



NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCY

North Carolina
**RESILIENT
COASTAL
COMMUNITIES
PROGRAM**



INTERACTIVE WEBINAR

August 18th, 2020

Regional Resilience Workshops and Summit Follow-up

**Tancred Miller, *Policy & Planning Section Chief*
NC Division of Coastal Management
August 18th, 2020**





May 2nd
Northeast
Regional
Resilience
Workshop

June 11-12th
Coastal Resilience
Summit

May 14th
Havelock, NC
Southeast Regional
Resilience Workshop



North Carolina



Eastern Carolina Council



CAPE FEAR
 COUNCIL OF GOVERNMENTS

Albemarle-Pamlico

National Estuary Partnership



North Carolina
 Coastal Federation
Working Together for a Healthy Coast



UNC
 SCHOOL OF GOVERNMENT



June 11-12

NORTH CAROLINA COASTAL RESILIENCE SUMMIT

Havelock, North Carolina

nccoast.org/resilience

Goals:

- **Inform the development of the NC Coastal Climate Risk Assessment and Resilience Plan**
- **Support understanding and preparedness for short- and long-term hazards affecting communities**
- **Showcase a range of existing solutions to address identified challenges**

North Carolina Coastal Resilience Summit

Panel Topics:

- The Relationship of Climate Change to Coastal Hazard Risk
- Resilient Tourism-Based Coastal Communities
- Strengthening our Roots: Natural & Working Lands
- Military Strategies and Perspectives
- Climate Ready & Productive Estuaries
- Resilience for ALL During Long-Term Recovery
- Helping Nature Help Us
- Smart Critical Systems and Built Environment
- Resilience Innovations: Financing Opportunities
- Building Partnerships for Success



Northeast Regional Resilience Workshop

May 2nd, 2019

Elizabeth City

The Carolina Center

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**



Southeast Regional Resilience Workshop

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**

May 14th, 2019

Wilmington

Holiday Inn at Market Street



The State is developing a Climate Risk Assessment and Resiliency Plan for 2020. What are the key issues or topics you think it should address?



Question #1: How is your community affected by natural hazards & long-term stressors?

**natural
environment**

**infrastructure &
built environment**

**vulnerable
populations
& social systems**

**economic
drivers**



Question #1: How is your community affected by natural hazards & long-term stressors?

**natural
environment**

- Salt-water intrusion
- Prolonged flooding and runoff
- Harmful algal blooms and septic issues
- Length of time for forest recovery
- Storms removing beach nourishment
- Degraded ecosystem services
- Shoreline/riverine erosion
- Water quality degraded from runoff
- Shoaling
- Drainage ditches inadequate



Question #1: How is your community affected by natural hazards & long-term stressors?

infrastructure & built environment

- Sewer and wastewater system failures
- Rising water table threatens septic viability
- Reliance on ocean outfalls for stormwater
- Road/highway damage & disruption
- More impervious increases flooding
- Capital budgets not designed to handle full replacement
- Retrofitting more challenging in rural communities
- Transportation design standard inadequate
- Focus is on rebuilding quickly, not stronger



Question #1: How is your community affected by natural hazards & long-term stressors?

**vulnerable
populations
& social systems**

- Communicating risks to non-permanent residents, absentee owners, & new buyers
- Preserving tax base through elevations
- Housing loss: pressure on receiving counties
- Communications during power loss
- Physical and psychological impacts may be 'under the radar'
- Complexity of recovery assistance framework more challenging to navigate for socially vulnerable



Question #1: How is your community affected by natural hazards & long-term stressors?

economic drivers

- Lower tax value for repetitive loss properties
- Lost occupancy taxes
- Fisheries & agricultural losses = higher prices
- Workforce displacement
- Higher insurance, utilities, & housing costs
- Community aesthetics and mood affected
- Loss of “safe” areas for development
- Funding streams get backlogged during recovery



Question #2: What are some potential strategies?

**infrastructure
and
nature-based
solutions**

**local and
regional plans**

**policy and
regulation**

**education,
awareness &
incentive
programs**



Resilience Strategy Posters

Local and Regional Plans

- Description:** 20- to 30-year planning horizon, leading to development of community goals by guiding future growth, development, and land use. Includes significant public engagement.
- Requirement:** Yes, for Coastal Area Management Act (CAMA) communities per 15A NCAC 02B.
- Resilience Connection:** Can provide future, public engagement/education and policy guidance. Taking hazard mitigation, flood risk management, sea level rise projections, and other items necessary to support development of regulations, higher standards, and response programs.

Capital Improvements Plan (CIP)

- Description:** 6- to 6-year plan identifying capital projects (water, transportation, water supply, and/or infrastructure) and financing funding.
- Requirement:** No.
- Resilience Connection:** Can leverage funding to support mitigation measures. Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Other Examples? Insert Sticky Note Below

- Provide description of how it contributes to future resilience, where it occurs, as well as what partners are involved.

Infrastructure & Nature-Based

Transportation

- Description:** Resilient and accessible transportation infrastructure that can withstand and recover from natural hazards. Includes:
 - Changes the existing critical and essential transportation infrastructure to be resilient to natural hazards.
 - Builds new critical and essential transportation infrastructure to be resilient to natural hazards.
 - Changes the existing critical and essential transportation infrastructure to be resilient to natural hazards.
- Requirement:** No, but can require FEMA Community Rating System points.
- Resilience Connection:** Can absorb and store water with natural features and coastal open spaces (such as wetlands and marsh) can act as a natural and semi-natural buffer. Eligible areas are open.

Elevating Critical Components Above BFE

- Utility and building structures, including electrical systems, water supply, and other critical components.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Low Impact Development (LID) & Green Infrastructure

- Reducing impervious surface area and increasing permeable surface area to improve water quality and quantity management.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Other Examples? Insert Sticky Note Below

- Provide description of how it contributes to future resilience, where it occurs, as well as what partners are involved.

A successful approach to resilient plans where feasible to maximize...

These types of actions usually fall into one of four categories: #2. Accommodate (build/retrofit to asset can maintain) and #4. Relocate (retroactively moving critical infrastructure).

