N.C. Division of Coastal Management
Resilience Initiatives
and
Resilient Coastal Communities Program

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NCBIWA Conference 11/9/20
Coastal Resilience Initiative

• DCM Coastal Resilience Pilot Project
• Regional Resilience Workshops
• DCM Coastal Community Resiliency Guide
• N.C. Climate Risk Assessment & Resilience Plan (Executive Order 80)
• State Legislature and NFWF Funding
Building Coastal Resilience in North Carolina

A pilot project by the North Carolina Division of Coastal Management
Building Coastal Resilience in North Carolina

Pilot Communities

- Edenton
- Duck
- Kill Devil Hills
- Hatteras
- Oriental
- Pine Knoll Shores
Building Coastal Resilience in North Carolina

Working Together on Coastal Resilience
Coastal Adaptation and Resiliency

What is coastal resilience and why does it matter?

Building coastal resilience in a community generally means ensuring all members and systems within it can better withstand major events and long-term stressors in a way that helps meet larger community goals. There is no one-size fits all answer because every community is unique. Learn more by exploring the Frequently Asked Questions (FAQs).
**Coastal Community Resilience Guide**

- **Hazard Forecasts**
  Explore short-term (e.g., tides, river flooding, coastal storm surge) and long-term (e.g., sea level rise) predictions for your region.

- **Adaptation Examples**
  Discover new ideas and types of structural and non-structural adaptations being implemented in North Carolina and beyond.

- **Tools**
  Understand hazards risk, conduct a community-wide assessment or planning process, and use mapping applications to aid decision-making.

- **Data**
  Explore and download data to guide

- **Planning and Policy**
  Learn from others and ensure

- **Funding and Assistance**
  Find out how to fund adaptation
Introduction

Welcome to the North Carolina Coastal Communities Resilience Guide! To get started, please scroll down to view or select the sections below that further describe how to use this interactive guide:

- Navigating the guide
- Purpose
- Intended audience
- What to look for
- About this guide
Step #1: Establish Context and Expectations

The Town's CASLRC prioritizing actions to build resilience that were identified during VCAPS process through a dot-voting exercise (Source:
Step #2: Assess Vulnerability and Risk

Source: Town of Edenton RENA Community Asset Mapping

Other Tools for Mapping &
Step #3: Identify Adaptation Strategies

Examples of Nature-based Solutions

- **Moving People Out of Harm’s Way: Property Buyouts**
  - Property Buyouts are a set of strategies to which communities can remove development from...

- **Waterfront Parks**
  - Waterfront parks are communal recreational spaces that are intentionally designed to be...

- **Living Breakwaters**
  - Breakwaters are offshore structures designed to limit wave energy by creating a...

- **Horizontal Levees**
  - A horizontal levee consists of a hardened structure (levee) built up from the...

- **Rain Gardens**
  - Rain gardens are planted basins which have several key purposes including, increasing...

- **Living Shorelines**
  - Living shorelines are a suite of shoreline erosion control techniques that combine...
Case Studies and Examples

See the four categories below for various case studies and examples describing resiliency strategies or projects pursued by communities in coastal North Carolina. See the "Submit a Case Study" tab to add additional examples!
North Carolina
Coastal Resilience Summit
June 11-12th at the Havelock Tourist & Event Center

Keynote Address
A Post-Event Review of Hurricane Florence in North Carolina: Lessons Learned
Rachel Norton, Researcher & Lead Author
ISET International & Zurich Flood Resilience Program

Register: www.nccoastalmanagement.net
Recipe for Resilience:
• Dr. Jess Whitehead, N.C. Sea Grant*

Managing & Measuring Change Part 1:
• Anne-Marie Knighton, Town of Edenton
• Holly White, Town of Nags Head
• Daniel Brinn, Hyde Soil and Water Conservation District

Managing & Measuring Change Part 2:
• Dr. Reide Corbett, Coastal Studies Institute/ECU
• Dr. Jared Bowden, SE Climate Adaptation Science Center at NC State
Recipe for Resilience:
- Dr. Jess Whitehead, N.C. Sea Grant*

Managing & Measuring Change Part 1:
- Andrea Correll, Town of Swansboro
- Jeremy Hardison, Town of Carolina Beach
- Gary McSmith, Cape Fear Public Utility Authority

Managing & Measuring Change Part 2:
- Dr. Larry Cahoon, UNC-Wilmington
- Dr. Jared Bowden, SE Climate Adaptation Science Center at NC State
Question #3: How can the state better support communities in addressing climate hazard risks and impacts?

