC Marine Patrol assists with flooding following Hurricane Florence

National Flood Insurance Program Community Rating System

Another aspect you may wish to consider is the National Flood Insurance Program [Community Rating System \(CRS\)](#). This is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the [National Flood Insurance Program](#). Identifying potential projects within Phase 2 which overlap with the CRS will have an added benefit for the community.

In communities that participate in the CRS, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community's efforts that address the three goals of the program:

1. Reduce and avoid flood damage to insurable property;
2. Foster comprehensive floodplain management; and
3. Strengthen and support the insurance aspects of the National Flood Insurance Program
4. If your community is (or becomes) a CRS program participant, the following resources can help to maximize CRS points:

- [Digital Coast Partner Tools for the Community Rating System](#)
- [CRS Green Guide \(to be used in conjunction with the CRS Coordinator's Manual\)](#)



Connect to a network of participating CRS communities, including the Outer Banks CRS Users Group and Southeast CRS Users Group.

Pre- and Post-Disaster Recovery and Redevelopment

The value of planning for a disaster beforehand is improving communication, response time, and utilization of funding and other disaster recovery resources. The disaster recovery period also offers an opportunity to invest recovery funds into long-term resilience.

Explore the following resources to learn more about how to integrate resilience into recovery and redevelopment (additional resources available in the Technical Appendix):

- [Pre-Disaster Recovery Planning Guide for Local Governments](#)
- [National Disaster Recovery Framework](#)
- [Post-Disaster Recovery Guide for Planners](#)

Phase 2, Step 1 Minimum Requirements

- Develop a portfolio of resilience projects aimed at reducing exposure and sensitivity to hazards as well as strengthening the adaptive capacity of community assets and vulnerable populations.
- Ensure that each portfolio includes at least one nature-based solution.



Step 2 Consolidate and Prioritize Projects



After brainstorming potential adaptation strategies with the community, it's time for the team to evaluate and prioritize actions. To do so, complete the following steps:

- **Evaluate strategies and their feasibility (including cost-benefit estimation)**
- **Consolidate and prioritize strategies**

As outlined in the community engagement strategy from Phase 1 Step 4, communities should host an Open House or other public forum to allow for feedback during this step to ensure transparency and continue to build community support around resilience planning.

As you work through this step of the program, we suggest referring to the [Community Resilience Building Workshop Guide](#) (Section E). Here you will find information about finalizing which projects you want to submit. This decision will be based on any vulnerability assessments conducted thus far as well as any cost-benefit estimations that help to sort projects based on their urgency and feasibility.

Additionally, at this stage, it is advisable to return to the previous steps and use all relevant information to inform your decision-making. Some key questions to focus on are :

- Are the projects identified meeting your community's vision and goals (identified in Phase 1, Step 3)?
- Do the identified projects correlate with community feedback (received throughout Phase 1)?
- Do the identified projects relate to your risk and vulnerability assessment (i.e., does the project *reduce the vulnerability or increase the adaptive capacity* of a critical asset or vulnerable population)?



Evaluate Strategies and Their Feasibility

Comprehensively evaluating strategies for their feasibility is key to developing strong resilience solutions. When evaluating whether or not a strategy is feasible, the [STAPLEE method](#) may be helpful. This tool assesses each potential project's social, environmental, economic, legal, political, administrative, and technical aspects to assist with prioritization. Alternatively, NOAA has provided a succinct template for [assessing feasibility](#).

The cost or the economic case for different projects or action items must be considered when developing resilience strategies. An informal cost-benefit analysis should be used to review proposed adaptation actions. Based on general criteria that are established by the community, ratings of high, medium, or low can be assigned to the anticipated costs and the benefits associated with each action. Make sure to explore and identify potential funding mechanisms for project implementation. As you do, consider mechanisms that can help ensure the longevity of the project(s) you select.

Benefit/cost analyses could include criteria such as:

Benefit	
High	Action would have a significant impact on risk reduction
Medium	Action would have an impact on risk reduction
Low	Long-term benefits are difficult to quantify in the short term

Cost	
High	Existing funding is not adequate
Medium	Requires budget reappropriation or amendment
Low	Funding available under the existing budget

In addition to these considerations, you should follow a formalized process for selecting adaptation strategies, monetizing them, and calculating their feasibility. In this case, refer to NOAA's guide, [What Will Adaptation Planning Cost? An Economic Framework for Coastal Community Infrastructure](#), which will help you to navigate the process in greater detail. For additional details on cost-benefit estimation and additional funding sources, please see the corresponding section of the Technical Appendix (page 78).

As you complete your feasibility and cost-benefit assessments, organize information for each project in the portfolio using the following template:

Project Name	Provide a brief, descriptive title for the project.
Project Description	Describe the project, including information gathered during project development and expectations for the project moving forward. <i>(Please note that these descriptions will be used for future grant applications. Therefore, they should be as detailed as possible, including specific quantitative and qualitative information. For example, "The living shoreline will directly address coastal erosion by installing 2,500 linear feet of oyster shells and native plantings. In addition, this nature-based solution addresses social vulnerability by reducing flooding and protecting housing in a historically disadvantaged community.)</i>
Location	Where will the proposed project take place?
Source	Where was this project recommended? CAT meeting, public meeting input, existing report?
Scoping Questions	Include any important questions that still need to be addressed (<i>i.e., would elevation be a more effective strategy than relocation?</i>)
Hazard(s) Addressed	List the hazards that your team identified that impact the project location.
Supporting Function³	What essential part of the community does this project support (e.g., communications, transportation, etc.)?
Type of Solution	Infrastructure, plans and policies, ordinances, non-regulatory programs, and others (describe).
Estimated Timeline	Estimate the time the project will take to complete and any anticipated delays in the timeline.
Responsible Entity	Describe who will primarily be expected to be responsible for project implementation (e.g., County Planning Department with a consultant).
Potential Partners	List potential partners (<i>i.e., individuals, organizations, agencies, etc.</i>).
Existing Funding	List any current source of funding associated with the project.
Potential Funding Sources	Identify potential sources of funding for project implementation. Include any upcoming application deadlines.
Estimated Cost	Estimate the total cost of the project by conducting a cost-benefit analysis.
Anticipated Benefit	What are the project's primary benefits, and how much benefit will the project have (high, medium, low)?
Priority Rating	How urgent is the project (high, medium, low)?
Project Map(s)	Provide any relevant maps of the project site.

³ Suggested Toolkit: [FEMA Community Lifelines](#)

Phase 2, Step 2 Minimum Requirements

- Solicit public input on projects and evaluate projects with the CAT
- Develop a Project Portfolio
 - Identify at least 5 priority projects, with at least one being a nature-based solution, organized using the template above



Resilience Strategy

The main deliverable for Phases 1 and 2 of the Resilient Coastal Communities Program is a **Resilience Strategy**. This document should be a detailed overview of the deliverables developed throughout this process. While this is not meant to be a comprehensive resilience plan, the information in this Resilience Strategy may later be used to develop a comprehensive Resilience Plan, integrated into existing local plans and ordinances, or leveraged to secure additional grant funding for project development and implementation. Having a planning document like this helps to provide clarity of purpose, attract funding, and provide a more direct path to implementation.

Document Organization

The Resilience Strategy deliverable will include the following sections and deliverables:

Vision & Goals

- ✓ List of community vision and set of goals
- ✓ Description of process for developing vision and goals

Review of Existing Local & Regional Efforts

- ✓ Inventory of relevant plans, ordinances, policies, and programs

Community Action Team Report

- ✓ Meeting agendas, minutes, and list of participants
- ✓ Description of process for developing Community Action Team

Stakeholder Engagement Strategy

- ✓ Plan for engagement with the community during the risk assessment and project development processes

Risk and Vulnerability Assessment Report

- ✓ Report documenting process and products for the following steps:
 - Mapping assets, natural infrastructure, and vulnerable populations
 - Assessing vulnerability
 - Estimating risk

Project Portfolio

- ✓ Portfolio detailing a minimum of five shovel-ready priority projects and action items.

Additional Files

- ✓ Provide mapping products and excel spreadsheets generated from the risk and vulnerability assessment in a zipped folder or using a file-sharing link.