Local Policy and Regulation

- Description:** Local policies and regulations that guide development and land use. Includes:
 - Local Comprehensive Zoning Ordinance (LCZO)
 - Local Ordinance Code (LOC)
 - Local Development Ordinance (LDO)
 - Local Flood Ordinance (LFO)
 - Local Stormwater Ordinance (LSO)
 - Local Tree Ordinance (LTO)
 - Local Land Use Ordinance (LLO)
 - Local Environmental Ordinance (LEO)
 - Local Historic Ordinance (LHO)
 - Local Cultural Ordinance (LCO)
 - Local Recreation Ordinance (LRO)
 - Local Public Works Ordinance (LPO)
 - Local Health Ordinance (LHO)
 - Local Fire Ordinance (LFO)
 - Local Safety Ordinance (LSO)
 - Local Security Ordinance (LSO)
 - Local Emergency Ordinance (LEO)
 - Local Disaster Ordinance (LDO)
 - Local Crisis Ordinance (LCO)
 - Local Recovery Ordinance (LRO)
 - Local Resilience Ordinance (LRO)
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Flood Damage Prevention Ordinance

- Regulating the siting and construction of buildings and structures in flood-prone areas.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Landscaping and Tree Ordinance

- Regulating the siting and construction of buildings and structures in flood-prone areas.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Other Examples? Insert Sticky Note Below

- Provide description of how it contributes to future resilience, where it occurs, as well as what partners are involved.

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- Provide description of how it contributes to future resilience, where it occurs, as well as what partners are involved.

Education, Awareness & Incentives

- Knowledge of Hazards:** Educating the public about the risks of natural hazards and the benefits of resilience.
- Professional Development:** Providing training and education for professionals in the field of resilience.
- Community Outreach:** Engaging the community in resilience planning and implementation.
- Insurance:** Encouraging the use of resilience-oriented insurance products.

Dune Vegetation Cost-Share Program

- Providing financial assistance to property owners for dune restoration and maintenance.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Citizen Science - N.C. King Tides Project

- Engaging the public in data collection and analysis to improve coastal resilience.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Community Emergency Response Teams (CERTs)

- Training and organizing community members to assist in disaster response and recovery.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

FEMA Community Rating System (CRS)

- Providing financial incentives to communities that exceed minimum flood damage prevention standards.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).

Other Examples? Insert Sticky Note Below

- Provide description of how it contributes to future resilience, where it occurs, as well as what partners are involved.

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Other Examples? Insert Sticky Note Below

- Provide description of how it contributes to future resilience, where it occurs, as well as what partners are involved.

CRS Program for Public Information (PPI)

- Providing financial incentives to communities that provide public information about flood risk.
- Requirement:** No.
- Resilience Connection:** Can provide opportunity to review and consider the impact of potential future events on the hazard and resiliency (e.g., guide new growth to safer areas, high quality of groundwater or non-susceptible infrastructure components).



Question #3: How should the state support local efforts?

**Funding
(grants, loans,
appropriations)**

**Education, training,
and outreach**

**Technical
assistance**

**Regulatory and policy
changes
(barriers and incentives)**

**Data/research
needs**

**Staff resources/
capacity**



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, listserv, templates, BMPs)
- Show State leadership as mandate for communities to address topics that may be difficult otherwise
- Develop a future floodplains map product to inform and help manage risk
- Create a portal for contact information in all communities (phone tree with backup contacts)
- 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 able to recover stronger
- Create a Clearinghouse of benefit-cost analyses, long-term ROI fast facts, or matrix of green-gray infrastructure solutions



ReBUILD NC



Building a Resilient North Carolina

NC Resilient Coastal Communities Webinar

Jessica Whitehead, Ph.D.
Chief Resilience Officer

NC Climate Change Interagency Council



Climate Change & Clean Energy: Plans & Progress

Get more info on each cabinet agency's initiatives and progress

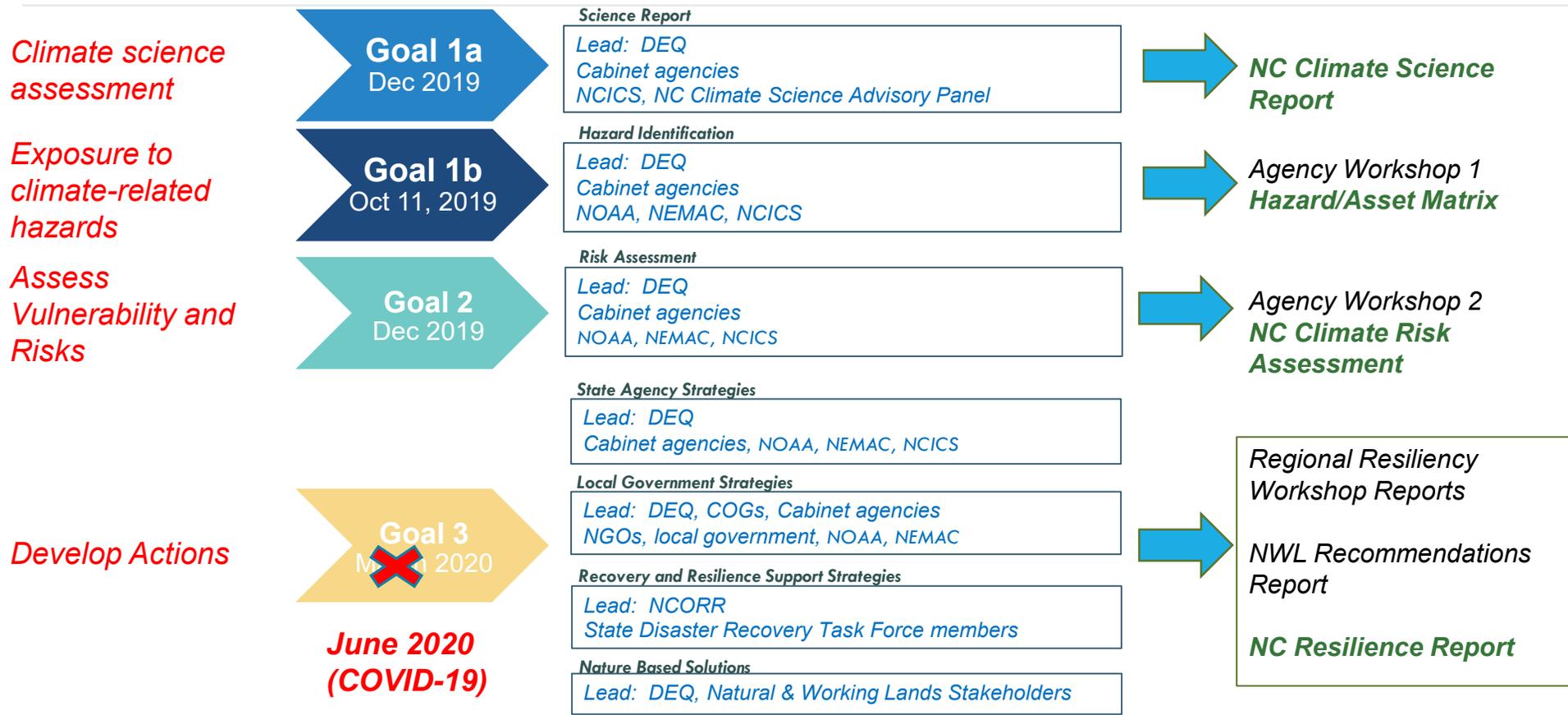
Climate Change & Clean Energy

On October 29, 2018, Governor Cooper established the North Carolina Climate Change Interagency Council as part of [Executive Order No. 80 North Carolina's Commitment To Address Climate Change And Transition To A Clean Energy Economy](#) :

The Secretary or designee of each cabinet agency and a representative from the Governor's Office shall serve on the North Carolina Climate Change Interagency Council ("Council"), which is hereby established. The Secretary of the North Carolina Department of Environmental Quality, or the Secretary's designee, shall serve as the Council Chair. The North Carolina Department of Environmental Quality shall lead the Council by providing strategic direction, scheduling and planning Council meetings, determining the prioritization of activities, facilitating stakeholder engagement, and assisting in the implementation of pathways to achieve the goals provided in Section 1 of this Executive Order.

