CLIMATE RESILIENCE PROJECTS

for the

Upper Coastal Plain Region

December 2022

NC RURAL CENTER

UPPER COASTAL PLAIN COUNCIL OF GOVERNMENTS

NCORR
NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCY

KLEINFELDER

RISE
Regions Innovating for Strong Economies and Environment

EQUAL HOUSING OPPORTUNITY

Land Acknowledgement

We wish to acknowledge and honor the Indigenous communities native to this region and recognize that this project portfolio covers communities and structures that are built on Indigenous homelands and resources. We recognize the Occaneechi, Saponi, Lumbee, Skaruhreh/Tuscarora (North Carolina), Meherrin, Kauwets'a: ka, Chowanoke, and Moratok people as past, present and future caretakers of this land. We also recognize the unnamed tribes that once oversaw these lands and have since relocated or been displaced.

About NCORR

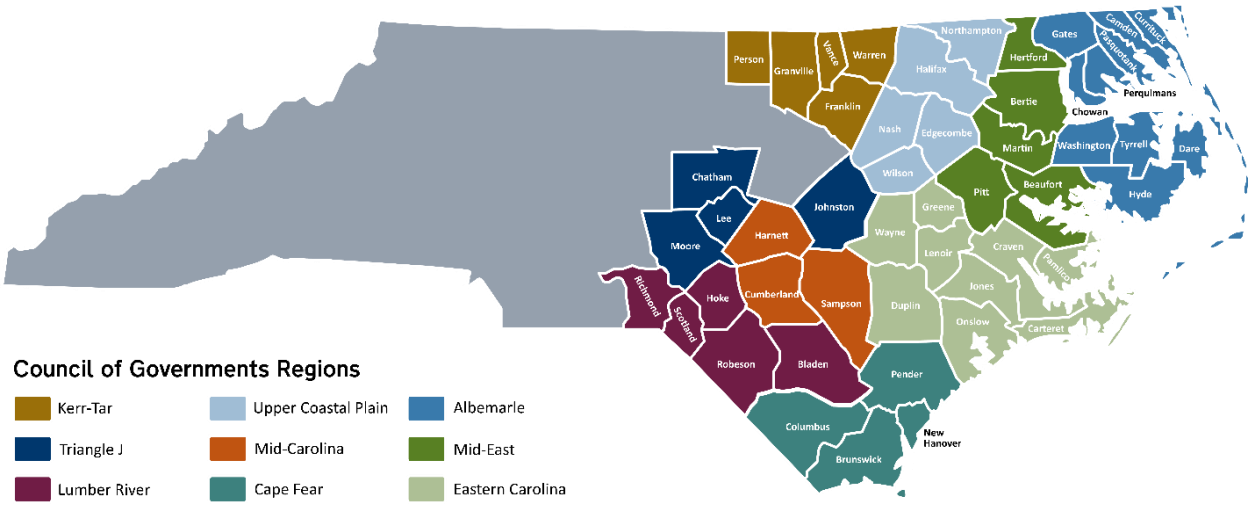
In the wake of Hurricane Florence in 2018, the State of North Carolina established the Office of Recovery and Resiliency (NCORR) to lead the state's efforts in rebuilding smarter and stronger. At that time, eastern North Carolina communities were still recovering from Hurricane Matthew, which had impacted the State in 2016. NCORR manages nearly a billion dollars in U.S. Department of Housing and Urban Development (HUD) funding in two grant types, Community Development Block Grant – Disaster Recovery (CDBG-DR) and Community Development Block Grant – Mitigation (CDBG-MIT). These are aimed at making North Carolina communities safer and more resilient from future storms. Additional funding is provided through the State Disaster Recovery Acts of 2017 and 2018, the Storm Recovery Act of 2019 and Economic Development Administration Disaster Supplemental Funds. NCORR manages programs statewide that include homeowner recovery, infrastructure, affordable housing, resilience and strategic buyouts. To learn more about NCORR programs, visit ReBuild.NC.Gov. NCORR is a division of the Department of Public Safety.

About RISE

Developed in partnership with the North Carolina Rural Center, NCORR's Regions Innovating for Strong Economies and Environment (RISE) program supports resilience in North Carolina. There are nine regions participating in the RISE program, all are grouped by their designated Council of Government's (COG) coverage area.

The RISE program aims to support resilience primarily in the storm-impacted regions of North Carolina by:

- Facilitating the Regional Resilience Portfolio Program, which provides coaching and technical assistance to regional partners in the eastern half of the state to build multi-county vulnerability assessments.
- Identifying priority actions to reduce risk and enhance resilience in their region.
- Developing paths to project implementation.
- Developing the North Carolina Resilient Communities Guide, a statewide resource that will provide tools, guidance, and opportunities for building community resilience.
- Hosting the Homegrown Leaders program, a North Carolina (NC) Rural Center leadership training workshop, which operates in the eastern half of the state, which emphasizes resilience as a tool for community economic development.



The RISE Regional Resilience Portfolio Program covers nine areas, which align with the North Carolina Council of Government regions as shown in the image above. This portfolio of projects is the second and final deliverable of the Regional Resilience Portfolio Program for the Upper Coastal Plain Region.

RISE is funded by the U.S. Economic Development Administration and the U.S. Department of Housing and Urban Development's Community Development Block Grant – Mitigation funds, with in-kind support from NCORR and the NC Rural Center. In addition, the Duke Energy Foundation committed $600,000 in grant funding to support the Regional Resilience Portfolio Program.

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December 19, 2022

Dear Upper Coastal Plain Region Residents,

The Upper Coastal Plain region, encompassing Edgecombe, Halifax, Nash, Northampton, and Wilson Counties, is evolving to meet the needs of its residents, employees, and visitors. Natural hazards challenge and impact this evolution, straining the region's social, environmental, and economic systems and infrastructure. Residents and local partners have been working diligently through collective action and proactive planning efforts to produce this document, which identifies specific projects that will reduce the impacts of hurricanes and other high wind events, heavy precipitation, extreme heat, and drought exacerbated by climate change.

The actions proposed in this portfolio address the major concerns identified in the Upper Coastal Plain region's Vulnerability Assessment. The portfolio provides an in-depth overview and implementation pathway for each proposed project. Each project represents the needs identified through numerous meetings and input from residents, elected officials and local leaders with assistance from the North Carolina Office of Recovery and Resiliency, the North Carolina Rural Center, Kleinfelder, Inc. and the Upper Coastal Plain Council of Governments.

As you read the following pages, think about how, if implemented, these projects will improve the quality of life in our communities and better prepare us for the immediate and long-term future.

Sincerely,

Robert Hiett, Executive Director

Serving Edgecombe, Halifax, Nash, Northampton, and Wilson Counties

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Introduction

Purpose of Project Portfolio

The Regional Resilience Portfolio Program provides technical assistance to help communities collectively reduce risk from climate hazards (also referred to as natural hazards) and increase resilience across the region. The two main deliverables for each region participating in the RISE Regional Resilience Portfolio program include:

- A vulnerability assessment that can be a standalone document but is also appropriate for integration into regional and local plans, grant applications, public presentations, educational opportunities, and other planning tools.
- A project portfolio of five to ten projects identified through community input and expert consultation. It is a separate document that outlines funding opportunities and paths to project implementation.

The Project Portfolio was developed with input from the Upper Coastal Plain region's stakeholder group, the public, and technical experts. The Stakeholder Partnership is comprised of representatives who live and/or work in the Upper Coastal Plain region – including Edgecombe, Halifax, Northampton, Nash, and Wilson Counties – and are local county and municipal government officials, economic development planners, emergency managers, and community organizers and activists. The Project Portfolio lays the foundation for implementing the priority projects identified by these groups. The document includes detailed descriptions, likely funding sources, potential costs, collaboration opportunities, project "champions" who can carry out the project, and other steps to implementation.

Portfolio Development Process

The Regional Resilience Portfolio Program for the Upper Coastal Plain region is a collaboration between NCORR, the North Carolina Rural Center, the Council of Government, Kleinfelder, Inc., and the five participating counties. The project team, consisting of the previously identified organizations, worked with stakeholders to brainstorm project ideas that evolved into a working list of potential projects (see **Appendix A – Initial Working List of Projects**). They also identified and added other projects described in Hazard Mitigation Plans and Resilience Plans and recommended potential projects that would fit the resilience needs of the region per the analysis and findings of the Upper Coastal Plain Vulnerability Assessment. The project team collected

stakeholder and resident feedback on the working list through multiple stakeholder meetings and two in-person open house sessions.

Once the working list of projects was approved by stakeholders, the project team employed a project prioritization tool, or a 'Resilience Scorecard' (refer to **Appendix B – Resilience Scorecard** for more details), designed by Kleinfelder to rank projects in an unbiased, objective, and consistent fashion. Fifteen projects, based on stakeholder preferences, went through the prioritization tool. The project team used input from the Stakeholder Partnership and the public to select the seven projects included in this document.