Next Steps

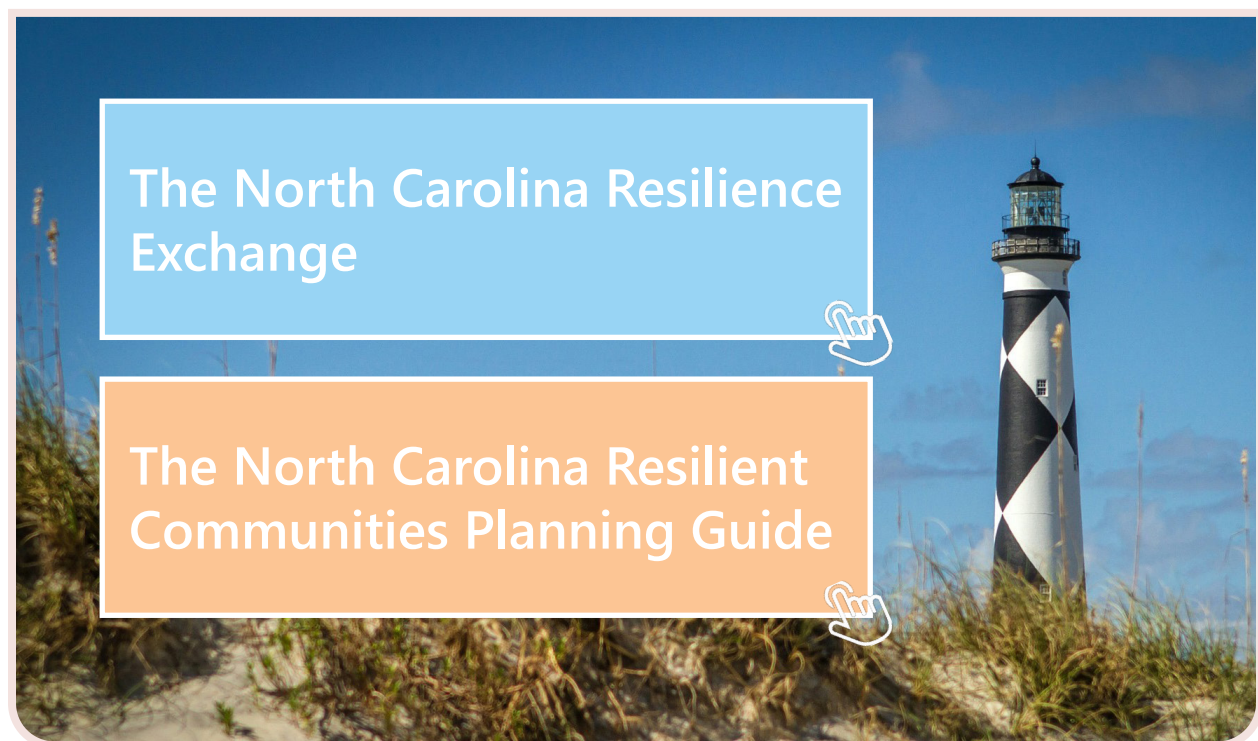
While you are prioritizing your projects, it is important to think about how your community will continue this effort after Phase 2 concludes. There may be additional steps that need to be taken, such as:

- ▶ **Continue CAT team meetings. Maintaining this network will build community capacity and may help address future resilience concerns.**
- ▶ **Consider integrating your Resilience Strategy into your CAMA Land Use Plan and other resilience-related policy documents.**
- ▶ **Complete additional feasibility studies to assess the applicability, feasibility, and cost of existing or future resilience projects.**
- ▶ **Leverage your new Resilience Strategy and project portfolio to guide you toward additional grant opportunities.**
- ▶ **Provide DCM with feedback on the RCCP process to help improve our efforts to improve coastal resilience in North Carolina.**

Technical Appendix

The technical appendix summarizes the materials referenced in the Handbook as a supplemental resource. This appendix links to additional information, such as helpful templates, maps, and formatting suggestions for Phase 1 and 2 deliverables. Additionally, this appendix provides examples from previous rounds of the RCCP (where applicable). While the handbook can be used independently, exploring what other similar resources are available and included here may be helpful. Doing so will strengthen the final deliverables and potential projects for each community. The RCCP Planning Handbook Technical Appendix has been updated for 2025.

2025 Spotlight:



1.) North Carolina Office of Recovery and Resiliency (NCORR)

a. Resource: [NC Resilience Exchange](#)

Description: The North Carolina Resilience Exchange is a new interactive tool created to support local leaders by providing guidance, data, and resources to strengthen community and environmental resilience. Navigate the dropdown menus at the top of the page to explore key steps in the resilience process: *"Understand Your Vulnerabilities"*, *"Identify Actions"*, and *"Find Funding"* will help you assess risks, plan strategies, and secure resources. The *"Find Resources"* section offers guidance on resilience-building efforts, while *"Find Experts"* connects users with professionals who can provide support.

b. Resource: [NC Resilient Communities Planning Guide](#)

Description: The North Carolina Resilient Communities Planning Guide is a thorough resource that heavily complements the RCCP Planning Handbook, helping local leaders, especially governments, plan for a more resilient future. It consists of the *Playbook*, a step-by-step guide to resilience planning, and the *Idea Book*, which offers specific actions and case studies from North Carolina across 14 subject areas. Together, these resources provide practical strategies and inspiration for communities to address economic, social, and environmental challenges.

Phase 1: Community Engagement & Vulnerability Assessment

Step 1: Developing A Community Action Team



RESOURCES TO BE CONSIDERED WHEN DEVELOPING A COMMUNITY ACTION TEAM:

1.) National Institute of Standards and Technology (NIST)

Resource: [Template 1-1: Forming a Collaborative Planning Team](#)

Description: This template provides a checklist to use when considering various community leaders and representatives. It also provides multiple examples.

Additional information about forming a Community Action Team can be found in the [Community Resilience Planning Guide for Buildings and Infrastructure Systems Playbook](#) (Step 1; Pgs. 8-13)⁴

2.) National Oceanic and Atmospheric Administration (NOAA)

Resource: [Participants Checklist for Risk and Vulnerability Assessment](#)

Description: This checklist is designed to help leaders consider a wide variety of local stakeholders and representatives that may be beneficial to include in a vulnerability assessment or on a Community Action Team.

3.) North Carolina Office of Recovery and Resiliency (NCORR)

Resource: [North Carolina Resilient Communities Planning Guide](#)

Description: The North Carolina Resilient Communities Planning Guide offers a collection of resources designed to assist local leaders, particularly government officials, in planning for a more resilient future. It consists of two main volumes—the Playbook and the Idea Book—which can be used independently or in combination. Step 1.3, Pages 21-27 of the [Planning Guide](#) specifically overviews the steps for creating a steering committee.

4. The Playbook is based on the full Community Resilience Planning Guide (Volumes I & II), which can be found [here](#).

Example #1 (RCCP, Round 1, Page 1/2):

Community Action Team Meeting Agenda

Prepared by Dewberry Inc. for the Town of Cape Carteret, NC



CAPE CARTERET CAT MEETING #1 DISCUSSION

DATE: September 28, 2021

TIME: 4:00 p.m.

LOCATION: Virtual (GoToMeeting)

PURPOSE: Cape Carteret Community Action Team Meeting Discussion Notes

Discussion Topics

1. Community Vision and Goals

Existing Vision Statements? N/A

Vision:

- Developing environmentally friendly stormwater infrastructure improvements to protect both life and property within the Town of Cape Carteret. (goal vs. vision?)

Goals:

- Get shovel-ready plans together to address stormwater infrastructure needs
- Plan not just for current events, but for future storms (increasing intensity and frequency)
- Plan for increased population and related infrastructure capacity
- Communication with the community on likelihood of events and community vulnerability
- Ensuring improvements or other development has minimal impact to the natural/coastal environment (pre-treatment of stormwater, etc.)

Other feedback: Primary hazards are storm surge, flooding inundation

2. Threats/Challenges to Community Resilience:

Identified during initial meeting (June 2021): *The Town has many low elevation areas which it would like to address for resiliency. The houses off of **Arden Oaks Drive** are of particular concern because of the flooding that occurred during Florence which required the road to be pumped by the National Guard. The streets ending **south of Edgewater Court**, facing the Sound, were all flooded during Florence. **Bogue Lane** also floods due to storm surge. Rain events lead to flooding on **Anita Forte Drive**, **Gemini Drive**, **Starlight Drive**, **Quailwood Court**, and **Dolphin Street**. Storms also lead to overtopping at a stretch of **Star Hill Drive** between the ponds and Pettiford Creek. A thunderstorm in June washed out **Bogue Sound Drive** from **Park Avenue** to the Sound.*

What should be added to this list?

- Sutton Drive
- Loss of trees following storms (Florence) and through development, exacerbating flooding
- Town egress from all sides due to flooding around town; getting fuel, etc.

What costs have been associated with these threats? (Includes damage costs from specific weather events, costs of prior improvements to increase resilience, etc.)

- Tree removal, clearing debris

Example #1 (Page 2/2):

- Florence is benchmark for worst-case scenario, especially in terms of debris/tree removal
- 5" rain event in 2020, including flooding and property damage; resulting addition of impervious surfaces limits ability to absorb rainfall
- Street debris impacts ability of emergency services to respond to 911 calls, events

Of these challenges, which are the most important (or have the most impact) to the overall community?

- Flooding events, storm surge inundation
- Wind damage, tree destruction (loss of tree canopy)
- Impassable roads following events, impacts to public safety
- Following storm events, impacts to water quality, including runoff, septic tank damage; impacts within coastal marsh (throughout the county)
- No dedicated shelter in this part of the county; anticipate this being addressed by county- new elementary school gym intended to address.

Other feedback:

3. Community Engagement Strategy:

What techniques (in-person meetings, virtual options) have been the most effective at getting feedback?

- Fall Festival on November 6, likely several thousand to attend; use a tent
- Christmas in the Cape in December
- Work with businesses in town to provide maps/surveys

If in-person, are drop-in events or formal presentations preferred?

- Outdoor events provide good engagement
- Can also use town's email listserv
- Monthly video update (announced through listserv and social media)
- Have held stand-alone events, weren't well attended
- Typically receive comments following storm events re: damage severity, etc.

What strategy do you recommend for this effort? Are there upcoming efforts/events that we can partner with on community outreach?

Other feedback:

- If using virtual option, provide information as soon as possible; have used paper surveys, QR codes, email notices, etc.