<https://deq.nc.gov/energy-climate/climate-change/nc-climate-change-interagency-council>

2020 NC Climate Risk Assessment and Resilience Report



Local Government Input

Participant Groups

- Local government officials
- Local Planners
- Community Organizations
- Business, Commerce, and Agriculture
- Supporting Organizations
- State agencies

Focus Areas

- Public Health
- Agriculture/Business/Commerce
- People and Community
- Environment and Natural Resources
- Local Planning
- Transportation











Regional Resilience Workshop

November 7, 2019
9:00 am to 4:00 pm

Lumber River Council of Governments
30 CJ Walker Road
COMtech Park
Pembroke, NC 28372

Expected Attendees

- City, Town, and County Representatives
- Elected Officials
- Businesses
- Environmental Groups
- Councils of Governments
- Community and Faith-Based Organizations
- Tribal Representatives

The N.C. Department of Environmental Quality, along with its many governmental, private, and non-profit partners are bringing together stakeholders and experts to help shape priorities of the State Climate Risk Assessment and Resiliency Plan under Governor Cooper's Executive Order 80. This workshop will help the team share information about impacts and solutions as well as learn from communities about their greatest resilience challenges in order to guide future state resiliency planning and investments.

CLICK HERE TO REGISTER!

Cost is Free but Space is Limited!

Lunch Provided to all Attendees

AICP/CFM Credits Available

QUESTIONS?

For questions about the workshop or registration:

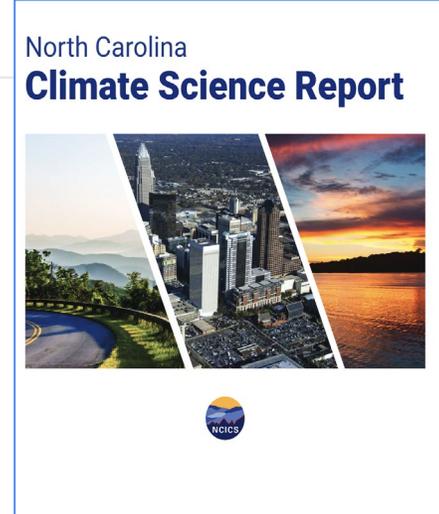
David Richardson - Executive Director, Lumber River COG
(910) 775-9752
david.richardson@lrcog.org

Vision of Resilience

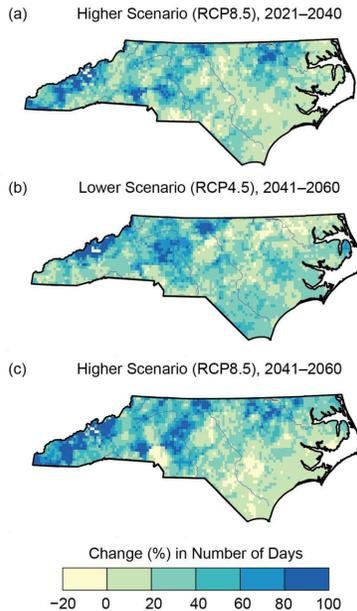
A resilient North Carolina is a state where our communities, economies, and ecosystems are better able to rebound, positively adapt to, and thrive amid changing conditions and challenges, including disasters and climate change; to maintain and improve quality of life, healthy growth, and durable systems; and to conserve resources for present and future generations.



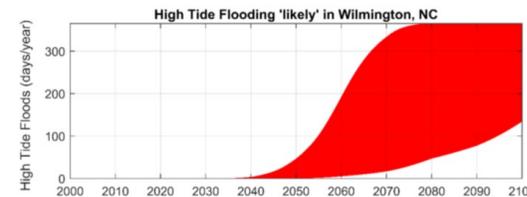
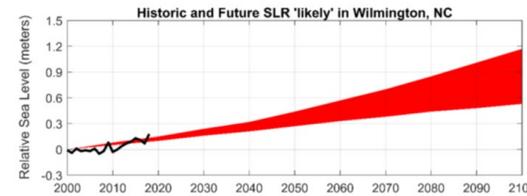
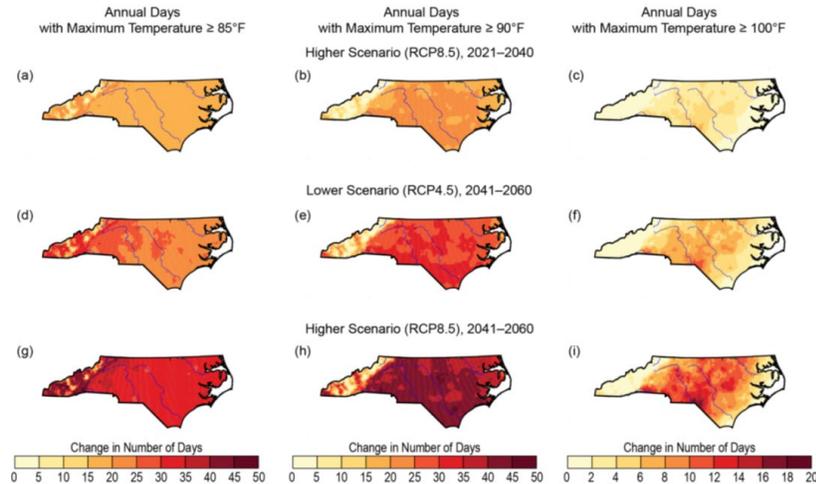
NC Climate Science Report



Projected Changes in Annual Number of Extreme Precipitation Events
Days with Precipitation \geq 3 Inches