About the Upper Coastal Plain

The Upper Coastal Plain region is situated in northeastern North Carolina and touches the border of southern Virginia. Characterized by water bodies and large open tracts of undeveloped land, the natural resources within the region, like Lake Gaston and the Roanoke and Tar Rivers, provide plentiful opportunities for residents. Land uses range from rural residential development, agriculture, recreation, forestland, and urban/suburban development in and around the larger towns. Most of the region is suburban and rural - the way most residents want to keep it, but certain areas of Nash and Wilson counties are experiencing residential growth due to proximity to the Raleigh metropolitan area. Vulnerabilities of the region include aging or inadequate infrastructure, slow growth-related issues (e.g., economic activity and employment), vulnerable populations, and limited resources. These challenges are likely to exacerbate the impacts of climate change. Programs such as RISE position communities to plan for climate change as a unified region with the same goals because climate change and natural hazards do not stop at political boundaries. Participation in RISE signals the Upper Coastal Plain's desire to create a more resilient region that can withstand the impacts of natural hazards while preserving its character.

Summary of the Vulnerability Assessment

Over the next 30 years, the Upper Coastal Plain region must adapt to changing climate conditions. In the Coastal Plain, climate scientists project that heavy rainfall and flooding will increase, severe weather will intensify, the number of very hot days and nights will increase, and drought and wildfire will become more common occurrences. The region will also continue to face other hazards, such as high winds and ice storms. Proactive measures to build resilience are crucial

because inaction may lead to serious consequences that threaten residents' health and livelihoods, along with communities, buildings, the local economy, and environment throughout the Upper Coastal Plain region.

The Upper Coastal Plain has many strengths that are helping the region address climate hazards now and in the future. Those strengths include natural resources and ecosystems that manage flood waters, allow for an agricultural economy and provide sanctuary for wildlife and drinking water sources, among other benefits. The region also has a comprehensive network of roads and other modes of transportation to support evacuation routes during emergencies. Furthermore, with nine higher education institutions and nearby military operations, residents have access to learning opportunities, technical support and military support during recovery efforts from catastrophic events.

After Hurricane Matthew (2016) significantly impacted the Upper Coastal Plain region and much of eastern North Carolina, the region completed hazard mitigation plans that have yet to be implemented. Matthew's 15 inches of heavy rainfall inundated portions of Nash and Wilson counties, with all five counties in the region receiving more than six inches of rainfall within a 48-hour period (RebuildNC, 2017). All the counties in the region received presidential disaster declarations, which makes federal assistance available through the Federal Emergency Management Agency (FEMA). Following the declarations, North Carolina Emergency Management created Hurricane Matthew Resilient Redevelopment Plans for each of the counties in the Upper Coastal Plain region. These plans evolved with public input and support and identified proposed projects and actions to address a variety of needs following the hurricane. However, many of the previously identified projects have not been funded in the five years following publication of the plans in 2017. Additional projects from the Nash Edgecombe Wilson Regional Hazard Mitigation Plan and the Halifax Northampton Regional Hazard Mitigation Plan have not yet been implemented, likely due to lack of funding and capacity. The RISE Program Project Portfolio aims to identify projects with local community support and further define pathways for implementation to provide benefits to communities across the region and increase resilience to climate hazards.

Based on research from scientific reports, regional planning documents, and localized knowledge obtained from the Stakeholder Partnership, the most prominent, high-impact climate hazards in the Upper Coastal Plain region today are flooding, hurricanes and tropical storms, and severe

weather, specifically heavy rainfall and winds. Extreme heat, heavy rain events, drought, winter storms and wildfire are projected to occur more frequently by the 2050s and beyond. The Upper Coastal Plain Vulnerability Assessment explores these climate hazards and explains present-day and future risks for the region and impacts to the population, resources, buildings and environment. Summary points for each hazard of concern are shown below.

- **Flooding** is the most prominent natural hazard that impacts the region and occurs due to heavy rainfall associated with storms.
- It causes widespread damage to residential and commercial property and infrastructure.
- Flooding is very likely to increase over the next 30-50 years.

- **Severe weather** includes thunderstorms, rain, wind, lightning, and hail.
- These events can cause substantial property damage and create dangerous conditions for residents.
- The frequency and intensity of severe weather and storms are likely to increase over the next 30-50 years.

- **Hurricanes and tropical storms** are the most damaging type of natural hazard.
- Heavy, sustained rainfall and high winds cause property destruction, debris accumulation, and severe, widespread flooding.
- Hurricanes and tropical storms are very likely to increase in frequency and intensity over the next 30-50 years.

- **Extreme heat** and heat waves impact health and can cause heat exhaustion, heat stroke, and death. It also raises energy costs for households.
- High temperatures and warm nights pose threats to vulnerable populations like seniors and those working outdoors.
- The number and severity of heat waves and high nighttime temperatures are likely to increase through the 2050s and beyond.

- **Droughts** can impact agriculture, wildlife, and water supply.
- Extreme heat can exacerbate drought conditions and impact the agriculture in the region.
- The region has previously experienced long periods of drought, and drought conditions are likely to increase in the next 30-50 years.

- **Wildfire** poses relatively low risk to most of the region, with increased risk located around urban centers and isolated areas of high wildfire ignition occurrence.
- Wildfires can impact water quality and water supply and pose a threat to public health.
- Wildfire is likely to become a more severe threat in the next 30–50 years.

In addition to describing the region's climate hazards and their present-day and future risks, the vulnerability assessment explains how these hazards impact major sectors including:

- Housing
- Critical Facilities
- Regional Economy
- Historical and Cultural Resources
- Natural Environmental Systems
- Public Health
- Social Vulnerability

Summary points for sector of concern are shown below.

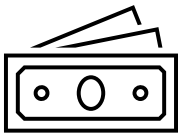
Housing

	• The housing stock in the Upper Coastal Plain region is particularly vulnerable because of the number of aging homes, mobile homes, and inefficient heating/cooling systems. Electric bills during the summer months are more than the monthly rent for some families. • Mobile and manufactured homes are also vulnerable as they are less structurally capable of withstanding high winds and hurricanes. • Over 3,000 homes across the region lie in the 100-year or 500-year floodplain, mostly in Edgecombe and Nash counties. • The Upper Coastal Plain region is particularly vulnerable to drought given the prevalence of homes that rely on private wells for drinking water, and drought conditions are likely to increase by the 2050s.

Critical Facilities

- Critical facilities are susceptible to severe weather and flooding that cause business, school, and road closures; downed trees and powerlines; and structural damage.
- Many **houses of worship** act as last resort shelters during natural hazards and don't have the same resources as established shelters.
- There are currently **four** major critical facilities located in the 100-year floodplain – 1) Stoney Creek Fire & Rescue Department - Station 3 in Nash County, and 2) O.R. Pope Elementary School (used as an emergency shelter), 3) Conetoe Volunteer Fire & Emergency Medical Services, and 4) Pattillo Middle School in Edgecombe County.
- There are **eight** major critical facilities located in the 500-year floodplain – 5 in Edgecombe County and 3 in Halifax County.

Regional Economy



- Flooding from hurricanes, tropical storms, and severe weather is the most significant hazard to the regional economy. Relatedly, residents report frequent power outages when it rains, which affects operations for businesses.
- Disruption to the supply chain, logisitics, and transportation routes caused by hazards like flooding, hurricanes, tropical storms, and severe weather can affect the manufacturing industry and regional economy.
- The Upper Coastal Plain region is particularly vulnerable to drought given the regional importance of agriculture.

Historical and Cultural Resources

- Flooding poses the most significant climate risk to historical and cultural resources because it is difficult to physically move these resources.
- 27 of the 158 sites on the National Register of Historic Places are in the 100-year floodplain.
- Archival records stored in government buildings are often impacted by flooding.

Natural Environmental Systems

- Conservation areas and natural and working lands can provide resilience to natural hazards, often buffering communities from disaster impacts.
- Wetlands, agriculture, and forests are key resources in the region to aid in resilience and should be given protection from development.
- Six species listed as endangered, threatened, or of special concern are found in **all five** counties and may be vulnerable to climate impacts that permanently change their habitat, such as higher temperatures.

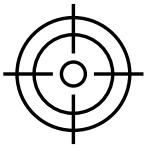
Public Health

- Physical and mental health can be directly impacted by natural hazards, particularly hurricanes, tropical storms, flooding, and extreme heat.
- Edgecombe, Halifax, and Northampton counties have the highest percentage of adults that report fair or poor physical or mental health.
- Elderly persons and persons with disability are more vulnerable to natural hazards.
- Natural hazards can impact drinking water quality and supply, directly affecting public health.
- Heat-related illnesses are common during extreme heat events and are the result of the body's decreased ability to cool itself.

Social Vulnerability

- Social vulnerabilities are the individual characteristics that make it harder for a person to withstand and quickly recover from natural hazards and other stresses.
- Edgecombe and Halifax counties have high overall social vulnerability and may be affected by natural hazards more than other parts of the region.
- The region is considered highly vulnerable because of household compostition and disability, meaning there are high proportations of elderly, youth, single-parent households, and residents living with a disability.
- Northampton County has the highest percentage (27%) of elderly persons who are more likely to experience harm from natural hazards.