Action Items

ACTION ITEM	ASSIGNED TO	DATE DUE	STATUS
Schedule Public Engagement event/prepare online survey #1	Dewberry	10/15/21	
Provide feedback on Meeting #1 discussion	CAT	10/8/21	

Step 2: Reviewing Existing Plans and Efforts



HOW TO BUILD UPON AND INCORPORATE HAZARD MITIGATION PLANS:

1.) American Planning Association (APA)

Resource: [Planning Advisory Service \(PAS\) Memo](#)

Description: This 2021 edition of the PAS Memo identifies where and how different types of resilience plans, policies, and models interact. This allows for areas of overlap or inconsistency to be identified to minimize conflicts and improve outcomes.

The method (i.e., [Plan Integration for Resilience Scorecard](#) Guidebook) identified in the PAS Memo has also been utilized and promoted by the National Institute of Standards and Technology. It acts as a comprehensive tool to evaluate and compare existing plans and efforts in coastal communities. Table 5, provides a example of the included resources.

2.) Federal Emergency Management Agency (FEMA)

Resource: [Plan Integration: Linking Local Planning Efforts](#)

Description: This 2015 FEMA resource outlines strategies for incorporating hazard data into various community plans, fostering inter-agency collaboration, and ensuring policies across disciplines account for risk reduction. Its emphasis on coordination, stakeholder involvement, and policy alignment makes it a valuable guide for enhancing resilience planning. Part One, beginning on Page 6, outlines various considerations and types of resources that may be helpful when reviewing existing plans and efforts.

3.) National Institute of Standards and Technology (NIST)

Resource: [Community Resilience Planning Guide for Buildings and Infrastructure Systems: A Playbook](#) (Step 2; Pgs. 15-23)

Description: This step in the NIST playbook gives a detailed overview of how to use and incorporate the Plan Integration for Resilience Scorecard (PIRS) method. While extensive, this method builds a comprehensive understanding of community characteristics and vulnerabilities.

4.) N.J. Department of Environmental Protection (NJDEP)

Resource: [Getting to Resilience: A Coastal Community Resilience Evaluation Tool](#)

Description: The Getting to Resilience questionnaire facilitates interdepartmental collaboration by identifying opportunities for plan integration, hazard mitigation, and adaptation. By guiding municipalities through self-assessment, it supports informed decision-making and highlights actions to improve resilience through planning, outreach, and response mechanisms. On Page 4, there is an example checklist that provides a template for accounting for various types of plans, ordinances, and codes.

Table 5: Examples of community plans from the Plan Integration for Resilience Scorecard Guidebook

Plan Type	Purpose	Contribution (+/-) to Vulnerability
Comprehensive/General Plan	Main community planning document	Policies can guide future development into or away from hazard zones.
Hazard Mitigation Plan	Reduce long-term risk to human life and infrastructure	Advocates vulnerability reduction and resiliency building, often via general policies or specific "action items"
Disaster Recovery Plan	Address disaster recovery related needs to be activated during recovery	Advocates vulnerability reduction and resiliency building post-disaster. Coordinates agencies to assist people post-disaster.
Area Plans:	Address planning issues pertaining to a portion of the community	Targeted policies may increase or decrease vulnerability, depending on purpose and location. Area plans may also contribute to policy district delineation.
Downtown (Redevelopment)		
Small Area/Neighborhood/District		
Waterfront		
Corridor Plan		
Functional or Sector Specific Plans:	Focus on individual or related functions or sectors in need of specialized planning	Individual plan policies (or objectives, action items, etc.) may increase or decrease vulnerability and are often distinct from those found in compensation or hazard mitigation plans. Applicability to individual policy districts may be aided by additional function/sector maps.
Transportation (or Transit)		
Parks/Open Space		
Economic Development		
Environmental Management		
Climate Adaptation/Mitigation		
Housing (Consolidated/Strategic)		
Wildlife Management		
Wildlife Protection		

Examples of comprehensive Community Resilience Plans in North Carolina:

- [2020 Pamlico Sound Regional Hazard Mitigation Plan](#): Carteret, Craven, Pamlico, and Beaufort Counties ([2024 Draft Update](#))
- [2021 Southeastern North Carolina Regional Hazard Mitigation Plan](#): Brunswick, New Hanover, Onslow, and Pender Counties
- [2021 Northeastern NC Regional Hazard Mitigation Plan](#): Bertie, Hyde, Tyrrell, and Washington Counties
- [2020 Albemarle Regional Hazard Mitigation Plan](#): Chowan, Camden, Perquimans, Pasquotank, Gates, and Hertford Counties
- [2024 Outer Banks Regional Hazard Mitigation Plan \(UPDATED\)](#): Currituck and Dare Counties

Step 3: Setting Vision and Goals



HOW TO ACHIEVE GOAL/OBJECTIVE SETTING USING STRUCTURED DECISION-MAKING PROCESSES:

1.) National Institute of Standards and Technology (NIST)

Resource: [Community Resilience Planning Guide for Buildings and Infrastructure Systems: A Playbook](#) (Step 3; Pgs. 24-36)

Description: This step in the NIST playbook walks through the process of creating short and long-term goals for your community and proposes a method to evaluate the expected performance of each goal to help choose the best options.

2.) University of Wisconsin-Madison (UW-M)

Resource: [Developing Your Vision and Goals](#)

Description: This resource is part of the [Community Engagement Toolkit](#). The resource outlines a step-by-step process for crafting and reviewing a community vision statement and goals.

Technical Appendix continued on next page.

Example #2 (RCCP, Round 1, Page 1/1):

Vision and Goals

Prepared by Kimley Horn for the Town of Ocracoke, NC.

B. Vision and Goals

The vision and goals for the project were developed with the Community Action Team (CAT) as described in Step 2 of Phase 1 [4]. The vision focuses on where the community wants to be in the next 10 years in relation to coastal hazards. The goal statements identify the steps the community wants to take to reach the vision. The vision and goals were designed to consider the triple bottom line approach to resilience by considering people, the planet, and profit. Vision and Goals statements developed by the CAT are shown in **Figure 4**.



Figure 4: Ocracoke Resilient Coastal Communities Program Vision and Goals

The vision and goals were developed at the first CAT meeting. The CAT was presented with examples and definitions of vision and goal statements. Additionally, the consulting team explained the triple bottom line approach. The CAT reviewed the example statements and highlighted any pieces that they thought were applicable to their community. Following the review of the examples, the project consultants lead a brainstorming discussion. The CAT was presented with a series of questions and discussion points related to the vision and goals statements. Examples included discussions on coastal hazards faced by the community and ranking of community priorities. The consulting team then presented the CAT with draft statements which the CAT revised for their community as appropriate. Following the meeting, the consulting team sent out a shared document for the CAT to continue revising the goal statements. After feedback was provided, the statements were selected.

Example #3 (RCCP, Round 1, Page 1/1):

Vision and Goals

Prepared by Moffatt & Nichol for the Town of Leland, NC.



RESILIENT COASTAL COMMUNITIES PROGRAM | RESILIENCE STRATEGY

The **vision** is intended to be an aspirational statement for where the Town wants to be in the future, particularly in relation to coastal hazards.

The **goals** are intended to be specific, measurable goals to help the community identify steps that can be taken to achieve the vision. The goals could relate to preparedness, recovery, community engagement, construction and restoration, etc. The community goals reflect the triple-bottom line approach to resilience, which goes beyond traditional hazard mitigation and disaster recovery to develop a holistic strategy considering social, environmental, and economic factors.

1.1.1 Vision Statement

The approved Leland RCCP Vision statement is, “To promote the health, safety, and overall well-being of the residents, visitors, and patrons of Leland by creating a more resilient community, particularly with regard to floodplain and stormwater management, sheltering and evacuation, data and research, transportation and infrastructure, community planning, communication, economy, and the environment.”

1.1.2 Goal Statements

The approved Leland RCCP Goal Themes and Statements are:

1. **Floodplain and Stormwater Management.** Evaluate and identify specific risks and vulnerabilities, particularly with regard to FEMA flood zones and stormwater problem areas, and establish projects and activities to evaluate, communicate, and provide solutions to reduce those risks
2. **Sheltering and Evacuation.** Identify, establish, and provide information on facilities for use as shelters and staging areas, and identify key roadways within the community for emergency evacuations and mobility during disaster events.
3. **Data and Research.** Update and use the most recent data and innovative research to inform and support resilience activities within the community.
4. **Transportation and Infrastructure.** Create solutions for critical building and transportation infrastructure with regard to flood hazards within the community.
5. **Plans, Policies and Ordinances.** Review, revise, and implement/enforce plans, policies, and ordinances, including land use, zoning, and inspections, and incorporate incentives for strong resilience practices within the community.
6. **Communication.** Enhance education, communication, and collaboration within the community, particularly with regard to vulnerable populations in flood-prone areas, as well as outside the community with neighboring jurisdictions, County departments, State agencies, and regional and Federal resources.
7. **Economics.** Work with appropriate stakeholders and partners to enhance the economic viability and resiliency of the local economy.
8. **Environmental.** Identify nature-based solutions that restore the natural beneficial functions of floodplains and wetlands to help alleviate flooding, reduce health and safety risks, and enhance the environmental appeal of the community.

Step 4: Develop a Community Engagement Strategy



COMMUNITY ENGAGEMENT AND OUTREACH TOOLS THAT ASSIST WITH DEVELOPING INCLUSIVE AND DIVERSE ENGAGEMENT STRATEGIES:

1.) Council on Environmental Quality (CEQ)

Resource: [Climate and Economic Justice Screening Tool \(CEJST\)](#)

Description: This tool showcases census-tract data that includes information about the social and economic burdens communities experience. The datasets leveraged by this tool identify indicators of social vulnerability and may help you identify areas needing special consideration.