Projected Changes in Hot Days: North Carolina

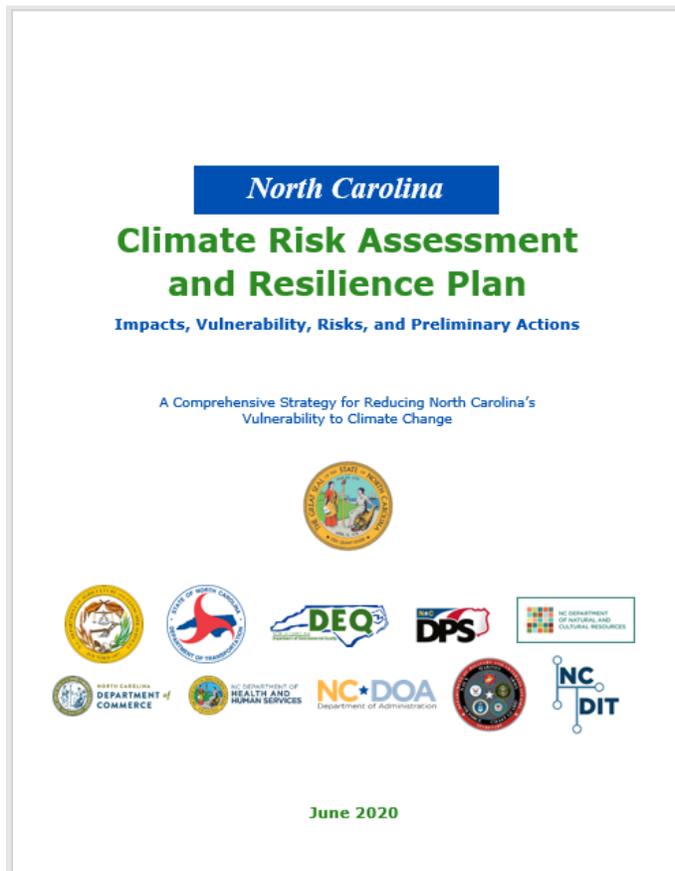


NC Climate Science Report (Kunkel et al. 2020):

<https://ncics.org/programs/nccsr/>

- Global State of the Science
- Historical Changes in NC
- Projections for NC

North Carolina Resilience Plan



- Executive Summary
- 1. Key Findings and Recommendations
- 2. Resilience Plan Development Process
- 3. NC Climate Science Report Summary
- 4. Climate and Environmental Justice
- 5. Vulnerability, Risk, and Potential Options for Addressing Climate-Related Hazards
 - Agriculture and Forestry
 - Coastal Resources
 - Commerce and Business
 - Cultural Resources
 - Ecosystems
 - Housing, Buildings, and Support Services
 - Health and Human Services
 - Public Safety
 - Transportation
 - Water and Land Resources
 - Energy
- 6. Nature-Based Solutions to Resilience
- 7. Path Forward

Science Report Contributors:
50+

Sector Strategy Developers:
200+

Community Workshops
Participants: 300+

NWL Stakeholders:
100+

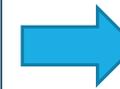
NC Resilience Plan: Path Forward

Local Government and Community Assistance

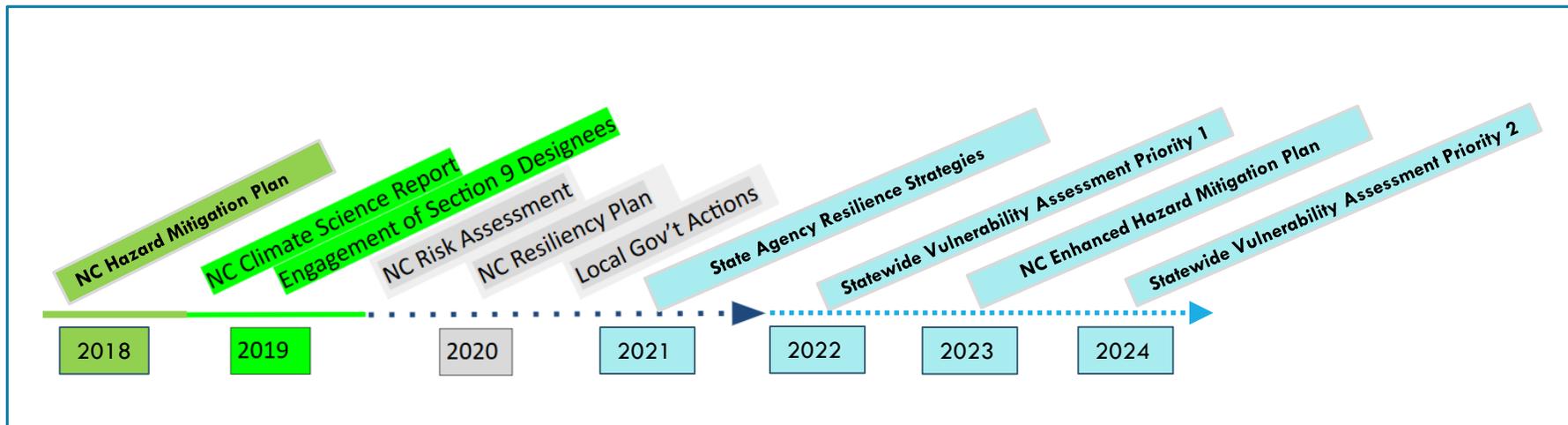


Local and Regional Resilience Plans & Actions

*Lead: NCORR
Cabinet agencies, COGs, local governments, NGOs*



Local Government Assistance Tools, Funding, Resources, etc.



Resilient NC Guiding Principles

1. Act quickly and decisively to reduce the most harmful impacts of climate change—flooding, drought, landslides, and wildfires
2. Act thoughtfully and collaboratively to develop equitable solutions for the most socially challenging effects of climate change
3. Invest in safe, affordable, and connected communities
4. Strengthen regional economies
5. Support healthy communities, local identity, and recreational access to nature
6. Implement resilience best practices



Cross-sector Resilience Strategies

- Consider resilience criteria in making investments
- Update plans, standards, and design values
- Increase resilience capacity in state agencies and at local governments
- Identify sustainable funding sources for building resilience
- Increase communication, outreach, and engagement on resilience needs and solutions