Hot Spots



- Census Tract 209 southeast of Princeville in Edgecombe County, Tracts 9301 and 9304 around Weldon and south of Roanoke Rapids near the Halifax Regional Medical Center in Halifax County, Tract 104 around the western portion of Rocky Mount in Nash County, and Tract 7 in the eastern part of the City of Wilson in Wilson County are climate hazard hot spots. These locations are within proximity to the 100-year floodplain, have a greater number of high heat days, have more impervious surface area, and have a greater number of mobile homes and nursing homes compared to other areas in the region.

The vulnerability assessment's analysis of the potential impacts of climate change in the Upper Coastal Plain region is an essential step in prioritizing efforts to increase regional resilience.

Upper Coastal Plain Priority Projects

Using the Upper Coastal Plain Vulnerability Assessment, along with stakeholder input and consultation, the project team identified the following priority regional-scale projects that address climate change for inclusion in this Project Portfolio. Each project includes a clear plan towards its implementation with potential funding sources and other resources.

Project A – Housing Needs Assessment

Project Overview

Following Hurricanes Matthew and Florence, housing structures in the Upper Coastal Plain region were left in various states of disrepair. State buyout programs have assisted in removing dangerous structures, however, people that participate in buyouts may struggle to find options to relocate locally within their communities. Often, single-family and multifamily housing for low- and middle-income residents located outside of flood zones is prohibitively expensive. Local and county officials are unsure how to proceed because data about the housing stock is absent.

This project would conduct a county-by-county or regional needs assessment, which is necessary to understand what existing housing stock can remain viable and serve low- and middle-income families. The needs assessment would identify:

- Structures that require retrofits to reduce future climate vulnerabilities, such as flooding and extreme heat.
- Structures that should be demolished, with the intent to return the land to open space or other less-intensive uses.
- Properties that qualify for energy efficiency assistance programs, such as:
  - Low Income Energy Assistance (LIHEAP), a one-time payment to eligible households to pay heating bills.
  - Weatherization Assistance Program (WAP), which can reduce energy costs by increasing energy efficiency while also ensuring health and safety.
  - Energy Efficiency and Conservation Block Grant Program, which provides funding to state, local governments, and Tribes to implement strategies to reduce energy use and improve energy efficiency.

The current housing stock in the Upper Coastal Plain region is particularly vulnerable to natural hazards like flooding, hurricanes, and extreme heat because of the number of aging structures, mobile homes, and inefficient heating/cooling systems. Approximately 64% of homes in the region were built more than 30 years ago and are likely more prone to inefficient energy use and structural damages related to hurricanes and high wind. This project would provide a better understanding of the current number of affordable and safe housing options for residents and identify opportunities for assisting low- and middle-income households with energy efficiency improvements.

The location of the study will vary depending on available resources and scope. The project may progress county-by-county or be completed for the entire five-county region.

Housing needs assessments generally include an analysis of current demographics, economic circumstances, housing market conditions and a housing demand forecast. Most often, housing needs assessments do not specifically analyze the physical condition of housing structures; however, this proposal includes a structural assessment of each home. The proposed project will be useful to determine whether vacant structures are fit for redevelopment. Inspections for structural soundness, asbestos and mold are critical in understanding suitability for continued use.

Primarily low- and middle-income residents would benefit from this project, including households that spend a large portion of their income on energy costs and disaster repair. In Northampton County, extremely low-income households that make 0%-30% of the Area Median Income (AMI) spend 31% of their total income on energy costs. Assistance for energy bills and improving energy efficiency will reduce households' energy spending and afford more capital for residents to spend on other necessities. Municipalities and counties often receive federal funding based on population counts performed through the Census. Over the last 20 years, the City of Wilson has participated in buyout programs and as a result has completed demolition of structures in core areas that they are now presenting new opportunities to developers for redevelopment.

Furthermore, a study from 2021 found that, across the US, disaster repair has increased since 2015, yet another burden for low-income families (Joint Center for Housing Studies of Harvard University, 2021). Low-income homeowners are likely to spend a much larger share of their cash flow on replacement projects, with 17% of budgets spent on repairs from disaster damage (Joint Center for Housing Studies of Harvard University, 2021).

This project is also a particularly important pre-cursor for communities wishing to access large amounts of funding via federal programs, such as HUD's HOME Investment Partnerships Program, which provides grants to states and localities to fund a wide range of activities including building, buying and/or rehabilitating affordable housing for rent or homeownership. The HOME program also can provide direct rental assistance to prospective low-income residents yet requires participating jurisdictions to first evaluate the feasibility of all rental or homebuyer development projects regardless of size (number of units) or activity type (i.e., acquisition only, acquisition/rehabilitation, rehabilitation, or new construction).

Implementation

Description of implementation

The following steps may assist the lead implementers in getting started.

Step 1 – Determine the scale and study area of the assessment

- Scale: Based on available resources, what scale (e.g., neighborhood, town, multi-town, county, or multi-county/region) will the study area be?
- Study area: Which location(s) in the Upper Coastal Plain region is most in need of the assessment?

Step 2 - Collect relevant data

- Determine what data are needed for the study and what data currently exists:
  - Are GIS data available for structures damaged during past storms?
  - Are data available for the number of:
    - Housing types in the study area?
    - People each dwelling can support?
    - Mobile/manufactured homes in the study area?
    - Apartments in the study area?
    - Single-family dwellings in the study area?
    - Structures in each housing type that are vacant?
  - Are data available on ownership status of each structure?
- Determine what additional information is needed or would be useful.
- Consider options for collecting missing data.

Step 3 – Conduct field surveys

- Identify housing structures for which you need additional information, as well as what information you need about each structure.
- Identify resources and processes for inspecting those structures.

- Inspect identified structures.

Step 4 – Analyze data to determine housing needs

- Based on final data collection and field surveys, project team may classify structures that are not fit for redevelopment or are not salvageable.
- Consider options for demolition of unfit structures.

Barriers to Implementation

The scale of the study area for the housing needs assessment will likely be a challenge. Stakeholders indicated the need for understanding housing needs in all five counties. Another challenge will likely be finding existing, most up to date data on area housing. This may take time and contribute to the need for ground truthing and field surveys. Additionally, structural inspections, ground truthing and field surveys will likely take the most time to complete and require the most resources and capacity. The amount of time and resources required will depend on the number of structures that need inspections. There may also be barriers with engaging homeowners to participate in inspections. A potential strategy to alleviate these challenges is to partner with college students to have them assist with ground truthing, field surveys and desktop data collection, which assists the project team and also provides students with experiential education.

Lastly, while there are many existing sources of funding for design and construction of affordable housing where a specific site/property has been identified, there are few existing grant programs or funding sources for the pre-steps that are seen as the most important first step (i.e., the local or regional studies to assess, inventory and track the existing regional affordable housing stock and conditions).

Needed Resources

- **Lead implementers**: Land Development Department, City of Wilson; Planning Director, Town of Tarboro.
- **Confirmed partners**: Upper Coastal Plain Council of Governments, Freedom Org.
- **Recommended partners**: College planning departments, NC Department of Health and Human Services, Northampton Economic Development Commission.

A housing needs assessment takes a lot of staff time. Personnel needs include building inspectors, GIS analysts and planning officials that are experienced with and aware of housing

data. Local housing authorities can assist with determining the scale and location of the assessment. Additional organizations that specialize in housing assessments (e.g., Bowen National Research, RTI International, etc.) may be important to engage as they have relevant knowledge and subject matter expertise. College students may be able to support some aspects of this project as mentioned above.

Funding Opportunities

The Rural Transformation Grant administered by the NC Department of Commerce may align best with this project as funding is available for local government activities that support the development of new affordable housing and improvements to existing affordable housing. The HOME Investment Partnerships Program may also be an avenue for future phases of the project, as it will first require a market assessment prior to funding allocation. This program provides grants to states and localities to fund activities "including building, buying and/or rehabilitating affordable housing for rent or ownership." The City of Rocky Mount is already receiving funding through the HOME Program, and was allocated nearly $2 million in 2021.

Through the Federal Inflation Reduction Act and the Affordable Housing Resilience and Efficiency Investments, there will be loans and grants available to fund projects that address affordable housing and climate change issues, such as projects that address climate resilience, projects focused on energy and water benchmarking of eligible property, and associated data analysis and evaluation of properties. Specific timing and funding amounts for North Carolina have not been released at this time.

Through the Federal Inflation Reduction Act passed and signed in August 2022, there will be funding available for 'Affordable Housing Resilience and Efficiency Investments.' "The loans and grants must fund projects that address affordable housing and climate change issues. For example, it provides funding, which shall remain available through FY2028, for projects that improve energy or water efficiency, projects that enhance indoor air quality or sustainability, projects that implement the use of zero-emission electricity generation, low-emission building materials or processes, energy storage, or building electrification strategies, or projects that address climate resilience. It also provides funding, which shall remain available through FY2028, for energy and water benchmarking of eligible property along with associated data analysis and evaluation at the property. Eligible property includes low-income housing or housing for the elderly or disabled."