Note: As of Jan. 22, 2025, CEQ's CEJST is no longer available on the White House website. The hyperlink above will take you to an archived copy of the tool and its data. Therefore, the available data is limited to what was available prior to that date. To view copies of other federal environmental datasets that have been removed, please view the Public Environmental Data Partners [Data & Screening Tools](#) website.

2.) Federal Emergency Management Agency (FEMA)

Resource: [National Risk Index: Community Resilience](#)

Description: This toolkit highlights examples of communities that are addressing the disproportionate impacts of climate change on vulnerable populations. The toolkit is intended to help governments and community-based organizations improve their climate adaptation initiatives.

3.) Georgetown Climate Center

Resource: [Equitable Adaptation Legal & Policy Toolkit](#)

Description: This toolkit highlights examples of communities that are addressing the disproportionate impacts of climate change on vulnerable populations. The toolkit is intended to help governments and community-based organizations improve their climate adaptation initiatives.

4.) National Oceanic and Atmospheric Administration (NOAA)

Resource: [Introduction to Stakeholder Participation](#)

Description: This resource is specifically designed as a social science resource for coastal management programs. It covers every step in the process, from identifying stakeholders to evaluating their participation.

5.) San Francisco Adapting to Rising Tides (ART)

- a. Resource: [ART Supply: Good Planning Guide - Stakeholder Engagement](#)

Description: This short document covers the basics of stakeholder engagement and emphasizes core concepts such as building long-term relationships, building trust, and guidelines for ensuring effective meetings.

- b. Resource: [ART Supplies](#) (Toolkit)

Description: A wealth of how-to guides, example process agendas, planning guides, engagement exercises, and supporting information.

6.) Urban Sustainability Directors Network (USDN)

Resource: [Equitable, Community-Driven Climate Preparedness Planning Guide](#)

Description: USDN offers a framework that incorporates specific equitable adaptation solutions and tactics into a community-driven planning process. The framework provides plenty of background, an overview of social inequalities and their relation to climate preparedness, and a step-by-step approach to finding solutions.

Technical Appendix continued on next page.

Example #4 (RCCP, Round 2, Page 1/5):

Community Engagement Strategy for the Town of Kitty Hawk, NC.

Prepared by Stewart Inc.

Community Action Team (CAT)

The Kitty Hawk Community Action Team was developed as a non-appointed steering committee to champion the effort alongside Town staff and consultants (Stewart) during the development of the Resiliency Plan. The Community Action Team consisted of members of the CAMA Land Use and Comprehensive Plan Steering Committee (the Planning Board) and other local stakeholders. Planning Board members were asked to participate in the Resilient Coastal Communities Program because of their expertise and experience during the Imagine Kitty Hawk planning process. Additional members were included to ensure inclusivity and expand the expertise of the Community Action Team. These included a local civil engineer, an engaged female Kitty Hawk citizen, the public works director, deputy fire chief, police lieutenant, town engineer, and two members of the recreation committee.



The main duties of the CAT members included: reviewing data and documents presented by the project team, discussing items presented, assisting and coordinating public outreach, and identifying shovel-ready projects and prioritizing future projects and next steps.

The Community Action Team consisted of the following members: John Delucia, Carlos Gomez, Jimmy Helms, Paul Henriques, Pete Mantz, Craig Merrill, Willie Midgett, David Morton, Mike Talley, Rob Testerman, Mackenzie Todd (*ex-officio*), Kasen Wally (*ex-officio*), and Amy Wells. The Community Action Team met monthly to discuss the project and provide expertise and local knowledge.

CAT Champion

One member of the committee was selected to serve as the project champion. This is the person who has knowledge, expertise, and passion to act as a point person with DCM, the project team, and the rest of the CAT. Rob Testerman, the Planning Director for the Town of Kitty Hawk, was chosen to be the CAT Champion.

Community Engagement Strategy

An inclusive community engagement effort led to the development of Kitty Hawk's Resilient Coastal Community Plan (Resilient Kitty Hawk). This Community Engagement Strategy outlines public engagement goals and specific actions by the Town of Kitty Hawk, Stewart, and the Community Action Team (CAT) to collect insightful, accurate public input that reflects the social and cultural values and priorities of the Town during the development of the Plan. This effort takes care to include representation from minority communities and vulnerable populations. Key targets are the African American community, low income residents, the growing Hispanic population, and the 65 and over age group.

Public Participation Goals

Robust community engagement is essential to creating a plan that reflects and serves the community. Going beyond just informing about the process to meaningfully engage and empower community members is key for fostering trust and more effective and equitable outcomes. The following goals will guide the community engagement strategy for the Kitty Hawk Resiliency Plan:

Equity, Inclusivity, and Diversity: Engagement demographics are monitored and compared to Town demographics according to latest Census data, including racial, income, and age demographics.

Engagement Choices: Community engagement opportunities are varied and equitable so community members can choose the option that works best for them.

Meaningful Dialogue: Community engagement opportunities ask meaningful questions, provide open platforms for discussion, and feature accessible activities within each meeting so community members feel heard and empowered.

Public Participation Methods

To support the Engagement Choices goal, the project team offered a diverse set of engagement methods at various stages of the project. These included:

- ◆ Community Workshops/Open Houses
- ◆ Digital Public Survey
- ◆ Project website: to host materials relevant to the program to encourage public participation

Example #4 (Page 3/5):

Socially Vulnerable & Historically Under-Represented Groups

Socially vulnerable and historically under-represented groups within the community are often not involved in planning processes and face disproportionate impacts from coastal and climate hazards. Including traditionally underrepresented groups from frontline communities in resilience planning is critical for equitable outcomes. Given that social aspects of the Town contribute to overall community resiliency, having the most inclusive approach possible is key.

The Town of Kitty Hawk has a relatively small population and as a beach community there are limited vulnerable and historically under-represented populations. Public engagement for the Resilient Kitty Hawk Plan was designed to help overcome obstacles in civic engagement in order to capture concerns of all of its residents.

The following digital media was used to promote the project and create general awareness:

- ◆ Local newspaper
- ◆ Local TV information channel
- ◆ Community newsletter
- ◆ Email
- ◆ Facebook
- ◆ Town website

Frontline Communities: People who are both highly exposed to climate risks (because of the places they live and the projected changes expected to occur in those places) and have fewer resources, capacity, safety nets, or political power to respond to those risks (e.g., these people may lack insurance or savings, inflexible jobs, low levels of influence over elected officials, etc.) (Georgetown Climate Center). This includes, but isn't limited to: people of color, low-income, immigrants, those at-risk of displacement, senior citizens, populations experiencing homelessness, outdoor workers / climate-vulnerable labor, incarcerated populations, renters / subsidized housing tenants, unemployed/underemployed, youth, persons with disability, and chronically-ill / hospitalized people.

Example #4 (Page 4/5):

Community Engagement Timeline

The following is a timeline of community engagement activities during the Resilient Kitty Hawk plan development.

Kitty Hawk Resiliency Plan Engagement Timeline			
Activity	Description	Date	Lead Party
Develop Community Engagement Strategy	Develop Draft Community Engagement Strategy; Include recommendations for 2 public workshops and targeted engagement for underrepresented community members	Late September 2023	Stewart
Develop Community Action Team (CAT)	Ask for participation from Steering Committee; Add additional members to build a multi-disciplinary committee; Identify and include representation from vulnerable populations (i.e. low income, African American, Hispanic and/or 65+ communities); Schedule 3-5 meetings	October 2023	Town, CAT/ Stewart: send RCCP explanation & homework to CAT 1-2 weeks in advance of 1st CAT meeting
Develop Project Webpage	Establish online presence; Set up dedicated Resiliency Plan webpage on Town website and populate with relevant information; Add notice to home page about the Plan and direct visitors to the Plan webpage; Create social media posts for Town and associated official accounts	Mid to Late October 2023	Town, Stewart to assist
CAT Mtg #1	Introduce the RCCP and planning process; Appoint a CAT Champion; Discuss member roles; Assign tasks to members on identifying contacts in vulnerable communities; Schedule next meeting	November 15, 2023	Town, CAT
Demographic Analysis	Mapping and research to identify vulnerable populations	December 2023	Stewart
CAT Mtg #2	Meeting to discuss engagement for targeted outreach, discuss existing plans and efforts, prepare draft goals and vision	December 19, 2023	Town, Stewart, CAT
Project Priorities Field Trip	Field trip with Public Works Director	December 2023 / January 2024	Town, Stewart
Public Open House / Community Workshop #1 & #2	Interactive input from the community on values, preference, and direction; Large community event with breakout groups for public to review existing conditions, survey 1 results, and draft resiliency and environmental goals for the town	January 2024	Town, Stewart, CAT

Date: November 4, 2024

Resilient Kitty Hawk | 9

Example #4 (Page 5/5):

Kitty Hawk Resiliency Plan Engagement Timeline			
Activity	Description	Date	Lead Party
CAT Mtg #3	Community Action Team meeting to review and discuss risk and vulnerability assessment	February 20, 2024	Town, Stewart, CAT
CAT Mtg #4	Community Action Team meeting to discuss development of potential resilience projects	March 20, 2024	Town, Stewart, CAT
CAT Mtg #5	Community Action Team meeting to discuss development of potential resilience projects	April 17, 2024	Town, Stewart, CAT
Public Open House / Community Workshop #2	Interactive input from the community on the draft plan, resiliency and environmental goals; Seek public input on prioritization	June 4, 2024	Town, Stewart, CAT
CAT Mtg #6	Community Action Team meeting to discuss prioritization and draft plan	June 5, 2024	Town, Stewart, CAT
Draft Plan Public Review Period	Draft plan available for public review and comment	August 2024	Town, Stewart, CAT

Ongoing Community Engagement Tasks			
Activity	Description	Date	Lead Party
Event Coordination	Coordinate on notices, press releases, and event details and responsibilities	Prior to major events	Town, Stewart to assist
Event Debrief	Go over results and feedback received at previous event	After major events	Stewart, Town
Public notices	Distribute notices via Town staff, email, website and social media prior to events	Prior to major events	Town
Project updates	Project updates and announcements to elected and appointed boards	Prior to major public events	Town, Stewart to assist
Community survey	Online survey accessed 24/7 during open period	Prior to first public meeting	Stewart, Town
Website, social media	Website updates and information sharing through staff	At milestones and after CAT meetings	Town, Stewart to assist

Step 5: Map Critical Assets & Natural Infrastructure



RESOURCES FOR IDENTIFYING AND MAPPING CRITICAL ASSETS AND NATURAL INFRASTRUCTURE:

1.) Environmental Protection Agency (EPA)

Resource: [EPA Geospatial Applications](#)

Description: A collection of web-based tools developed by the EPA to explore environmental data, including air and water quality, waste management, climate resilience, and environmental compliance. These applications provide interactive mapping, monitoring, and analysis to support decision-making at local and national levels.