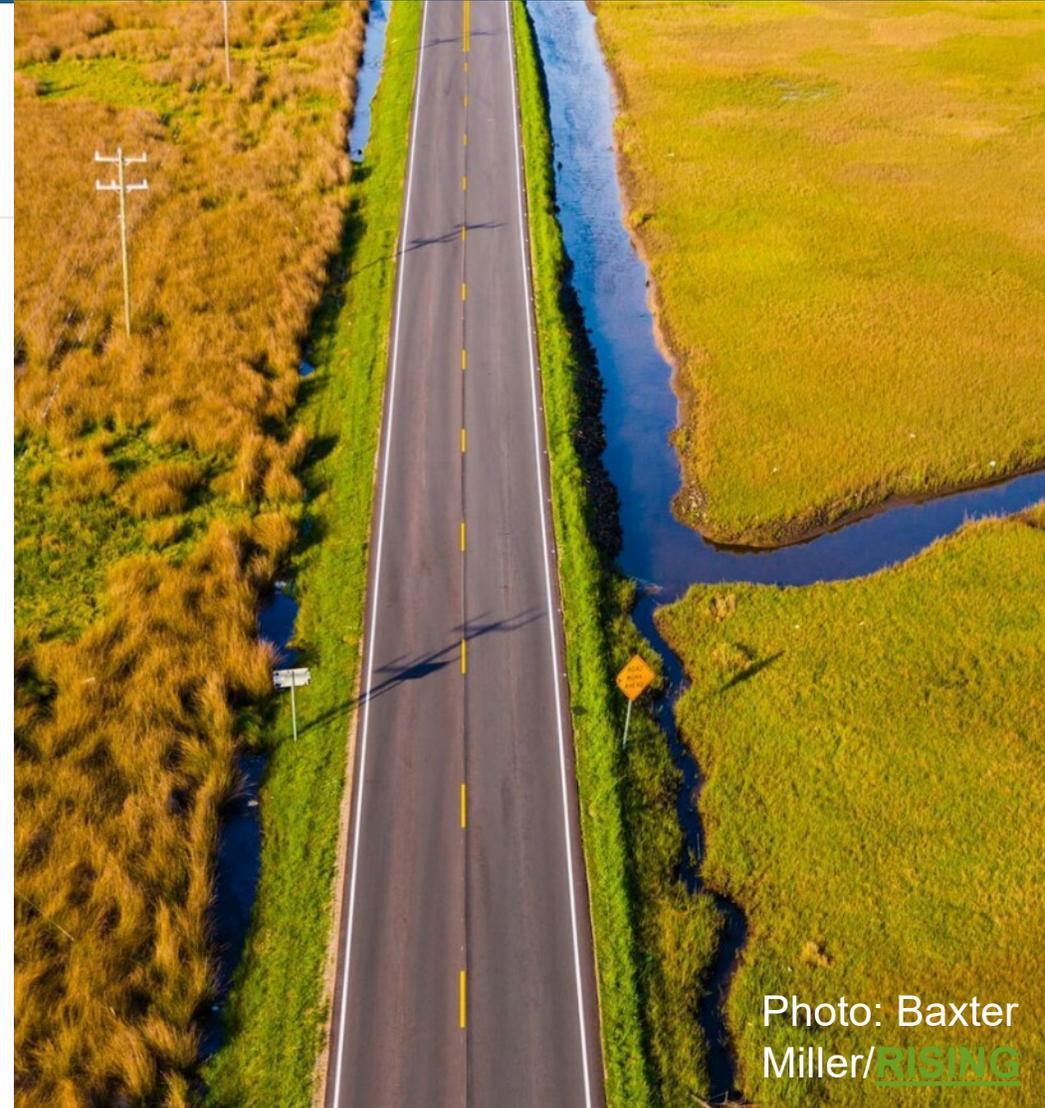
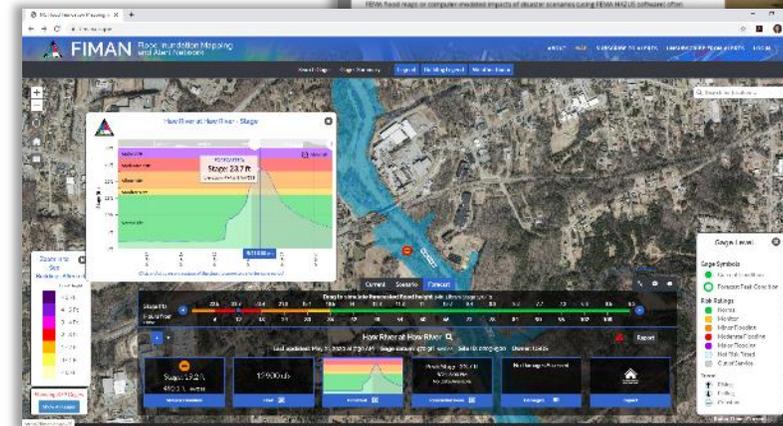
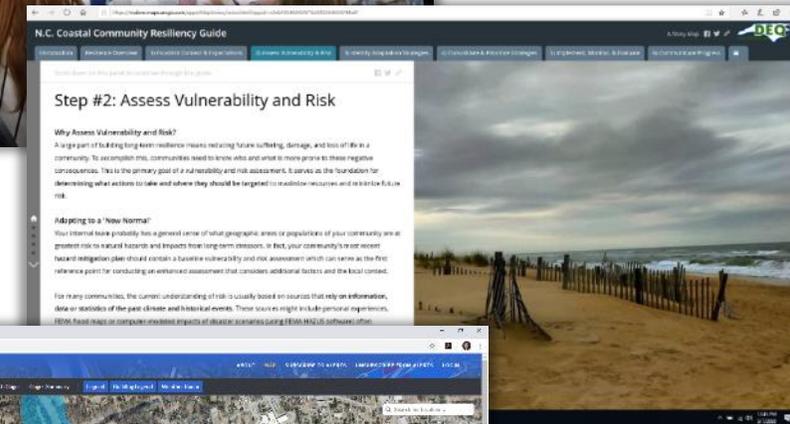


Photo: Baxter
Miller/[RISING](#)

Priority Initiatives

- Manage and coordinate statewide resilience
- Convene a dedicated Interagency Resilience Team
- Continue resilience efforts through the North Carolina Climate Change Interagency Council
- Establish the NC Resilient Communities program
 - Online Climate Resilience Clearinghouse and Toolbox
 - Resilience training programs for communities
 - Establish NC Resilient Communities Grant Program

Pilot grant opportunities: NFWF (DCM); EDA (NCORR)





NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCY

THANK YOU

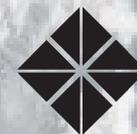
JESS WHITEHEAD, Ph.D.