Also through the Federal Inflation Reduction Act is the Neighborhood Access and Equity Grant Program, which "will provide range of incentives to consumers to relieve the high costs of energy and decrease utility bills. $9 billion for consumer home energy rebate programs; 10 years of consumer tax credits to make homes energy efficient; $1 billion grant program to make affordable housing more energy efficient." This will likely be best aligned with programs that support direct projects and repairs to homes.

The North Carolina Neighborhood Revitalization Program and Neighborhood Stabilization Program are part of the HUD Community Development Block Grant – Infrastructure is "available to local municipal or county governments for projects to enhance the vitality of communities by providing decent housing and suitable living environments and expanding economic opportunities. These grants primarily serve persons of low- and moderate- incomes. CDBG Funds are used to spur economic development for job creation and retention."

This project also may be suitable for the $65,000 Duke Energy Accelerator Grant. According to Bowen National Research, a typical housing needs assessment can cost $10,000 to $75,000 and take between two and twelve months to complete. However, the field survey component of this project is likely to result in higher costs. There are no anticipated maintenance or operations costs since the project is a one-time study.

Table 1 - Funding Opportunities for Housing Needs Assessment

Fund	Project A Alignment	Source	Amount	Type	Timing
Rural Transformation Grants (Resilient Neighborhoods - Affordable Permanent Housing subcategory)	All steps	NC Department of Commerce	Maximum grant allowed is $950,000 per grantee	Grant	Application period starting spring 2023 (third round of grants)
Emergency Solutions Grants (ESG) program	Step 1 – Step 2	U.S. HUD	Not available at this time.	Grant	Not available at this time.
North Carolina Community Development Block Grant – Infrastructure	Step 4	U.S. HUD – administered by NC DEQ	Max grant ceiling in 2021 - $2 million	Federal	Not available at this time.
Affordable Housing Resilience and Efficiency Investments	TBD	Federal Inflation Reduction Act (Sec. 30002)	$1 billion (nationwide)	Grant/loan	Not available at this time (new in 2023)
Continuum of Care (CoC) Program	Step 1 – Step 2	U.S. HUD	Max grant ceiling in 2021 - $2 million	Non-competitive + Competitive	Previous deadlines – November 2021 and October 2022

Fund	Project A Alignment	Source	Amount	Type	Timing
HOME Investment Partnerships Program	Will first require a market assessment prior to allocating funding	U.S. HUD HOME program	$37.5 million appropriated to NC in 2021, supplemented by over $137.4 million in additional American Recovery Plan funds.	Grant	Annual program
Neighborhood Access and Equity Grant Program	Best aligned with weatherization upgrades	Federal Inflation Reduction Act (Sec. 60501)	$3.045 billion (nationwide)	Grant/loan	Not available at this time (new in 2023)

Project B – Regional Emergency Shelter Feasibility Analysis

Project Overview

The American Red Cross recommends counties provided space and resources for 5% of the population; however, according to stakeholders, shortages in staffing, lack of available facilities that have back up power capability, and lack of locations with large enough facilities to accept people seeking shelter challenges the ability of the region to meet that recommendation. Residents also mentioned the existing shelters are especially stressed when storms hitting the coast prompt coastal residents to evacuate to the Upper Coastal Plain region for shelter.

The project would conduct a feasibility analysis for identifying a large (400+ person) regional facility that could be utilized as a shelter during disasters and emergencies. A single, larger shelter would 1) take the strain off staffing multiple smaller shelters, 2) reduce the need for multiple shelters to have back up power capability, and 3) streamline communication about the location of open shelters. The analysis would identify a suitable physical location accessible for people within the five-county Upper Coastal Plain region (Edgecombe, Halifax, Nash, Northampton, and Wilson Counties) and those that may evacuate from nearby coastal counties. Additional components or phases of the feasibility analysis may include:

- Evaluating opportunities for securing partnerships with organizations to provide food ahead of an emergency.
- Evaluating strategies for providing transportation to the shelter for people with mobility challenges.
- Evaluating strategies for securing trained personnel, especially health professionals, to staff the shelter during an emergency.

Currently, the shelters operating across the region do not meet the American Red Cross capacity recommendations, are not able to accommodate a larger influx of evacuees ahead of a major storm along the Atlantic coast and lack basic shelter requirements. Currently, Wilson County and Nash County each have two shelters with the capacity and resources to open when necessary. Halifax County lacks sheltering capacity in the southern end of the county, where flooding often impacts approximately 2,000-3,000 people. Northampton County has three shelters – all school gymnasiums – and plans to add two more locations. Still, these locations aren't enough to cover 5% of the region's population. During Hurricane Matthew, coastal residents evacuated inland and stopped at shelters in Halifax and Wilson counties. The NC Coastal Region Evacuation and Sheltering Standard Operating Guide (CRES-SOG) provides a framework and responsibilities

supporting evacuation from the 20 NC coastal counties. 'Risk' counties are those where evacuations may be necessary, and 'host' counties are those that have approved facilities for sheltering and are considered relatively safe for evacuees. The CRES-SOG directs 'risk' counties to also send appropriate personnel to staff 'host' counties. However, shelter managers had to turn some evacuees away during Matthew because of a lack of resources and personnel at inland shelters.

Additionally, the COVID pandemic restricted capacity caps at shelters, revealing a need for larger spaces. Most Upper Coastal Plain shelters are school system buildings, which have large indoor spaces (e.g., gymnasiums) and backup generators for sustained power. Houses of worship and community centers in the region also act as shelters in times of need. However, stakeholders identified that most existing shelters lack adequate heating and cooling capabilities, lack ADA compliant bathrooms and need general improvements to increase storage capacity. Shelters should be designed to serve community members most likely to evacuate; these individuals often represent socially vulnerable groups such as those unemployed, living alone, homeless and those who can't afford to evacuate to another location.

A larger, regional shelter has pros and cons. It may reduce confusion about which shelter facilities are open during an emergency. It may also streamline logistical processes, such as coordinating delivery of food and water to one location. One identified challenge is the time it takes for people across the region to travel to the shelter. Marginalized populations, particularly older populations, those with limited mobility and those with medical needs may struggle to reach a regional shelter. Input from the Stakeholder Partnership and the public indicated that the benefits of a regional shelter outweighed the challenges, especially if the project includes a transportation solution. Still, a feasibility analysis will help the region decide whether to proceed with a regional shelter.

Regional shelters have been done before. In 2011, the Western Massachusetts Region Homeland Security Advisory Council provided funding to three regional planning agencies in western Massachusetts to develop and implement a regional shelter. The Council also developed a regional shelter plan template to help local officials set up a regional shelter once a location has been identified. It also offers operating guidelines. Hampshire County, Massachusetts completed their regional shelter plan in 2016 and has designated regional shelter host municipalities.

Implementation

Description of Implementation

The following steps may assist the lead implementers in getting started.

Step 1 – Create project team

- Lead implementer(s) will create project team with relevant personnel.

Step 2 – Conduct site analysis

- Identify criteria, regulations, and standards for mass shelters:
  - Capacity needs (ideal person capacity, square feet per person, space for pets, etc.)
  - Building requirements (HVAC systems, water supply, generator capability, structural soundness, plumbing, ADA compliance, parking, access to utilities, etc.)
- Use GIS mapping to identify existing structures that meet listed criteria.

Step 3 – Complete regional shelter template

- Project team will complete a regional shelter planning template (e.g., Western Region Homeland Security Advisory Shelter Template or other similar document) to define roles and responsibility.

Step 4 – Provide recommendations for next steps

- Project team will use findings from site analysis and regional shelter template to recommend outfitting the identified structure(s) as a mass shelter OR provide recommendations for constructing an appropriate building to serve as a mass shelter.

Barriers to Implementation

Barriers to implementing the shelter feasibility analysis should be minimal, given the project is primarily a desktop analysis.

Needed Resources

- **Lead implementers**: Nash County Emergency Manager, Halifax County Emergency Manager
- **Confirmed partners**: TBD
- **Recommended partners**: NC Emergency Management, American Red Cross, FEMA Region 4, Wilson County Emergency Manager, Northampton County Emergency Manager, Edgecombe County Emergency Manager, Upper Coastal Plain Council of Governments

Personnel beyond the lead implementers are necessary to carry out the phases of this project. Organizations such as American Red Cross, NC Emergency Management and the Federal Emergency Management Agency (FEMA) Region 4 should be engaged for expertise related to shelters. NC Emergency Management will have knowledge specific to the Upper Coastal Plain region and be aware of data from past disasters that can inform site analyses. American Red Cross sets standards and criteria for building requirements. Other organizations that may contribute to this project include Community Emergency Response Teams (CERT) and NC Voluntary Organizations Active in Disaster (VOAD). Partners for food distribution and health care professionals should be identified as well.

Following implementation, maintenance and operational needs will include a regularly scheduled update to the regional shelter planning template and routine building inspections in accordance with FEMA, American Red Cross and NC Emergency Management requirements.