2.) Justice Institute of British Columbia

Resource: [Community Disaster Resilience Planning Process \(CDRP\)](#)

Description: This is an interactive, user-friendly online tool that walks a community planning team through the process of identifying hazards, assessing community resilience, and developing a community resilience plan.

3.) United States Forest Service (USFS)

a. Resource: [F.S. Geodata Clearinghouse](#)

Description: The Geodata Clearinghouse provides digital datasets on forests and grasslands, covering boundaries, ownership, natural resources, and infrastructure. It also includes data on private and state forests, such as insect threats and water resources, along with downloadable maps and links to related information.

b. Resource: [Geospatial Office \(GO\)](#)

Description: The USDA Forest Service Geospatial Office (GO) applies geospatial science and technology to support land and resource management. GO provides mapping products, ecological inventories, fire monitoring tools, and other geospatial data services to enhance decision-making and operational efficiency.

c. Resource: [HiForm - High Resolution Forest Mapping](#)

Description: HiForm (High-Frequency Forest Monitoring Initiative) is a USDA Forest Service Research and Development initiative that leverages satellite imagery and cloud computing to enhance forest disturbance monitoring. Using Sentinel-2 and Landsat data, HiForm produces Change-Over-Time products to analyze impacts from severe weather, wildfires, harvesting, and insect activity in eastern U.S. forests, addressing challenges posed by diverse species composition, seasonal changes, and fragmented ownership.

d. Resource: [Landscape Change Monitoring System](#)

Description: The Landscape Change Monitoring System (LCMS) is a remote sensing-based system developed by the U.S. Forest Service to track landscape changes across the U.S. since 1985. LCMS provides annual data on vegetation cover change, land cover, and land use to support land management decisions.

e. Resource: [Southern Research Station](#)

Description: The USDA Forest Service's research branch focused on sustaining and enhancing southern forest ecosystems. Headquartered in Asheville, NC, the station conducts research on fire, water, forest health, restoration, and forest products in collaboration with federal, state, and tribal partners.

4.) North Carolina Natural Heritage Program

Resource: [North Carolina Conservation Planning Tool](#)

Description: The North Carolina Conservation Planning Tool (CPT) provides maps that integrate information from multiple sources, including biodiversity and wildlife habitat, open spaces and conservation lands, agricultural lands, and forestry lands.

5.) North Carolina Wildlife Resources Commission

Resource: [Green Growth Toolbox](#)

Description: This resource offers guides, recommendations, and extensive GIS data which can be used to map and conserve natural habitats and wildlife in your community. Layers include wetlands, natural heritage sites, outstanding resource waters, and other natural features that will be critical in mapping natural infrastructure.

6.) United States Geological Survey (USGS)

Resource: [3D Hydrography Program](#)

Description: The 3D Hydrography Program (3DHP) is a nationwide effort to enhance surface water mapping by deriving high-resolution, three-dimensional hydrography data from 3D Elevation Program (3DEP) LiDAR. It improves the accuracy, detail, and connectivity of hydrographic features to support hydrologic modeling, water resource management, and infrastructure planning.

Step 6: Conduct Vulnerability Assessment



THE FOLLOWING TOOLS ARE USEFUL FOR IDENTIFYING AND MAPPING LOCALLY RELEVANT HAZARDS:

1.) City of Asheville, North Carolina

Resource: [Final Assessment Report \(2018\)](#) (Pgs. 7-9; 25-30)

Description: This report is an excellent example of how to perform a risk and vulnerability assessment. Within, you will find summaries, examples that describe the assessment process, and the relevance of the Vulnerability Equation listed in Step 6. We recommend reviewing this document in its entirety.

2.) Federal Emergency Management Agency (FEMA)

- a. **Resource:** [Checklist for Vulnerability of Flood-Prone Sites and Buildings](#) (Ch. 2, Pgs. 91-99)

Description: This tool can be used to assess site-specific flood hazards and structural vulnerability.

- b. **Resource:** [National Hurricane Center Storm Surge Risk Maps](#)

Description: National-scale maps illustrating storm surge flooding vulnerability for hurricane-prone coastal areas. These maps highlight that storm surge impacts can extend far inland beyond beachfront areas.

- c. **Resource:** [National Risk Index](#)

Description: A FEMA tool that assesses risk for 18 natural hazards across U.S. counties and Census tracts, providing interactive maps, risk reports, and data exports for analysis.

- d. **Resource:** [Resilience Analysis and Planning Tool \(RAPT\)](#)

Description: A GIS-based tool with over 100 preloaded data layers, including community resilience indicators, infrastructure, hazards, and census data, to support local planning and disaster preparedness.

3.) National Aeronautics and Space Administration (NASA)

- a. **Resource:** [Earthdata GIS \(EGIS\)](#)

Description: EGIS offers interactive mapping, web services, and analytical tools to support environmental monitoring, disaster response, and scientific research. Users can access datasets on air quality, land cover, and climate through ArcGIS and open-source GIS tools.

- b. Resource: [Sea Level Change: Observations from Space](#)

Description: A suite of tools for visualizing and analyzing sea level rise scenarios using satellite and tide gauge data

4.) National Oceanic and Atmospheric Administration (NOAA)

- a. Resource: [Storm Events Database](#)

Description: This tool shows every type of storm event that has affected a specific area. The user can sort by area, date range, event type, and storm quality.

- b. Resource: [The Climate Explorer](#)

Description: This tool provides an overview of a specific area's past, present, and future climate conditions. It provides climate maps, climate graphs, high-tide flooding, and records of extreme events.

- c. Resource: [Carolinas Precipitation Patterns and Probabilities \(CP3\)](#)

Description: This tool displays information on precipitation patterns in the Carolinas over the past 120 years.

5.) North Carolina State Government

- a. Resource: [NC Emergency Management Digital Elevation Models \(DEMs\)](#)

Description: This tool from NC Emergency Management shows flood zone maps, provides base data (QL1/QL2 LiDAR, elevation, and legacy LiDAR), and built environment data layers.

Please note: this tool requires a free NCID username/password

- b. Resource: [2020 North Carolina Climate Science Report](#)

Description: This is a scientific assessment of historical trends and the potential for future climatic change in North Carolina. It marks statewide changes, regional changes, sea level rise, compound events, and engineering challenges.

- c. Resource: [2016 Sea Level Rise Impact Study \(Updated 2025\)](#)

Description: This impact study looks at the 2015 update to the 2010 report on sea level rise across North Carolina. It provides recent information and future predictions for the State.

- d. Resource: [Flood Inundation Mapping and Alert Network \(FIMAN\)](#)

Description: This tool from NC Emergency Management shows fine-grain flooding data and potential risks to specific coastal and riverine areas.

6.) United States Geological Survey (USGS)

Resource: [Coastal Vulnerability Index \(CVI\)](#)

Description: This tool provides an overview, at the National Scale, of the susceptibility of coastal areas to sea-level rise. The CVI considers variables like tidal range, regional coastal slope, wave height, and shoreline erosion rates.

Example #5 (RCCP, Round 2, Page 1/4):

Sensitivity Scores for Critical Assets and Natural Infrastructure

Prepared by Moffatt & Nichol for the Town of Ocean Isle Beach, NC.

Risk and Vulnerability Assessment | Town of Ocean Isle Beach, NC

5. VULNERABILITY ASSESSMENT

This section describes the assessment that utilizes the information provided in previous sections and identifies vulnerable populations and assets. In doing so the Town can better understand the relationship between vulnerable populations, assets, and specific hazards, and can develop hazard mitigation policies, projects and plans accordingly.

5.1. Vulnerability Score of Critical Assets

Vulnerability of critical assets to natural hazards can be conceptualized as a combination of three vulnerability components: exposure, sensitivity and adaptive capacity. In this report, exposure refers to the probability of physical contact between an asset and a hazard. Sensitivity is the degree to which an asset's function is impacted by a hazard. Adaptive capacity is the ability of an asset to change its characteristics or behavior in response to a hazard. These definitions are then aggregated to generate an overall vulnerability "score" for each critical asset using the following formula:

$$\text{Vulnerability} = \text{Exposure} + \text{Sensitivity} - \text{Adaptive Capacity}$$

A survey was distributed to the CAT of the Town (from December 5th, 2023 to January 15th, 2024) to elicit the sensitivity and adaptive capacity scores for each critical asset, and average scores were generated for each. The scores were then refined in a meeting on January 10, 2024, with discussion by the CAT, and are presented in **Table 7**.