JESSICA.WHITEHEAD@NCDPS.GOV | 984-833-4345



North Carolina

**RESILIENT
COASTAL
COMMUNITIES
PROGRAM**



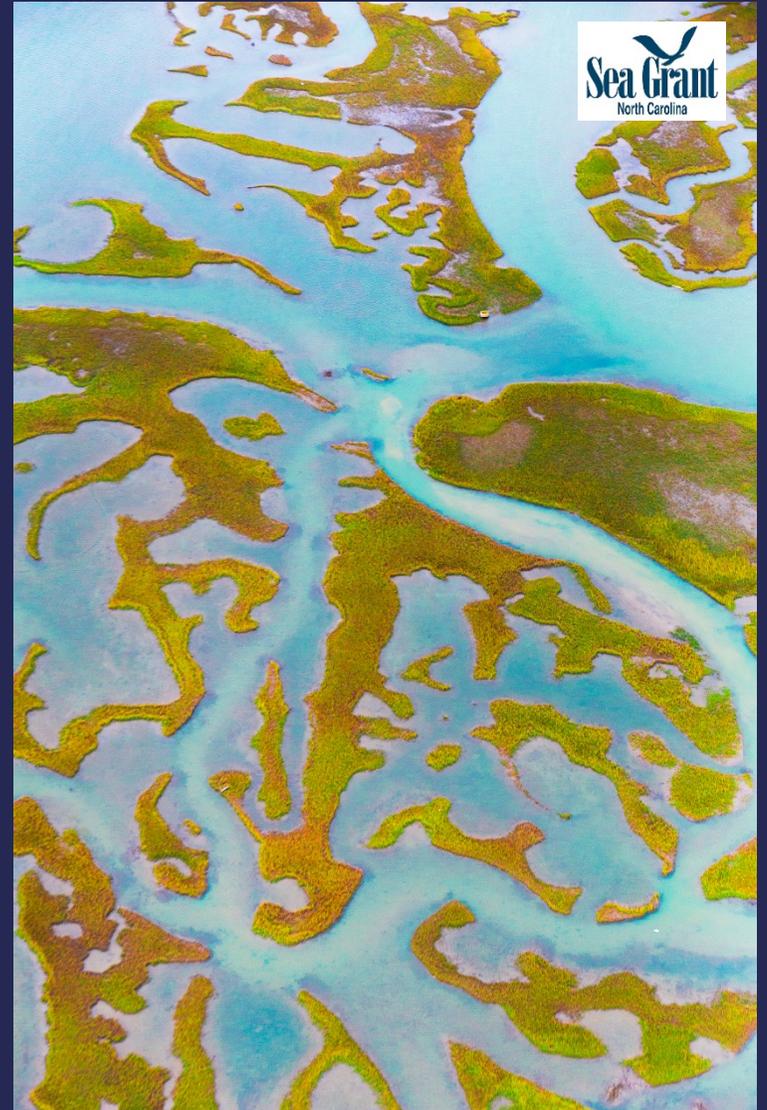
NCORR

NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCY

Sam Burdick, *Coastal Resilience Coordinator*

Outline

- Overview
- Scope
- Guiding Principles & Objectives
- Framework
- Timeline
- Next Steps

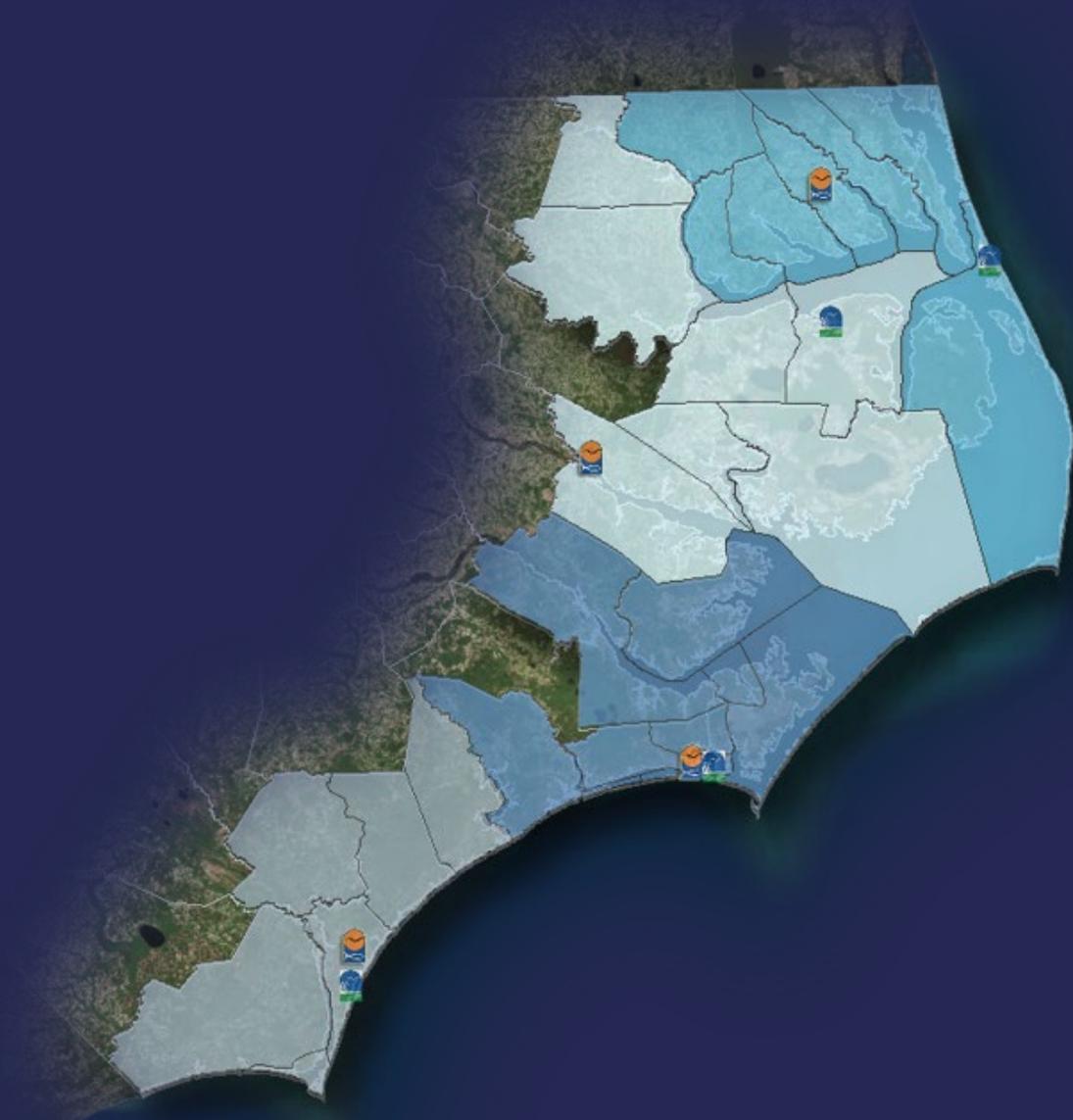


How it all started

- *N.C. Climate Risk Assessment & Resilience Plan*
- *State Legislature Funding*
- *NFWF Emergency Coastal Resilience Fund*