Funding Opportunities

One of the primary targets for funding this project is the Capacity Building Competitive Grant (CBCG) program, which was passed by the North Carolina State Legislature in FY 2022. CBCGs are designed to help ensure local county emergency management agencies (EMAs) are adequately equipped, trained and prepared for all hazards and emergencies. These grants aim to increase local mass care, human services capacity and preparedness initiatives. Additionally, funding is applicable to other items supported by a documented local or regional risk assessment, such as that completed through the RISE Program.

CBCG provides up to $400,000 of funding to eligible county EMAs. In FY 2021, $3 million was allocated for this grant. This grant operates with two separate rounds of funding as identified in Senate Bill 105, Section 19E.5.(a). Applications for funding will begin on January 1st, 2023, with awards before June 2023 and a period of performance through June 2024.

The Emergency Management Preparedness Grant, administered by NC Emergency Management, aligns with preparedness and readiness goals for communities and will likely be a source to target for funding the feasibility analysis. The Homeland Security Grant, also administered by NC Emergency Management, "includes a suite of risk-based grants to assist state, local, tribal and territorial efforts in preventing, protecting against, mitigating, responding to and recovering from acts of terrorism and other threats. This grant provides grantees with the

resources required for implementation of the National Preparedness System and working toward the National Preparedness Goal of a secure and resilient nation."

The FEMA BRIC program is also likely an applicable funding source for the assessment step of the project, as BRIC funds projects with multiple phases, such as assessments, engineering studies, benefit cost analysis, project scoping, etc.

This project may be suitable for the $65,000 Duke Energy Accelerator Grant as the assessment done at either a county or regional level can likely be completed in less than one year. The cost to perform the assessment may range close to the amount of the Duke Energy Accelerator Grant.

Table 2 - Funding Opportunities for Regional Emergency Shelter Feasibility Analysis

Title	Project B Alignment	Source	Amount	Type	Timing
Capacity Building Competitive Grant (CBCG)	All steps	NC Department of Public Safety	Up to $400,000 of funding to eligible county EMAs	Grant	First round of funding administered in Spring 2023. Second round of applications anticipated Fall 2023
FEMA Emergency Management Performance Grant (EMPG)	All steps	FEMA; NC Department of Public Safety / NC Emergency Management	$9.4 million (FY21 state allocation)	Grant	FY22 Application deadline on April 13, 2022
FEMA Building Resilient Infrastructure in Communities (BRIC)	Step 2 – Step 3	FEMA; NC Emergency Management Hazard Mitigation Division	$2.295 billion to be distributed for FY22; See NC DPS website for more information	Grant	Annual; applications FY22 round were due in December 2022. The Notice of Funding Opportunity is typically posted in the summer and Communities (sub-applicants) must submit

Title	Project B Alignment	Source	Amount	Type	Timing
					a Letter of Interest by October.
State Homeland Security Grant Program (HSGP)	All steps	FEMA; NC Emergency Management	$5.28 million (FY21 state allocation)	Grant	Annual; application for FY22 were due June 2022

Project C – Electrical Assessment and Procurement of Transfer Switches for Emergency Shelters

Project Overview

Two emergency shelters in Nash County and two in Halifax County (four total) have identified the need for transfer switches to sustain power generation: Southern Nash High School and Nash Central High School; and Southeast Halifax High School and TJ Davis Recreation Center. **This project would procure and install transfer switches at designated emergency shelters.**

Transfer switches change the power load between two sources. For generators above 5,000 watts, a transfer switch is important for safety and ease of use. Automatic transfer switches can automatically change electricity coming from utility-provided electricity to generator-provided electricity. A manual transfer switch requires someone to change the power load to the generator.

Procuring and installing transfer switches at the identified shelter locations will increase resilience at critical facilities used by people across the region. It is crucial that shelter facilities maintain power during extreme weather because safety is the top concern for emergency managers. Without reliable power, heating and cooling systems cannot function and medical equipment that require electricity cannot function. This project would benefit residents in highly vulnerable census tracts, as well as others living close to the four identified shelters.

The Hurricane Matthew Resilient Redevelopment Plan – Nash County (2017) and Nash Edgecombe Wilson Hazard Mitigation Plan (2020) identified the need for procuring and installing transfer switches at various emergency shelters and critical facilities. Nash County applied for grant funds under a FEMA Pre-Disaster Mitigation Grant in 2017 to install transfer switches at Southern Nash High School and Nash Central High School, but funds were not received. Similar projects have been completed in other shelters across the region, including Englewood Baptist Church and Nash County Warehouse.

Implementation

Description of Implementation

Based on industry standards, a transfer switch is required for generators greater than 5,000 watts for safety and ease of use. Having a transfer switch in place allows generators to run power for

larger appliances like an HVAC system, and an automatic transfer switch facilitates power transfer immediately without any manual need.

The following steps may assist the lead implementers in getting started.

Step 1 – Conduct electrical assessment

- Hire a certified electrician to complete an electrical assessment for the four locations identified for potential upgrades.
- The assessment would include:
  - An inventory of internal and external electrical characteristics of each site.
  - A detailed scope of improvements for each location.
  - A cost estimate for necessary upgrades to install the transfer switches and any ancillary improvements.
  - An outline of procurement, scheduling and permitting processes to install improvements for each location.

Step 2 – Evaluate electrical assessment outcomes

- Prioritize location(s) to move forward with installation of transfer switches.

Step 3 – Engage in procurement process

- Prepare a Request for Qualifications (RFQ) for work to be performed.
- Review Statement of Qualifications (SOQ) of vendors in response to RFQ.
- Select and procure certified electricians and contractors to perform construction.

Step 4 – Engage in construction and installation

- Selected electricians and contractors will perform construction and installation of transfer switches.

Barriers to Implementation

The greatest barrier to implementation is determining whether electrical upgrades are necessary at the four identified locations to support a transfer switch. Depending on what the electrical assessment finds, the project may cost more in time and funding. Additionally, the characteristics of the existing generator will influence the parameters of the transfer switch. If the switch is not appropriately sized for the existing generator, there will likely be a reduction in overall energy performance. Additionally, the impacts of inflation on the costs of materials and disruptions of supply chains may result in costs that are higher than previous similar projects, such as the recent project in Nash County. To reduce long term risk of the project failing and maintenance costs over

time, it will be important to select a qualified vendor using the Qualifications-Based Selection process for procuring services covered under the Mini-Brooks Act (G.S. 143-64.31).

Needed Resources

- **Lead implementers**: Nash and Halifax County Emergency Managers
- **Confirmed partners**: TBD
- **Recommended partners**: Certified electrician, building facilities staff, NC Emergency Management, American Red Cross, Upper Coastal Plain Council of Governments

Relevant personnel beyond the lead implementers are necessary to carry out the phases of this project. A certified electrician will be required to install the transfer switches. North Carolina Emergency Management can assist with building evaluations and the procurement process. If available, architectural plans for each building will assist the contractor in performing the electrical assessment and may also reduce the front-end costs of the assessment.

Following implementation, automatic transfer switches and generators should be tested monthly, according to the National Fire Protection Association (NFPA) 110 standard. This test should consist of an automatic generator start, initiated by the transfer switch, followed by an automatic transfer of facility load onto the standby generator. Transfer switches last on average 20-25 years. However, relays and contacts in the transfer switch can fail sooner, which is why regular cleaning and maintenance is important.

Funding Opportunities

The Capacity Building Competitive Grant, passed by the North Carolina State Legislature for FY 2022 and administered by the NC Department of Public Safety, has allocated $5 million total in funding to ensure local county emergency management agencies are adequately equipped, trained, and prepared for all hazard emergencies. The Grant provides up to $400,000 of funding to eligible county emergency management agencies and will fund shelter improvements such as HVAC, backup power generators, transfer switches, electrical systems, etc. In FY 2021, $3 million was allocated for this grant. This grant operates with two separate rounds of funding as identified in Senate Bill 105, Section 19E.5.(a). Applications for funding will begin on January 1st, 2023, with awards before June 2023 and a period of performance through June 2024.

Englewood Baptist Church, which is used as a regional shelter in Nash County, recently installed a transfer switch for $20,000. Based on discussions with the lead implementers, an electrical

assessment as defined in Step 1 is anticipated to cost approximately $7,500. The overall construction costs of the project can vary based on the findings of the electrical assessment, which will describe necessary ancillary improvements (e.g., electrical panel or wiring upgrades) prior to installation of transfer switches. The cost of a transfer switch ranges from $500 to $1,500, but installation and any electrical upgrades accompanying the installation can cost up to $20,000 total.

The Emergency Management Preparedness Grant, administered by NC Emergency Management, aligns with preparedness and readiness goals for communities and will likely be a source to target for funding the electrical assessment. The FEMA Pre-Disaster Mitigation Grant program funds projects that “plan for and implement sustainable cost-effective measures designed to reduce the risk to individuals and property from future natural hazards, while also reducing reliance on federal funding from future disasters.” Funding has previously been allocated for projects such as emergency generators, electrical renovations, and shelter improvements. The FEMA BRIC program is also likely an applicable funding source for the assessment step of the project, as BRIC funds projects with multiple phases, such as assessments, engineering studies, benefit cost analysis, project scoping, etc.