Table 7. Sensitivity and Adaptive Capacity scores for critical assets.

Critical Asset	Final Sensitivity Score	Final Adaptive Capacity Score
Roads/Evacuation Routes		
Roads (NCDOT, Town, Private)	2	2
Bridge	3	1

Example #5 (Page 2/4):

Utility Infrastructure		
Water Infrastructure (lines, valves)	3	2
Water Towers	3	1
Fire Hydrants	2	2
Sewer Infrastructure (lines, manholes)	3	2
Pump Stations	3	2
Wastewater Treatment Plant	2	2
Stormwater Infrastructure (lines, manholes, catch basins)	2	2
Gas Stations		
Gas Stations - On Mainland	2	2
Gas Stations - On Barrier Island	2	1
Grocery Stores		
Grocery Stores	2	2
Medical Facilities		
Private Doctor Office	1	2
Banks		
Bank	2	2
Community/Government Offices		
Town Hall	3	3
Town Operations Centers	3	2
Community Center	2	2
Museum of Coastal Carolina	2	2
Public Safety/Emergency Services		
Fire Station	3	3
Police Station	3	3
Airport	2	2
Boat Ramp	2	2
Town Center Park	2	2
Ferry Landing Park	2	2
Hohonu Tide Gauge	2	2
Public Beach Access Points	2	2
Natural Infrastructure		
Dunes	3	1
Streams	2	2
Wetlands	2	2
Water Bodies	3	2

A GIS desktop analysis of each asset in relation to each hazard was conducted to investigate which asset is affected by each hazard. A score of 1 was assigned for every hazard that an individual asset encountered, and a sum of all “1’s” was calculated for each asset to represent how many hazards each are exposed to as described in Section 2.3. This final exposure score

Example #5 (Page 3/4):

was then used in the above formula to generate an overall vulnerability score for each critical asset. Each critical asset, displayed by their overall vulnerability score, is shown in **Figure 11**. **Figure 12** shows the major categories of assets along with the distribution of vulnerability scores. A table of all assets with associated vulnerability scores is presented in Appendix B.

The majority of the critical assets had vulnerability scores of 2 or less, indicating a lower level of vulnerability. The assets with scores of 3 or higher are listed in **Table 8**. The most vulnerable assets (scores of 5) were determined to be the protective dunes and the Odell Williamson Bridge leading to Causeway Drive (NC 904). The bridge serves as the only way on or off the island and is a critical evacuation route. This bridge is maintained by the North Carolina Department of Transportation and was last repaired and rehabilitated in 2022. The protective dunes maintain a barrier between elevated water levels and waves and the Town's infrastructure. They are vulnerable to erosion due to tropical storms, hurricanes, and other periods of elevated water levels and waves. Dune growth is promoted by existing Town projects as described in Section 1.2.2, but dedicated projects may be needed to augment existing dunes or repair dunes impacted by storms.

The next most vulnerable assets (score of 4 or 3) include water bodies and wetlands surrounding the Town as well as a number of the water and wastewater infrastructure elements. The wetlands and water bodies surrounding the Town serve to buffer the effects of tropical storms and hurricanes, damping the effects of storm surges. However, these water bodies can be impacted by runoff and potential water quality impacts. Water quality in surrounding natural areas can also be impacted by the stormwater and sewer infrastructure being compromised due to flooding and/or power outages. Sewer pump stations have control panels at grade and need to be pumped out with generators during power outages. This ensures that the sewer system does not cause overflow pollution of the adjacent high quality water bodies (classified as SA/HQW (Market Shellfishing, Tidal Salt Water/High Quality Waters) by the NC Division of Environmental Quality.) The Town has been working on a plan to elevate the pump station control panels and obtain additional generators to support these efforts. A number of roadways are also vulnerable to multiple sources of flooding in several locations near the canals and east and west ends of the island. Potential solutions to these issues include construction of living shorelines on the estuarine shorelines and potential dune infiltration projects where flooded roads are located near the ocean side shorelines. Public beach access vulnerability is also linked to the protective dune vulnerability, with those locations being identified as critical access for emergencies as well as important in supporting the Town's tourism.



Example #5 (Page 4/4):

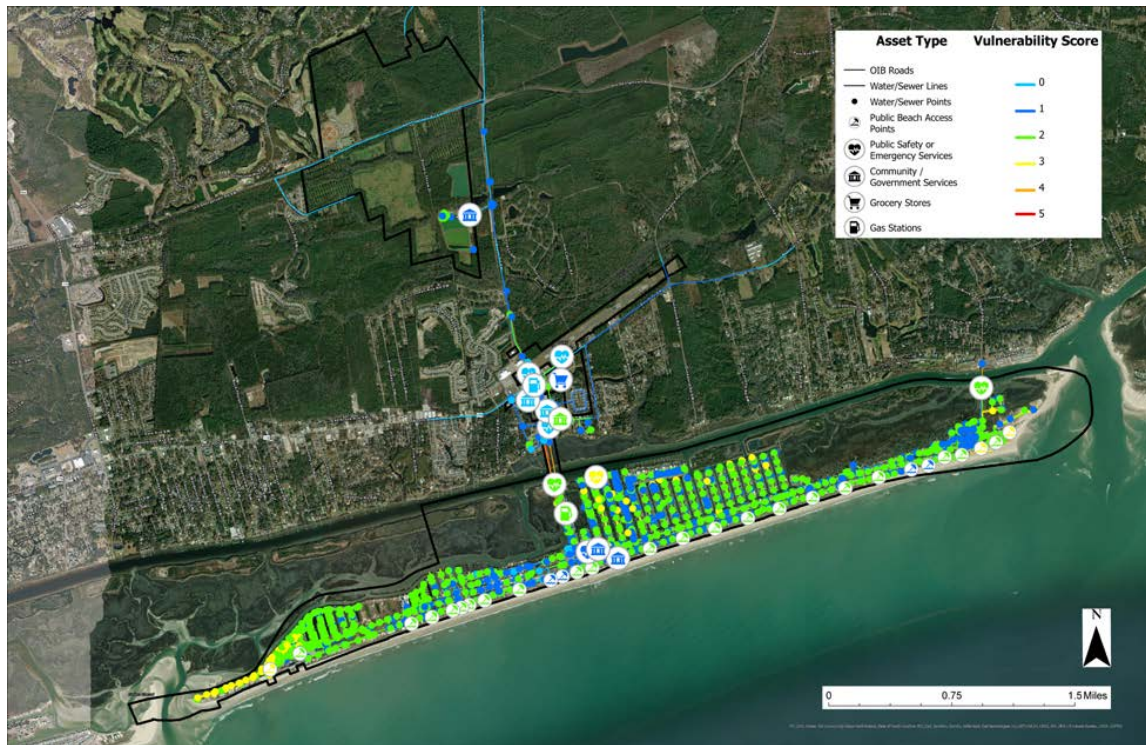


Figure 11. Map of critical assets in the Town of Ocean Isle Beach and their overall vulnerability scores.

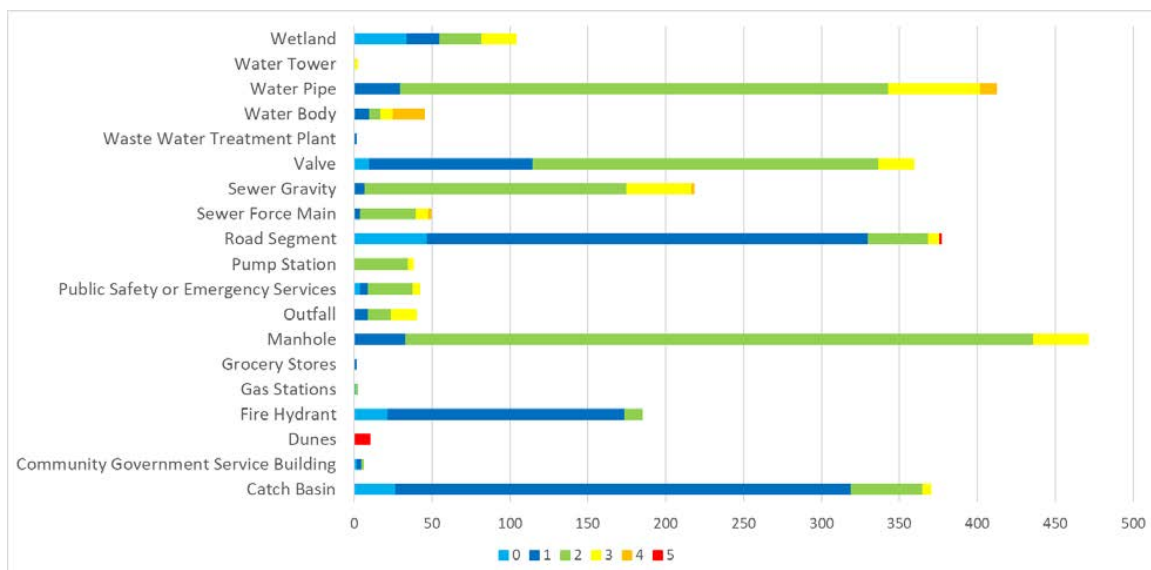


Figure 12. Critical assets in the Town of Ocean Isle Beach with distribution of vulnerability scores.