Program Scope



Program Objectives

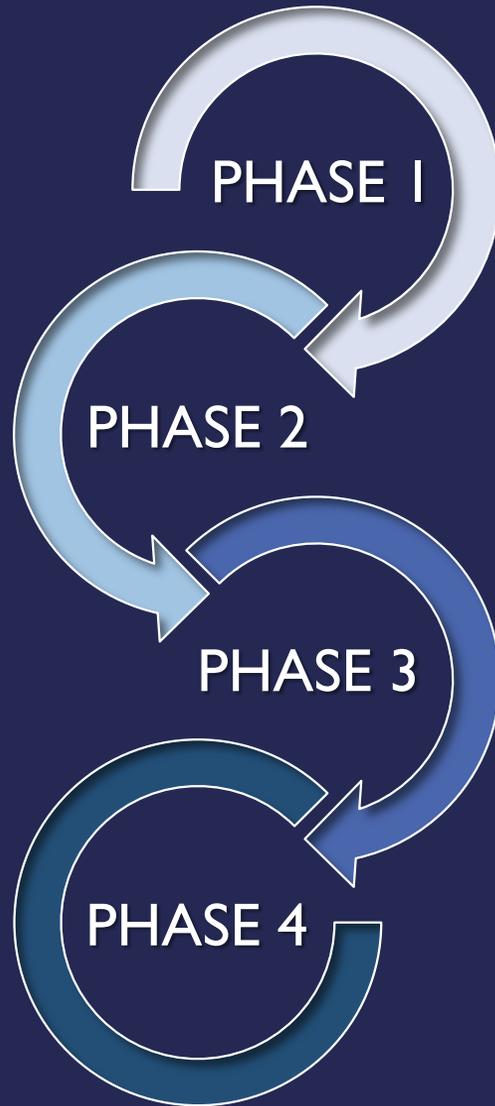
- Address barriers to resilience at the local level;
- Assist communities with risk & vulnerability assessments and developing a portfolio of well-planned and prioritized projects;
- Advance coastal resilience projects to “shovel-ready” status; and
- Link communities to funding streams for project implementation.

Guiding Principles

- Increase local capacity and capability for resilience planning and implementation
- Incentivize a data and community-driven process
- Provide tools to address social inequities and support underrepresented populations
- Reduce costs to communities
- Meet communities *where they are*



Program Phases



Community Engagement and Risk & Vulnerability Assessment

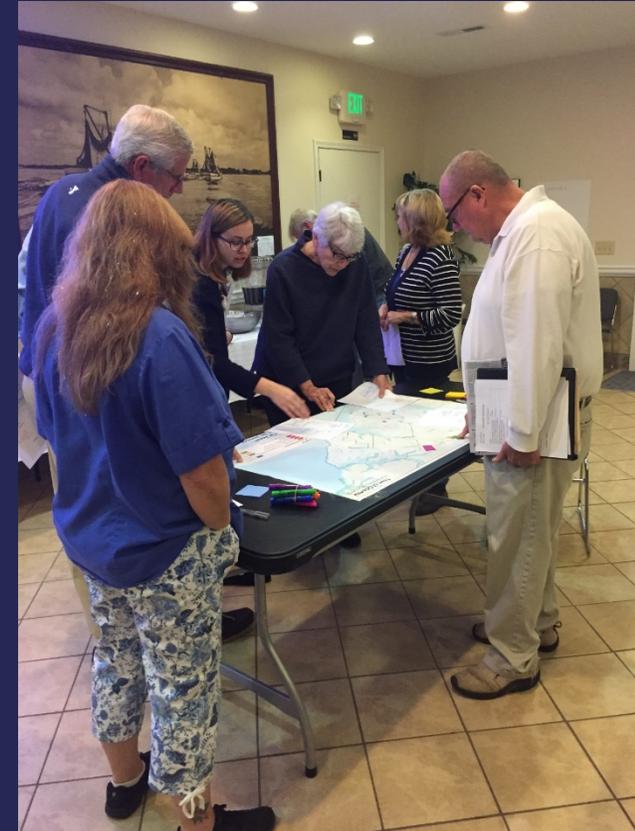
Planning, Project Selection, and Prioritization

Engineering & Design

Implementation

PHASE I: Community Engagement

- Develop an Action Team
 - Actively participates in the program
- Public engagement



PHASE I: Risk & Vulnerability Assessment

- Coastal *and* Riverine Flooding
 - Precipitation, storm surge, and SLR projection scenarios
- Future land use
- Social vulnerability
- Community assets



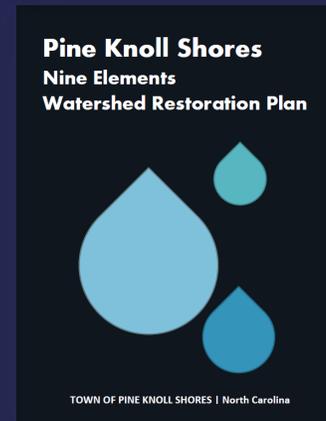
PHASE 2: Planning, Project Selection, & Prioritization

- Resilience Strategy
 - Risk and Vulnerability Assessment
- **Project Portfolio**



Project Portfolio

- Infrastructure and Nature-Based
- Local Policy and Regulation
- Local and Regional Plans
- Education, Awareness, and Incentives



*Meeting your community where you are
and getting you where you want to be*

Project Prioritization

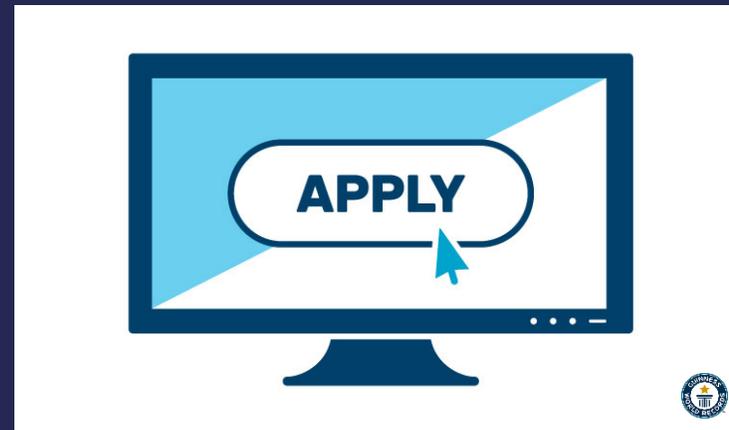
- Resilience Prioritization Criteria Assessment Tool



Application Process

Direct, non-financial **technical assistance**

- Communities submit pre-application in response to an Invitation to Apply
- Consultants, COGs, and universities submit response to Request for Qualifications



PHASES 3 & 4:

Grants: Natural (Green) or Hybrid Infrastructure focus

- PHASE 3: Engineering and Design
- PHASE 4: Implementation



Natural and Hybrid Infrastructure

- **Natural infrastructure:** wetlands, forests, beaches, dunes, rivers, and other ecosystems
- **Nature-based, or “green” infrastructure:** engineered systems that mimic natural processes
- **Hybrid infrastructure:** contain both green and grey infrastructure components



HOW GREEN OR GRAY SHOULD YOUR SHORELINE SOLUTION BE?