The $65,000 Duke Energy Accelerator Grant may be an excellent funding source to move this project forward. The Accelerator Grant can potentially ensure all four locations install transfer switches.

Table 3 - Funding Opportunities for Electrical Assessment and Procurement of Transfer Switches for Emergency Shelters

Title	Project C Alignment	Source	Amount	Type	Timing
Capacity Building Competitive Grant (CBCG)	All steps	NC Department of Public Safety	Up to $400,000 of funding to eligible county EMAs	Grant	First round of funding administered in Spring 2023. Second round of applications anticipated Fall 2023
FEMA Emergency Management Performance Grant (EMPG)	All steps	FEMA; NC Department of Public Safety / NC Emergency Management	$9.4 million (FY21 state allocation)	Grant	FY22 Application deadline on April 13, 2022
Pre-Disaster Hazard Mitigation Grant (PDM)	All steps	FEMA HMGP; funds administered via NC Emergency Management	FY22 appropriated $154 million total	Grant	FY22 funding cycle deadlines on May 25th and September 30th – FY23 likely similar
State Homeland Security Grant Program (HSGP)	All steps	FEMA; NC DPS/NC Emergency Management	$5.28 million (FY21 state allocation)	Grant	Annual; application for FY22 were due June 2022

Title	Project C Alignment	Source	Amount	Type	Timing
FEMA Building Resilient Infrastructure in Communities (BRIC)	Step 2 – Step 3	FEMA; NC Emergency Management Hazard Mitigation Division	$2.295 billion to be distributed for FY22; See NC DPS website for more information	Grant	Annual; applications FY22 round were due in December 2022. The Notice of Funding Opportunity is typically posted in the summer and Communities (sub-applicants) must submit a Letter of Interest by October.

Project D – Upper Coastal Plain 'Resilient Routes' - Flood-Resilient Roadway Accessibility for Regionally Significant Critical Facilities

Project Overview

Roadway flooding can restrict access to facilities that are critical to counties, towns, and cities. Regional Hazard Mitigation Plans and Hurricane Matthew Resilient Redevelopment Plans identified challenges in the ability to maintain roadway accessibility, especially for emergency vehicles, following major flood events. NC Department of Transportation (NCDOT) Hydraulics and Structural Teams are responsible for ensuring bridge structures and roadways can withstand flooding and safely return to service following a flood. However, with miles upon miles of transportation infrastructure and the increasing severity, frequency and duration of heavy rainfall, protecting roadways from floods is challenging. Local public works departments, county roads departments, emergency managers, floodplain coordinators and the NCDOT pay close attention to roadway flooding that prevents access to critical facilities and essential services like hospitals, emergency communication towers, pump stations, and major roads that communities and first responds rely on. Still, gaps remain across the state.

Currently, there is a lack of focus specifically on projects or measures that can be taken to improve the resilient access of low-lying roadways, particularly ensuring that flooding will not impact the route in the first place. **The project will create a prioritized list of regionally significant critical facilities that are vulnerable to flooding. In addition, the project will package, co-develop, and apply for funding for priority locations that flooded in previous storms (e.g., Hurricanes Matthew, Florence, Floyd, etc.).**

As reported in the Upper Coastal Plain Vulnerability Assessment, stakeholders identified two problem areas along roadways where creeks cause flooding during heavy rainfall, impacting access to critical facilities. One location (see Error! Reference source not found. **in Appendix C**) i s in Nashville along N. 1st Street, where Stony Creek causes flooding along the road extension to a regionally significant public safety communications tower. The only means of access to the emergency (911) communications tower is a low-lying gravel access road located within a regulated FEMA floodway. Emergency managers need unrestricted access to the tower, particularly during storms, to ensure the backup generator has fuel. The communication tower is the hub for simulcasting fire and EMS response across the county, and it supports local school bus communications and radio stations.

A second location (see Error! Reference source not found. **in Appendix C**) identified by s takeholders is in Roanoke Rapids along Smith Church Road near the East Carolina University (ECU) Health North Hospital, where flooding during Hurricane Matthew overwhelmed undersized culverts, restricting access to the hospitals for emergency vehicles, employees and community members. Hurricane Floyd caused flooding in the basement of the hospital where the generators are located, prolonging the hospital closure during the storm. The ECU Health North Hospital is the only medical center in the county and is also one of the biggest employers.

Additional locations previously identified to be considered for this project include:

- City of Wilson fire station, located at 307 Hines St W, Wilson, NC 27893.
- Wilson Emergency Operations Center, located at 1800 Herring Ave E, Wilson, NC 27893.
- City of Wilson Wiggins Mill Pumping Station.
- Culverts in Halifax County located at Highway 301, Bridges Road, Ringwood Road, and Route 481 leading to Town of Enfield.
- Pump stations in Rocky Mount at Fenner Road, Church Street, and Old Mill Road.
- Town of Nashville lift station located at Indian Trail.
- Pinetops Wastewater Treatment Plant located in Edgecombe County.
- Chapel Hill Church Road substation located in Northampton County.

This project will take the first steps toward ensuring access to critical infrastructure and facilities during and after heavy rainfall, providing benefits to vulnerable populations and first responders.

Similar projects are being completed across North Carolina. In July 2022, The Town of Leland, NC was awarded a $950,000 grant through the NC Emergency Management Transportation Infrastructure Resiliency Fund to identify critical routes within and surrounding Town limits. During Hurricane Florence, critical evacuation routes were impacted by flooding. Like the project identified for the Upper Coastal Plain region, the Leland Resilient Routes Project will analyze routes to determine their resiliency to flooding and storm surge, and routes that prove vulnerable to these hazards will have potential solutions identified. Additionally, six counties in western North Carolina will replace approximately 28 low water bridges to protect access for emergency vehicles, school buses, and agricultural vehicles to traverse them. This Fixing Low Water Bridges for Emergency, Transportation, Technology, Equity and Resilience project will receive $10.7 million to complete the enhancements.

Implementation

Description of Implementation

The following steps may assist the lead implementers in getting started.

Step 1 – Define, identify and map critical facilities

- Determine classifications for infrastructure that is critical:
  - Health resources (emergency medical services, dialysis centers, pharmacies, urgent care centers, hospitals).
  - Emergency response (emergency operations centers, police and fire stations, emergency shelters, cellular communication towers).
  - Utilities (pump stations, lift stations, water treatment facilities, electrical substations).
  - Group quarters and vulnerable housing (colleges and universities, correctional institutions, nursing homes, mobile home parks).
  - Hazardous contamination potential (hazardous waste sites, landfills, power plants).
  - Social hubs and resources (schools, houses of worship, SNAP-authorized retailers).
- Work with local Emergency Managers to identify critical facilities:
  - Data can come from existing lists of known sources and from the Vulnerability Assessment.

Step 2 – Identify existing projects

- Collate all projects relevant to flood impacts on roads that enable critical facility access using existing documents into a list, such as:
  - Hurricane Matthew Resilient Redevelopment Plans (Edgecombe, Halifax, Nash, Northampton, Wilson Counties).
  - Nash Edgecombe Wilson Regional Hazard Mitigation Plan (2020).
  - Halifax Northampton Regional Hazard Mitigation Plan (2021).
  - Additional local, county or other documents.
- Work with NC Department of Transportation and other partners to identify projects that have not been addressed.

Step 3 – Define a prioritization process

- Determine an appropriate method and criteria for prioritizing identified projects.

Step 4 – Scope and align projects with funding

- Ensure all projects have a defined scope and a description of need.
- Align each project with relevant funding sources.

Barriers to Implementation

Likely barriers to implementation for this project include defining the categories of critical facilities and then subsequently prioritizing projects for funding. Like the Vulnerability Assessment, it will be important to consider facilities beyond EMS, fire, communications, etc. to include things such as pharmacies, schools, nursing homes, and grocery stores as providing critical services to vulnerable populations. These challenges have historically been a source of impediment for various agencies, as there are simply too many projects and not enough funding. One strategy to address defining critical facility categories is to consider, locally or regionally, infrastructure serving the most vulnerable populations. For example, immediately surrounding the ECU Health North Hospital, there are census tracts with high social vulnerability, indicating that these communities are likely to experience negative impacts from flooding more so than communities with lower social vulnerability. Additionally, with a large number of employees and people dependent on this hospital—the only one in the county, it would be important to include health facilities as a category of critical facilities. There should be collaboration amongst implementers and partners to ensure criteria for prioritization is equitable and acknowledges previous efforts to date.

Needed Resources

- **Lead implementers**: Halifax County Emergency Management, Nash County Economic Development Administration
- **Confirmed partners**: TBD
- **Recommended partners**: NC Department of Transportation (Divisions 1 and 4, and Resilient Routes Program), Upper Coastal Plain Rural Planning Organization, North Carolina Emergency Management, Peanut Belt RPO

Personnel beyond the lead implementers are necessary to carry out the phases of this project. Engagement from the North Carolina Department of Transportation (NCDOT), Division 1 and Division 4, will be critical to the success of this project, as many locations have already been identified by NCDOT. Additionally, North Carolina Emergency Management (NCEM) cand NCDOT can further facilitate roadway, bridge, and ‘Resilient Routes’ projects, as these two

agencies already coordinate with each other when administering grants via the Emergency Management Transportation Infrastructure Resiliency Fund. The Upper Coastal Plain Rural Planning Organization and knowledge from county emergency managers and other local officials can aid in identifying needs and defining the prioritization process. County GIS data, NCDOT hydrological data, and FEMA floodplain data will all be important information for this project.