- Provide a one-stop-shop for resiliency resources (data, training, funding, templates, BMPs)
- Show State leadership as example for communities to address difficult topics
- Implement a uniform resiliency planning framework
- Streamline hazard mitigation programs
- Provide more regional training and staff support on resiliency/climate adaptation
- Incentivize resilient best practices (streamlined permitting, tax and financial incentives)
- Help communities identify resilient redevelopment strategies before a disaster, to be prepared to recover stronger
- Create a Clearinghouse of benefit-cost analyses, long-term ROI fast facts, or matrix of green-gray infrastructure solutions
Chapter 7(E). Priority Resilience Initiatives

- 1. Manage and coordinate statewide resilience
- 2. Convene a dedicated Interagency Resilience Team
- 3. Continue resilience efforts through the NC Climate Change Interagency Council
- 4. Establish the North Carolina Resilient Communities Program

**Build local capacity** for vulnerability assessments, planning and project development, and implementation

**Provide technical assistance** for resilience planning, vulnerability assessments, and project/program identification and design

**Supply funds** to plan and implement resilience projects and programs
Program
Scope
Guiding Principles

- Increase local capacity and capability for resilience planning and implementation
- Incentivize a data and community-driven process
- Provide tools to address support vulnerable populations
- Reduce costs to communities
- Meet communities where they are
Program Objectives:

- Address barriers to coastal resilience at the local level
- Assist communities with risk & vulnerability assessments
- Help communities develop portfolio of well-planned and prioritized projects
- Advance priority projects to “shovel-ready” status
- Link communities to funding streams for project implementation.
Program Phases

PHASE 1
Quantitative & Qualitative Risk Assessment

PHASE 2
Planning, Project Selection, and Prioritization

PHASE 3
Engineering & Design

PHASE 4
Implementation
Community Action Teams

- One per participating locality
- **Members:** Contractors, RCCP representatives, local staff and elected officials, resource managers, community leaders
- **Role:** actively participate in process with contractors
Engaging Communities

• Engage community members, including historically underrepresented populations

• Three key areas to seek input:
  • Quantitative assessment results
  • Qualitative risk assessment
  • Project identification

• Flexible format
Risk Assessment Overview

- Quantitative and Qualitative assessment
- Characterize vulnerability and evaluate risks primarily to flooding hazards
- Flexibility in process, consistency in products

STEP 1: Identify Hazards
STEP 2: Map Assets
STEP 3: Assess Vulnerability
STEP 4: Estimate Risk
STEP 4: Identify and Prioritize Highest Risks
Identify Hazards

PHASE 1

- Assess risks to the following **flood hazards**:
  - Storm surge
  - Heavy-intensity rainfall flooding
  - Tidal flooding
  - Sea Level Rise (minimum 30 years)
    - Can choose scenario
- Hazards that may need to be included:
  - Riverine flooding
  - Subsidence
  - Erosion
PHASE I

Map Community Assets

- Public facilities
- Critical infrastructure
- Vulnerable populations
- Economic & Natural resources
Assessing Vulnerability

3 main components:
- Exposure
- Sensitivity
- Adaptive capacity

PHASE I

Potential Impact

NWF 2014

NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCE

NCORR
Evaluating Risk

- Economic risk: Estimate cost of inaction under different scenarios
  - Direct and indirect costs

Risk Characterization Matrix

<table>
<thead>
<tr>
<th>Probability of a loss</th>
<th>Magnitude of (potential) loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Very High</td>
<td>Very High</td>
</tr>
</tbody>
</table>

Relative Risk

- Low
- Medium
- High
- Very High

PHASE 1

US Climate Resilience Toolkit
Developing Solutions

PHASE 2

• Types of Potential Solutions:
  • Infrastructure and Nature-Based Solutions
  • Local Policy and Regulation
  • Local and Regional Plans
  • Education, Awareness, and Incentives
## Natural Infrastructure / Nature-based Solutions

<table>
<thead>
<tr>
<th>WATERSHED / REGIONAL</th>
<th>COMMUNITY / SITE</th>
<th>COASTAL FOCUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Land conservation</td>
<td>• Rain gardens</td>
<td>• Coastal wetlands</td>
</tr>
<tr>
<td>• Wetland restoration and protection</td>
<td>• Green roofs</td>
<td>• Dunes</td>
</tr>
<tr>
<td>• Floodplain restoration</td>
<td>• Permeable pavement</td>
<td>• Living shorelines</td>
</tr>
<tr>
<td>• Greenways</td>
<td>• Tree trenches</td>
<td>• Oyster reefs</td>
</tr>
<tr>
<td>• Stormwater parks</td>
<td>• Vegetated swales</td>
<td>• Waterfront parks</td>
</tr>
<tr>
<td></td>
<td>• Rainwater harvesting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tree canopy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Green streets</td>
<td></td>
</tr>
</tbody>
</table>