GREEN - SOFTER TECHNIQUES

GRAY - HARDER TECHNIQUES

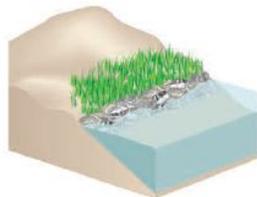
Living Shorelines



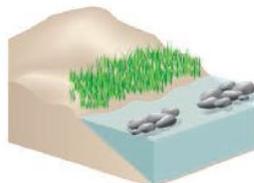
VEGETATION ONLY -
Provides a buffer to upland areas and breaks small waves. Suitable for low wave energy environments.



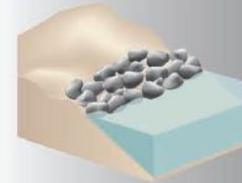
EDGING -
Added structure holds the toe of existing or vegetated slope in place. Suitable for most areas except high wave energy environments.



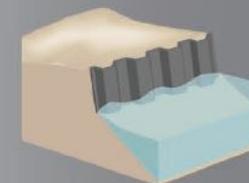
SILLS -
Parallel to vegetated shoreline, reduces wave energy, and prevents erosion. Suitable for most areas except high wave energy environments.



BREAKWATER -
(vegetation optional) - Offshore structures intended to break waves, reducing the force of wave action, and encourage sediment accretion. Suitable for most areas.



REVETMENT -
Lays over the slope of the shoreline and protects it from erosion and waves. Suitable for sites with existing hardened shoreline structures.

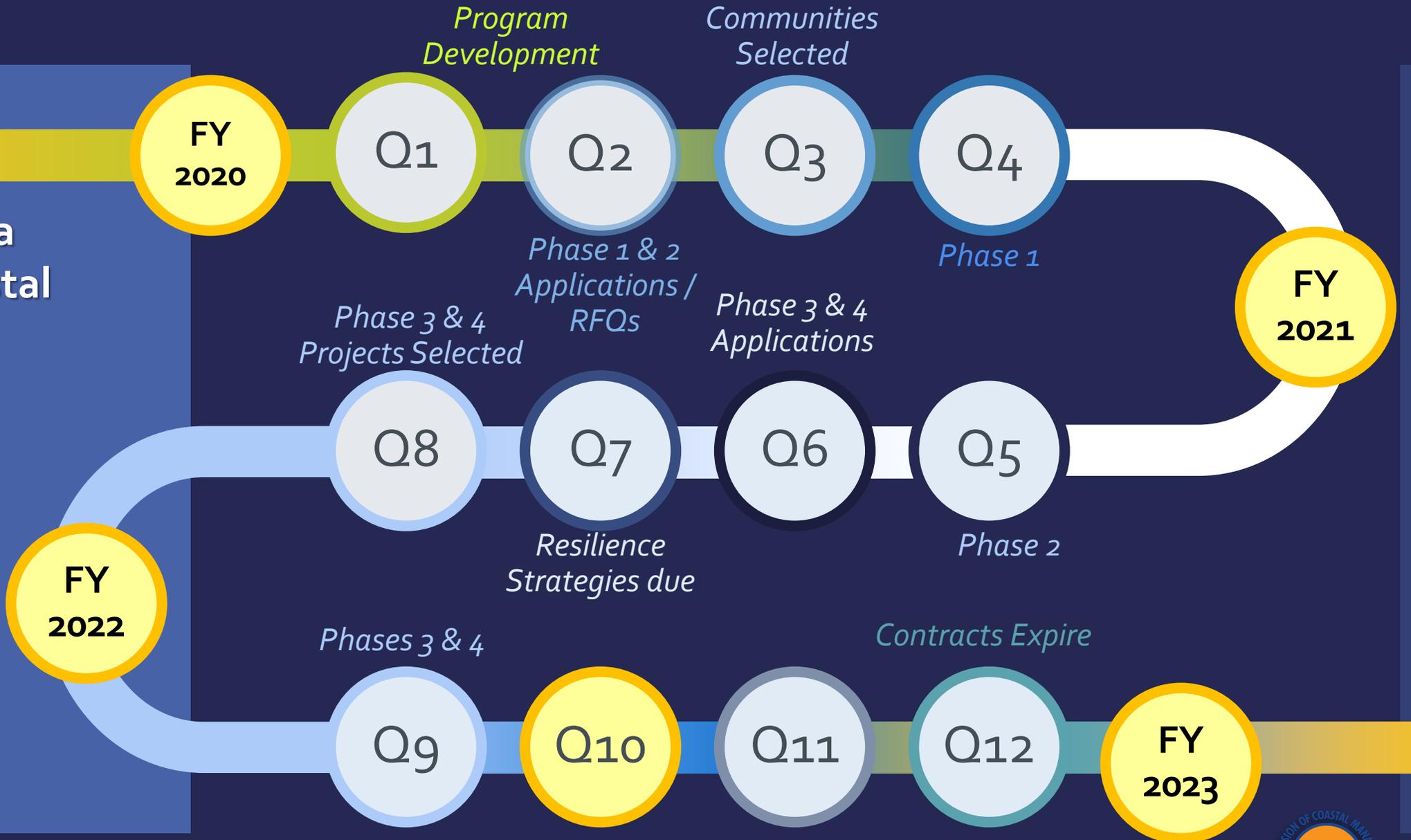


BULKHEAD -
Vertical wall parallel to the shoreline intended to hold soil in place. Suitable for high energy settings and sites with existing hard shoreline structures.

North Carolina Resilient Coastal Communities Program

TIMELINE

2020-2023



Next Steps

- Public comment period
- Aug – Sept: Finalize Program Curriculum
- Sept – Oct: Issue Invitations to Apply communities; RFQ to consultants, universities, and COGs



Program Contacts

Program Coordinators

Sam Burdick

Samantha.Burdick@ncdenr.gov

Tancred Miller

Tancred.Miller@ncdenr.gov

Jessica Whitehead

Jessica.Whitehead@ncdps.gov

District Planners

Charlan Owens

Charlan.Owens@ncdenr.gov

Rachel Love-Adrick

Rachel.Love-Adrick@ncdenr.gov

Mike Christenbury

Mike.Chistenbury@ncdenr.gov