Funding Opportunities

The Infrastructure Investment and Jobs Act (IIJA) has historic levels of new and supplementary funding for transportation-related resiliency projects. In particular, the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) and Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) program's formula funding and competitive grants will be major opportunities for counties and municipalities to bundle multiple capital and resiliency planning projects together. Half of funding allocations will go to transportation projects in rural communities, ensuring racial equity, and aiming to remove barriers to opportunity. Additional federal programs, such as the FEMA's Building Resilient Infrastructure and Communities (BRIC), Rural Surface Transportation Grants, and Safe Streets and Roads For All may potentially fund such projects.

At the state level, Disaster Relief and Mitigation Grant (DRMG) and Transportation Infrastructure Resiliency Grant (TIRG) funds can be used for flood mitigation efforts that stabilize areas and reduce future damage, or for predevelopment assistance to provide small and underserved communities with technical assistance to identify and design shovel-ready projects related to disaster relief and flood mitigation. The Period of Performance (POP) is 36 months, and the application deadline for FY22 was March 31st, 2022.

- Transportation Infrastructure Resiliency Grant:
  - Eligible applicants include state agencies, units of local government, and nonprofit organizations to facilitate transportation resilience against natural disasters.
  - Approximately $15 million in funding was made available in the last round (April 2022).
  - Funds can be used for:
    - Projects that update and prepare transportation infrastructure for storms, mudslides, and flooding.
    - Risk assessments for critical transportation routes.

    - Creating community-informed flood risk and vulnerability assessments that identify resilience gaps and help maintain vital transportation functions following floods.
- Disaster Resilience and Mitigation Grant:
    - Eligible applicants include state agencies, units of local government, and nonprofit organizations for use in flood mitigation efforts.
    - Approximately $15 million in funding is available.

TIRG funding may be well aligned with the Roanoke Rapids location, and DRMG funding may be well aligned with the Nashville location.

The FEMA Pre-Disaster Mitigation Grant program funds projects that "plan for and implement sustainable cost-effective measures designed to reduce the risk to individuals and property from future natural hazards, while also reducing reliance on federal funding from future disasters. The program has previously funded projects like emergency ingress/egress improvements, bridge replacement, etc.

The Rural Surface Transportation Program, administered by U.S. Department of Transportation, "supports projects to improve and expand the surface transportation infrastructure in rural areas to increase connectivity, improve the safety and reliability of the movement of freight and people, and generate economic growth and improve quality of life."

The identified project may be an appropriate match for the $65,000 Duke Energy Accelerator Grant. The project is defined as a desktop effort to review existing plans and prioritize plans based on defined criteria and will result in a clear path to move project forward towards implementation as funding is available.

Table 4 - Funding Opportunities for Upper Coastal Plain 'Resilient Routes'

Title	Project D Alignment	Source	Amount	Type	Timing
NC Emergency Management Transportation Infrastructure Resiliency Grant (TIRG)	All steps	NC Department of Public Safety / NC Emergency Management (in coordination with NCDOT)	$15 million (FY23)	Grant	FY23 deadline was March 31, 2022
NC Emergency Management Disaster Relief and Mitigation Grant (DRMG)	All steps	NC Department of Public Safety / NC Emergency Management	$15 million (FY23)	Grant	FY23 deadline was March 31, 2022
Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grants	All steps	US DOT	$7.5 billion in additional funding over five years	Grant	FY23 deadline is February 28, 2023
PROTECT Program	Step 4	FWHA; NCDOT	Estimated $194 million total for State over 5 years for North Carolina (via formula allocation) + nationwide competitive grants	Competitive grant	Not available at this time.
Pre-Disaster Hazard Mitigation Grant (PDM)	All steps	FEMA HMGP; funds administered via NC Emergency Management	FY22 appropriated $154 million total	Grant	FY22 funding cycle deadlines on May 25th and September 30th – FY23 likely similar

Title	Project D Alignment	Source	Amount	Type	Timing
Rural Surface Transportation Grant Program	All steps	US DOT	$2 billion (nationwide total for FY22-FY26)	Grant	FY23 deadline was May 23, 2022
FEMA Building Resilient Infrastructure in Communities (BRIC)	All steps	FEMA; NC Emergency Management Hazard Mitigation Division	$2.295 billion to be distributed for FY22; See NC DPS website for more information	Grant	Annual; applications FY22 round were due in December 2022. The Notice of Funding Opportunity is typically posted in the summer and Communities (sub-applicants) must submit a Letter of Interest by October.

Project E – Heat Wave Response Protocol Template

Project Overview

Heat illness is an increasing concern in North Carolina and across the Upper Coastal Plain. Local communities vary in their awareness of heat health issues, the type of heat illness prevention programs already in place and activities that can help individuals vulnerable to extreme heat. As described in the CDC's Heat Response Plans: Summary of Evidence and Strategies for Collaboration and Implementation, a heat wave response protocol describes and organizes government and community activities to prevent heat-related morbidity and mortality. The protocol guides government agencies and partners to provide services and information to the public and at-risk groups during periods of high heat and humidity. Protocols may cover a broad geographic scope (county or region) or a smaller area (city or neighborhood).

This project would use the CDC guidance to create a template that defines response procedures for emergency managers and other relevant officials when a heat wave is forecasted. The template will contain educational materials (e.g., CDC Heat Response Plan guidance document) to help local governments understand the need for heat response and inform the public about available resources and actions to take before and during extreme heat events. The intention is for each local and county government in the Upper Coastal Plain to adapt the template to suit their needs and adopt the protocol.

The template and accompanying materials will specify how to reach the following vulnerable populations (Connecticut Division of Emergency Management and Homeland Security, 2021):

- Infants and young children, which are sensitive to the effects of high temperatures and rely on others to regulate their environments and provide adequate liquids.
- People 65 years of age or older, who may not compensate for heat stress efficiently and are less likely to sense and respond to change in temperature.
- People who are overweight. These individuals may be prone to heat sickness because of their tendency to retain more body heat.
- People who overexert during outdoor work or exercise, who may become dehydrated and susceptible to heat sickness.
- People who are physically ill, especially those with heart disease or high blood pressure, or who take certain medications, such as for depression, insomnia, or poor circulation. These individuals are often more sensitive to extreme heat.
- People who are socially isolated, linguistically isolated, and living alone.

Heat management strategies help communities prepare for and respond to heat risks. As climate change continues to increase average temperatures, more frequent, longer lasting and more intense heat waves will challenge residents' health. Most cities and towns do not have a plan to help community members respond to extreme heat. The most recent data indicates that 2019 was the warmest year on record for North Carolina, and scientists project the number of very hot days will increase to 17-60 days per year for the state. The number of excessively warm nights is expected to increase from an average of six per year to 23-55 per year by the 2050s (Kunkel, et al., 2020). Urbanized areas across the region that have higher amounts of impervious surfaces (e.g., roads, buildings, etc.), which absorb heat during the day and release it into the evening hours, are likely to experience more warm and very warm nights, which will make it difficult for people to cool down.

State agencies in and outside of NC have begun developing heat response protocols and management plans. The Climate and Health Program, housed in the NC Department of Health and Human Services, Division of Public Health, developed the NC Climate and Health Implementation and Monitoring Strategy (IMS) for Heat-Related Illness. The project tailored heat heath education and information campaigns in Bladen County (for agricultural workers), Robeson County (for low-income people and those living in mobile homes), Sampson County (for low income and older adults), and Scotland County (for youth). In these four counties, the Division worked with key stakeholders to assess current heat-illness prevention efforts, identify needed resources and identify specific populations to assist. In another project, the Connecticut Division of Emergency Management and Homeland Security developed an extreme heat emergency management procedure (July 2022) that outlines actions in advance of a forecasted heat wave. It includes a sample press release and specifies roles and responsibilities for the Division and other agencies. Additional examples of heath response plans and protocols include:

- San Diego County, CA – Excessive Heath Response Plan (2021)
- Stanislaus County, CA – Extreme Heat Contingency Plan (2022)
- Cumberland District, ME – Coordinated Heat Response Plan (2015)

Implementation

Description of Implementation

The following steps may assist the lead implementers in getting started.

Step 1 – Create an advisory group

- Convene an advisory group for the duration of the project that includes project partners and any other relevant areas of expertise, such as:
  - National Weather Service
  - State, county, tribal and local health departments
  - Hospitals and healthcare coalitions
  - Colleges and universities
  - School districts
  - American Red Cross
  - Aging and Adult Services
  - Occupational Safety and Health Professionals
  - Emergency Response Teams

Step 2 – Write a template outline to identify the information needed

- The advisory group will guide development of the outline using the Heat Response Plans: Summary of Evidence and Strategies for Collaboration and Implementation, and other community protocols as a starting point.
- Consideration will be given to the uniqueness of Upper Coastal Plain communities to tailor the document for the region.