Phase 2: Planning, Project Identification, and Prioritization

Step 1: Identifying A Suite of Potential Solutions



THE FOLLOWING TOOLS CAN ASSIST WITH THE PROJECT DEVELOPMENT PROCESS:

1.) N.C. Division of Coastal Management (DCM)

- a. Resource: [Resiliency Strategy Posters](#) (Direct Download)

Description: The Division of Coastal Management created this resource to clarify project types and resiliency strategies, supporting discussions with stakeholders, community partners, and Community Action Teams.

- b. Resource: [NC Coastal Community Resiliency Guide](#) (Case Studies and Examples)

Description: This interactive Story Map is designed to walk users through the key steps and questions required for effective community-level resiliency planning. It provides case studies and example projects that could be used in a resiliency plan.

2.) United States Global Change Research Program

Resource: [US Climate Resilience Toolkit](#) (Case Studies Section – Southeast Region)

Description: The US Climate Resilience Toolkit explores different case studies from across the nation that tackle building resilience in their communities. This is a good resource for project examples, especially those that pertain to North Carolina's communities and resources.

3.) U.S. Environmental Protection Agency (USEPA)

Resource: [Smart Growth Fixes for Climate Adaptation and Resilience](#) (Chapter 3; Pgs. 11-28)

Description: The policy options in this publication offer short- and long-term benefits—environmental, economic, health, and societal—that help communities prepare for climate impacts while enhancing daily life.



EXPLORE THE FOLLOWING RESOURCES FOR GUIDANCE ON DEVELOPING NATURAL/NATURE-BASED AND HYBRID SOLUTIONS:

1.) Federal Emergency Management Agency (FEMA)

Resource: [Building Community Resilience with Nature-Based Solutions](#) (Pgs. 4-8)

Description: This guide helps communities identify and leverage resources to implement nature-based solutions. It also offers a working definition of nature-based solutions and provides case studies.

2.) Naturally Resilient Communities

Resource: [Using Nature to Address Flooding](#)

Description: This guide shows what nature-based solutions may work best for specific hazards and provides additional case studies of successful projects.

3.) N.C. Division of Coastal Management (DCM)

Resource: [NC Coastal Community Resiliency Guide](#) (Case Studies and Examples)

Description: This interactive Story Map is designed to walk users through the key steps and questions required for effective community-level resiliency planning. It provides case studies and example projects that could be used in a resiliency plan.

4.) National Oceanic and Atmospheric Administration (NOAA)

Resource: [Green Infrastructure Practices & Benefits Matrix](#)

Description: CREST is used to make informed decisions about the siting of coastal restoration and resilience projects. This tool can help you analyze project sites, determine where a site should go, and provide you with a basic regional assessment.

5.) Georgetown Climate Center

Resource: [Green Infrastructure Toolkit](#)

Description: The Green Infrastructure Toolkit can help communities identify and deploy green infrastructure approaches.

6.) U.S. Environmental Protection Agency (USEPA)

Resource: [Climate Ready Estuaries Synthesis of Adaptation Options](#)

Description: This guide outlines key climate impacts on estuaries and explores adaptation options for coastal managers, detailing climate stressors and potential solutions.

7.) World Bank Group

Resource: [Integrating Green and Gray: Creating Next Generation Infrastructure](#) (Pgs. 19-25, Figure 1.6, Table 1.1)

Description: This report discusses how to integrate nature into mainstream infrastructure systems. It reviews approaches and examples of integrating green infrastructure into mainstream project appraisal processes and investments.

8.) NC Wildlife Resources Commission

Resource: [NC Model Natural Resources Conservation Ordinance and Incentives Guide](#) (Pgs. 14-21; Coastal Plain)

Description: This guide provides model language to assist local governments, especially those in coastal North Carolina, to amend their land development regulations through incentives instead of requirements.



THE FOLLOWING RESOURCES MAY ASSIST WITH FLOODPLAIN/ STORMWATER MANAGEMENT:

1.) City of Charlotte, NC

Resource: [Flood Risk Assessment and Reduction Community Guidebook](#)

Description: This guidebook offers a data-driven framework to assess flood hazards and risks in North Carolina, prioritize actions to mitigate those risks, and track successes over time. There is broad applicability to the RCCP process throughout.

2.) Environmental Law Institute and UNC Institute for the Environment

Resource: [Floodplain Buyouts: An Action Guide for Local Governments](#)

Description: This is a guide for thinking through available management options that maximize the benefits of floodplain acquisition programs and for considering challenges before they arise.

3.) National Oceanic & Atmospheric Administration (NOAA)

a. **Resource:** [Adapting Stormwater Management for Coastal Floods](#)

Description: This guide explains the benefits of stormwater management, covering risk management, adaptive techniques, relevant policies, funding sources, and case studies.

b. **Resource:** [Sharing Stories and Improving Discussions About Floodplain Buyouts](#)

Description: A case study on why talking about flood risk and mitigation processes is important.

4.) NC Coastal Federation

- a. Resource: [Watershed Restoration Planning](#) (Ch. 7, Pgs. 110- 120)

Description: The Watershed Management Planning Guidebook provides a framework for developing watershed management plans that maintain, restore, and protect surface water quality. It discusses Best Management Practices (BMPs) and Low-Impact Development (LID) techniques.

- b. Resource: [Low-Impact Development for the North Carolina Coast Fact Sheet](#)

Description: This factsheet explains what low-impact development is and why it is useful while also providing concrete examples of LID strategies.



THE FOLLOWING RESOURCES MAY BE HELPFUL IF YOUR COMMUNITY IS A PROGRAM PARTICIPANT IN THE NATIONAL FLOOD INSURANCE COMMUNITY RATING SYSTEM:

1.) National Oceanic & Atmospheric Administration (NOAA)

Resource: [Digital Coast Partner Tools for the Community Rating System](#)

Description: When communities reduce flood risk, the Federal Emergency Management Agency (FEMA) can offer discounts on flood insurance premiums for policyholders. Participant communities in FEMA's Community Rating System receive credits to determine the amount. One way to earn credits is by preserving floodplains. This "how-to" provides a step-by-step approach for earning this credit (CRS Activity 420) in areas that are already protected. It also identifies places where additional credit could be achieved through future preservation efforts.

2.) The Nature Conservancy (TNC)

Resource: [Coastal Resilience Application](#)

Description: The Nature Conservancy's coastal resilience application provides an online decision support tool to help address the effects of climate change and natural disasters. It provides a mapping portal that looks at case studies of resiliency across the nation and internationally.

3.) Association of State Floodplain Managers

Resource: [CRS Green Guide](#)

Description: The purpose of the CRS Green Guide is to highlight 25 of the 94 elements in the 2017 CRS Coordinator's Manual, which have beneficial impacts beyond flood risk reduction and can help reduce your community's flood insurance premiums. A "profile" of each "Green" CRS element was written to share local insights, best practices, useful tools and resources, and challenges associated with implementing that element.



EXPLORE THE FOLLOWING TO LEARN MORE ABOUT HOW TO INTEGRATE RESILIENCE INTO POST-DISASTER RECOVERY AND REDEVELOPMENT:

1.) Federal Emergency Management Agency (FEMA)

Resource: [Pre-Disaster Recovery Planning Guide for Local Governments](#) (PGS. 11-20)

Description: This guide is designed to help local governments work with community stakeholders to develop a recovery plan that includes recovery roles and capabilities, organizational frameworks, and specific policies and procedures. It follows the strategy in FEMA's Comprehensive Preparedness Guide.

2.) Florida Department of Economic Opportunity

Resource: [Post-Disaster Redevelopment Planning Guide](#) (Ch. 2, Pgs. 7-20; Ch. 4, Pgs. 50-56)

Description: This resource is an updated addition to the Post-Disaster Redevelopment Planning: A Guide for Florida Communities guidebook. This resource is helpful for communities to see how a wide range of adaptation strategies can be used in the face of post-disaster redevelopment.

3.) American Planning Association (APA)

Resource: [Planning for Post-Disaster Recovery: Next Generation](#)

Description: The American Planning Association's recent report provides updated policies and procedures for planners addressing natural disasters like floods, earthquakes, and hurricanes. It explores the benefits and limitations of disaster planning, featuring case studies from both large cities and small towns. This resource also provides a deeper dive into the APA's post-disaster recovery research with **briefing papers** that are more succinct and digestible for the general public.

Please note: this tool requires a free account to access

4.) Georgia Department of Natural Resources

Resource: [Post-Disaster Recovery & Redevelopment Planning Guide](#)

Description: The Georgia Coastal Management Program (GCMP) completed a document to guide the coast in community redevelopment after a significant natural disaster. This guide addresses issues related to coastal storms, sea-level rise, and marine debris hazards. This document can be used as a model for communities trying to engage in similar work.

5.) American Planning Association (APA)

Resource: [Model Pre-Event Recovery Ordinance](#)

Description: This is model language for a recovery ordinance that towns may use.

8 RESILIENCE PROJECT PORTFOLIO

8.1 OVERVIEW

The project portfolio presented here is the culmination of the resilience strategy planning process, which was designed to help identify and implement tangible actions and policies that will improve resilience in Edenton.

To develop the project portfolio, the key findings from the vulnerability assessment and the review of existing plans and efforts were used to create an initial list of resilience strategies that could address the specific issues highlighted in asset evaluation as well as key takeaways from CAT and public input. The CAT worked together to refine this list and create resilience projects that support the plan objectives and reflect the Edenton's resilience needs.