**WATERSHED / REGIONAL**
- Land conservation
- Wetland restoration and protection
- Floodplain restoration
- Greenways
- Stormwater parks

**COMMUNITY / SITE**
- Rain gardens
- Green roofs
- Permeable pavement
- Tree trenches
- Vegetated swales
- Rainwater harvesting
- Tree canopy
- Green streets

**COASTAL FOCUS**
- Coastal wetlands
- Dunes
- Living shorelines
- Oyster reefs
- Waterfront parks

[Image: Natural Infrastructure / Nature-based Solutions]
PHASE 2

Promoting Integration

- Hazard Mitigation Plans
- CAMA Land Use Plans
- Hurricane Matthew Resilient Redevelopment Plans
- Floodplain Management Plans
- Stormwater or Watershed Plans
- Open Space Plans
- Comprehensive Plans
- Universal Development Ordinances and/or Subdivision Ordinances
Prioritizing Projects

• Resilience Prioritization Criteria Assessment Tool (being adapted from Colorado Resiliency Playbook)

• Considers following aspects of each project:
  • Urgency
  • Adaptive capacity
  • Co-benefits
  • Economic benefit-cost
  • Risk and vulnerability
  • Social equity
  • Sustainability
  • Ability to harmonize with existing activities
  • Innovation
  • Technical soundness
Resilience Strategy

- Phase 1: Risk & Vulnerability Assessment
  - Assessment table cataloging qualitative and quantitative data
  - Quantitative products developed using ArcGIS

- Phase 2: Project Portfolio
  - Planned and ranked using prioritization criteria provided by DCM
Program Curriculum

- Guidance for contractors and communities
- Checklist of program requirements
- Guides process while allowing flexibility
- Details existing tools and resources to utilize
- Provides consistency in products

PHASES 1 & 2
Engineering, Design, & Implementation

No-match grants to local governments

- PHASE 3: Engineering and Design
- PHASE 4: Implementation
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>November 2</td>
<td>Invitations to Apply issued to eligible communities</td>
</tr>
<tr>
<td>November 16</td>
<td>Contractor Request for Applications released</td>
</tr>
<tr>
<td>January 15, 2021</td>
<td>Applications due from communities</td>
</tr>
<tr>
<td>January 29, 2021</td>
<td>Applications due from contractors</td>
</tr>
<tr>
<td>February 2021</td>
<td>Up to 20 communities selected to complete questionnaire</td>
</tr>
<tr>
<td>February 2021</td>
<td>Contractors selected</td>
</tr>
<tr>
<td>March 2021</td>
<td>Questionnaire due from communities</td>
</tr>
<tr>
<td>March 2021</td>
<td>Match contractors and communities</td>
</tr>
<tr>
<td>April 2021</td>
<td>Phase 1 and 2 contracts finalized, work begins</td>
</tr>
<tr>
<td>December 2021</td>
<td>Resilience Strategies due; Phase 1 and 2 contracts expire (8 mos)</td>
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**NFWF TIMELINE**

**2020-2023**

**Program Development**

**Q1**
Phase 1 & 2 Applications / RFPs

**Q2**
Communities & Contractors Selected

**Phase 1**

**Q3**
Phase 3 & 4 Applications

**Q4**
Phase 3 & 4 Projects Selected

**Phase 2**

**Q5**
Phase 3 & 4 Resilience Strategies due

**Q6**
Phases 3 & 4 Contracts Expire

**Q7**
Projects Finalized

**Q8**

**Q9**

**Q10**

**Q11**

**Q12**

**FY 2020**

**FY 2021**

**FY 2022**

**FY 2023**

**NCORR**

**NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCE**
Direct, non-financial technical assistance

- Community application period NOW OPEN

Funding to provide technical assistance

- Private contractors, COGs, universities, NGOs submit response to Request for Applications (coming soon)
Selection Process

PHASES 1 & 2

- **Primary contractor selection criteria:**
  - Qualifications, previous experience, cost-effectiveness
- **Primary community selection criteria:**
  - 1 per county, subject to interest
  - Level of assistance needed
- Contractors and communities will be matched
- Contracts administered by DCM
Program Webinars

2 Local Government Webinars
225 participants

1 Contractor Webinar
40 participants
Please contact RCCP@ncdenr.gov with any questions! Thank you!