The Town's planning consultant helped CAT members consider a variety of approaches to building resilience, including policy and regulations, local and regional planning, infrastructure projects, nature-based solutions, hybrid structural and nature-based solutions, capacity building, and education, awareness, and incentive programs. The CAT was also encouraged to consider ways to align projects with the risk assessment findings and the plan goals. The CAT discussed the following factors which were considered throughout the strategy development process to determine whether a potential project would be appropriate and feasible for inclusion in the project portfolio:

- **Comprehensive:** The project portfolio should support several approaches to resilience (nature-based solutions, structural projects, policy, capacity building, etc.).
- **Support Goals:** Projects should reflect plan goals and meet the unique needs of the town and its residents.
- **Capability:** Projects should support existing functions, capabilities, and funding opportunities.
- **Specific:** Projects should be specific and clear.
- **Timeline for Implementation:** The project portfolio should address short-term and long-term needs.
- **Priorities:** Projects should address the most at risk locations, assets, and populations.

The CAT also discussed plan integration and opportunities for resilience projects to complement actions and projects already identified in the Town's network of plans. Strategies from the Town's Greenways and Open Space Plan, the RENA report, and the Chowan County Hurricane Matthew Resilient Redevelopment Plan were considered for inclusion in the resilience project portfolio.

After evaluating a variety of strategies and their feasibility, the CAT consolidated the project list and prioritized the selected projects. Community feedback was sought through a second public workshop to help prioritize projects and ensure the project portfolio met the community's goals.

8.2 RESILIENCE PROJECTS CONSIDERED

Table 8.1 presents a summary of resilience projects that the CAT discussed and considered for inclusion in the project portfolio. These projects were based on the findings of the risk and vulnerability assessment as well as relevant project ideas documented in the RENA and the Hurricane Matthew Resilient Redevelopment Plan.

Example #6 (Page 2/4):

Table 8.1 – Draft Resilience Projects

DRAFT STRATEGY	RELATED ASSETS	STRATEGY AREA
Update and replace drainage infrastructure in downtown Edenton along Court Street.	Swain Apartments, Chowan Senior Center, historic districts, vulnerable populations	Infrastructure
Conduct maintenance to restore the constructed wetland along Filberts Creek. Undertake design and construction to expand this wetland.	ECU Health Chowan Hospital, Edenton House, wetlands, parks	Nature-Based Solutions
Update and expand bulkheads in known erosion areas, particularly along Water Street.	Roanoke River Lighthouse, Barker House, historic districts, wetlands, parks	Infrastructure
Construct a living shoreline along the waterfront that extends to Sunfish Park and into Queen Anne Creek.	Roanoke River Lighthouse, Barker House, historic districts, wetlands, parks	Nature-Based Solutions
Implement stormwater improvements to address drainage concerns along Robin Lane.	Edenton National Fish Hatchery	Infrastructure
Improve communication and collaboration with North Edenton Community.	Vulnerable populations	Education, Awareness, and Incentives
Promote development of trails and greenways in flood prone unbuilt areas.	Wetlands, parks	Local Policy and Regulations
Inventory the Town's stormwater infrastructure (inlets, pipe size, inverts, type of pipe direction of flow) so there is a complete GIS file of the stormwater system.	Critical assets, historic and cultural assets, vulnerable populations	Education, Awareness, and Incentives
Preserve empty waterfront property as natural open space.	Wetlands, parks	Local Policy and Regulations
Replace the culvert on Filberts Creek.	ECU Health Chowan Hospital, Edenton House, wetlands, parks	Infrastructure
Install tree islands on the bay side of the bulkheads, to reestablish bald cypress trees, which provide aesthetic value and protect against wave action.	Roanoke River Lighthouse, Barker House, historic districts, wetlands, parks	Nature-Based Solutions

8.3 PRIORITIZATION

To begin project prioritization, Edenton used a resilience scorecard developed by WSP that evaluates projects based on resilience criteria that a project should address, co-benefit impacts that a project can potentially provide, and considerations for ease of project implementation. The scorecard evaluates projects across three categories—Effectiveness, Implementation, and Benefits—to determine if one resilience project might be more important, more effective, or more likely to be implemented than another.

Example #6 (Page 3/4):

- **Effectiveness:** this category considers a project’s ability to withstand shocks and stressors, whether it will provide long-term benefits, and its ability to be replicated or expanded.
- **Implementation:** this category considers the feasibility of project implementation, alignment with other town planning initiatives, and potential obstacles.
- **Benefits:** this category assesses the project’s ability to provide overall benefits to the town, including quality of life for residents, environmental quality and protection, and economic growth.

The resilience scorecard, including the performance criteria within each category, is detailed in Table 8.2.

Table 8.2 – Resilience Scorecard

	CRITERIA	DESCRIPTION / GUIDING QUESTIONS
Effectiveness	Resilient	Is the project itself able to withstand identified hazards and stressors?
	Redundant	Does the project reduce/avoid service interruptions?
	Sustainable	Does the project provide long-term benefits and minimize future mitigation needs?
	Scalable	Can the project be expanded or duplicated if successful? Does this project enable future project implementation?
	Targeted	Does the project benefit high or moderate vulnerability assets?
Implementation	Feasible	Can the strategy be implemented with existing administrative and technical capabilities?
	Supported	Does the strategy have political and public support?
	Integrated	Does the strategy align with other town planning goals and projects?
Benefits	Cost-Beneficial	Do the benefits of the projects outweigh the costs?
	Social Benefits	Does the strategy increase equity within the Town?
	Economic Benefits	Does the strategy support the local economy?
	Environmental Benefits	Does the strategy protect existing natural systems and resources?

Each resilience project is rated as negative, neutral, or positive for each of the criteria listed in Table 8.2.

- **Negative** (-1 point) = the project opposes the criteria (i.e. costs outweigh benefits, the project contradicts existing plans or policies, there is public or political opposition, etc.)
- **Neutral** (0 points) = the criteria are not relevant to the project, or the pros and cons are balanced
- **Positive** (1 point) = the project meets or provides benefits within the criteria

Points for each the criteria are grouped and totaled for each of the three categories (effectiveness, implementation, and benefits) to provide a summary rating for each category and an overall prioritization score. For example, a resilience project could receive an Effectiveness score between 5 and -5 and an overall resilience score between 12 and -12. Strategies with resilience scores between 9 and 12 are considered high priority strategies, those with scores between 6 and 8 are medium priority, and those with scores of 5 or lower are low priority.

Project scores from the resilience scorecard were compared with public and stakeholder input, received at the final public workshop and through an online project poll, to ensure project prioritization aligned with community preferences. Preliminary prioritization results were presented to the CAT for final consensus.

Example #6 (Page 4/4):

Results of the resilience scorecard prioritization are presented in Table 8.3 below.

Table 8.3 – Resilience Scorecard Results

ACTION	PRIORITY	TOTAL	EFFECTIVENESS			IMPLEMENTATION			BENEFITS			RESILIENT			REDUNDANT			SUSTAINABLE			SCALABLE			TARGETED			FEASIBLE			SUPPORTED			INTEGRATED			COST-BENEFICIAL			SOCIAL BENEFITS			ECONOMIC BENEFITS			ENVIRONMENTAL BENEFITS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

In addition to the resilience scorecard, the CAT conducted an informal cost-benefit analysis for each project to support decision-making on project prioritization and implementation. The cost-benefit analysis ratings are provided in the project portfolio and are based on the following criteria from the RCCP Planning Handbook:

BENEFIT		COST	
High	Action would have a significant impact on risk reduction.	Existing funding is not adequate.	
Medium	Action would have an impact on risk reduction.	Requires budget reappropriation or amendment.	
Low	Long-term benefits are difficult to quantify in the short-term.	Funding available under the existing budget.	

Source: RCCP Planning Handbook

Step 2: Consolidate and Prioritize Projects



EXPLORE THE FOLLOWING TOOLS AND RESOURCES TO INCLUDE:

Colorado Resiliency Office

Resource: [Colorado Resiliency Playbook](#) (Ch 4, Pgs. 24-26 & Attachment 6)

Description: This playbook is Colorado's guide to resiliency planning. Chapter 4 and Attachment 6 detail how to develop a project that integrates resilience and presents questions to help guide communities through project prioritization.

NC Department of Environmental Quality (NCDEQ)

Resource: [Funding & Assistance for Coastal Resilience](#)

Description: Thinking in terms of adaptation and resilience can help communities connect the dots to achieve multiple goals simultaneously by leveraging multiple funding sources and types of assistance. This resource will help communities understand the need for variety in their funding sources.

National Oceanic & Atmospheric Administration (NOAA)

- a. Resource: [What Will Adaptation Planning Cost? An Economic Framework for Coastal Community Infrastructure](#) (Pgs. 21-44)

Description: This framework guides communities in evaluating options for adapting infrastructure to make it more resilient while also considering the importance of making economically informed decisions. It leads communities through a scenario-based approach to understanding the full range of costs and benefits.

- b. Resource: [A Guide to Assessing Green Infrastructure Costs and Benefits for Flood Reduction](#)

Description: This guide aims to provide a process that communities can use to assess the costs and benefits of green infrastructure to reduce flooding.

- c. Resource: [Assessing the Feasibility of Adaptation Options](#)

Description: The purpose of this aid is to provide guidance and suggestions to help facilitate the decision-making process on adaptation options.



Resilient Coastal
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Planning Handbook

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