Step 3 – Write the template

- Identify experts on the advisory group or elsewhere to fill in the template outline.

Step 4 – Review template

- Advisory group will review template and present template for community draft input and review.

Step 5 – Encourage communities to adapt the template to their community and adopt it

- The advisory group will present the heat wave response protocol to local government officials and request formal adoption to enforce roles and responsibility assigned in the protocol.

Barriers to Implementation

A potential barrier to implementation may be convincing local governments to adopt the protocol. While extreme heat is a climate hazard identified in multiple plans and documents for the Upper

Coastal Plain region, it has been infrequently talked about by stakeholders and community members. There is a need to educate local governments about heat wave risks to garner more support for addressing the climate hazard. Additionally, the Upper Coastal Plain has vulnerable population groups, such as transient agricultural workers and migrant populations from coastal counties, that are increasingly displaced by hurricanes, coastal storms and sea level rise. It may take additional time and funding to identify key stakeholders and representation for the identified project.

Needed Resources

- **Lead implementers**: Edgecombe, Halifax, Nash, Northampton, and Wilson County Health Departments.
- **Confirmed partners**: Working Landscapes.
- **Recommended partners**: County Emergency Managers, County Emergency Operations Centers, local public health departments, NC Department of Health and Human Services–Climate and Health Program (NCDHHS, Division of Public Health), universities and colleges.

Personnel beyond the lead implementers are necessary to carry out the phases of this project. County emergency managers can connect the advisory council to information from the National Weather Service. They can also assist in coordinating emergency public service announcements and providing timely warnings about extreme heat and heat waves. Emergency managers may also be able to assist in coordinating cooling shelters or other similar public resources. Local public health departments and the North Carolina Department of Health and Human Services (NC DHHS) may be able to provide guidance related to the most vulnerable populations and their needs before, during and after heat waves. Page 16 of the CDC Heat Response Plan provides examples of types of partners and organizations that have participated in state or local heat response plans around the US. Additional personnel that work directly with the Low-Income Home Energy Assistance Program (LIHEAP) and the Weatherization Assistance Program (WAP) may have resources to share with the advisory group as well.

Additional data that will be useful for the advisory group and implementing this project may include existing hospital records, ER visit data, historic morbidity and mortality rates, location and number of cooling stations, and weather data. The NC DHHS Resilience Strategy report, North Carolina Emergency Operations Plan (Annex B, Appendix 9) – Heat Emergency Response Plan, and North

Carolina Climate and Health Adaptation Plan will also be important resources for guiding the identified project.

Funding Opportunities

Funding opportunities may exist through the North Carolina Climate and Health Program. This program is part of a national public health effort to anticipate and prepare for human health effects related to global and local climate change. The program has been supported by the Centers for Disease Control and Prevention's Climate and Health Program since 2010 and was recently awarded federal funding via C.D.C.'s Building Resilience Against Climate Effects (BRACE) program to continue and expand climate and health adaptation work through 2026. The BRACE program "assists local health departments, nonprofit agencies, and community-based organizations to implement climate change and health adaptation projects addressing impaired air quality (from wildfire and prescribed burning), extreme heat, and/or extreme weather events (e.g., inland or riverine flooding, hurricanes)."

In September 2022 the North Carolina Division of Public Health, Occupational and Environmental and Epidemiology Section solicited proposals from local health departments, nonprofit agencies, and community-based organizations for "Climate Change Adaptation in the Sandhills Region" to implement climate change and health adaptation projects addressing impaired air quality (from wildfire and prescribed burning), extreme heat, and/or extreme weather events (e.g., inland or riverine flooding, hurricanes).

Additional funding may come from other federal programs, such as LIHEAP, US EPA's Environmental Justice Small Grants (EJSG), and the FEMA Building Resilient Infrastructure and Communities (BRIC) program:

- In July 2022, NC DHHS issued guidance that will help LIHEAP program recipients expand how they respond to extreme heat and support vulnerable communities by providing for a range of flexible options. The guidance discussed adjustments recipients can make to their LIHEAP programs, including:
    - providing education to LIHEAP applicants and beneficiaries about how to keep their homes cool during extreme heat, including safe use of their cooling equipment and setting indoor temperatures sufficient for the make-up of household members, especially those with older adults, young children, and individuals with disabilities. LIHEAP energy burden reduction set-aside funds can be used to support home energy education activities.

  - establishing cooling centers, which may include partnering with other public facilities such as local libraries, community centers and government buildings, where people can remain cool during the hottest periods of the day, as well as coordinating how to help move homebound individuals to cooling centers if needed.
  - providing and coordinating targeted outreach to identify households at greatest risks to ensure they are in a temperature-safe environment.
- Since its inception in 1994, the US EPA's EJSG Program has awarded more than $37 million in funding to over 1500 community-based organizations, tribal governments, and Native American organizations to support and empower communities working on solutions to local environmental and public health issues. The Environmental Justice Small Grants program "supports and empowers communities working on solutions to local environmental and public health issues. The program is designed to help communities understand and address exposure to multiple environmental harms and risks."
- In FY 2022 FEMA doubled the funding available through its BRIC Program to $2.3 billion, its highest level ever, to help state and local governments, tribes and territories proactively mitigate natural hazards and extreme weather, including reducing vulnerabilities to heat waves. BRIC funds projects with multiple phases, such as assessments, engineering studies, benefit cost analysis, project scoping, etc.

The Climate Ready States and Cities Initiative "helps grant recipients use the five-step BRACE framework to identify likely climate impacts in their communities, potential health effects associated with these impacts, and their most at-risk populations and locations." As mentioned above, the BRACE framework helps grant recipients develop and implement health adaptation plans and address gaps in critical public health functions and services.

The Preventative Health and Health Services Block Grant, administered by the CDC, "supports local programs and actions to achieve healthy communities through public education and awareness." Additionally, the $65,000 Duke Energy Accelerator Grant may be a good match for funding this project.

Table 5 - Funding Opportunities for Heat Wave Response Protocol Template

Title	Project E Alignment	Source	Amount	Type	Timing
Building Resilience Against Climate Effects (BRACE) grants	All steps	CDC; NC Department of Health and Human Services; Occupational and Environmental Epidemiology Section	Grants of up to $101,000 were recently made available for BRACE: Implementing and Evaluating Adaptation Strategies that Protect and Promote Human Health in the Sandhills Region	Grant	Information regarding timing and priority location(s) for next round of grants is not available at this time.
Climate-Ready States and Cities Initiative (CRSCI) Grant	All steps	CDC; North Carolina Department Health and Human Services	Not available at this time.	Grant	Information regarding timing of next round of grants is not available at this time.
Environmental Justice Small Grants (EJSG) Program	All steps	EPA	$100,000 max award	Grant	Annual, varies
Preventative Health and Health Services Block Grant	All steps	CDC	FY22 total allocation was $146 million – NC received $4.3 million	Grant	Not available at this time.

Title	Project E Alignment	Source	Amount	Type	Timing
FEMA Building Resilient Infrastructure in Communities (BRIC)	All steps	FEMA; NC Emergency Management Hazard Mitigation Division	$2.295 billion to be distributed for FY22; See NC DPS website for more information	Grant	Annual; applications FY22 round were due in December 2022. The Notice of Funding Opportunity is typically posted in the summer and Communities (sub-applicants) must submit a Letter of Interest by October.

Project F – Comprehensive Plan and Zoning Ordinance Updates to Manage Climate Change

Project Overview

Integrating climate change into the framework of a comprehensive plan can provide the structure a community needs to adopt policies that promote energy efficiency, reduce greenhouse gas emissions and adapt public infrastructure, services, natural systems and resources to climate impacts. Additionally, amending zoning ordinances to tie in the climate objectives of the comprehensive plan can support pathways for implementation.

This project would 1) identify the status of all Upper Coastal Plain municipal comprehensive plans, 2) conduct an audit of these plans for references to climate change, 3) create a template for integrating climate change into existing or future comprehensive plan updates, and 4) review and amend zoning and unified development ordinances to align with comprehensive plan objectives related to climate change. Ideally, the project will result in one or more pilot municipalities integrating climate change into their comprehensive plan and zoning ordinances. Local communities have used climate action plans and hazard mitigation plans to address climate change, but comprehensive plans can provide a more holistic, integrated framework to mitigate and adapt across community systems.

Local communities have used climate action plans and hazard mitigation plans to address climate change, but comprehensive plans can provide a more holistic, integrated framework with strategies to mitigate and adapt across community systems. Chapter 160D of the North Carolina General Statutes requires North Carolina municipalities to adopt a Comprehensive Plan or Land Use Plan by July 1, 2022. The new Chapter consolidates current city- and county-enabling statues for development regulations into a single, unified chapter that is more logical and has more coherent organization. It affects all city and county zoning, subdivision, and other development regulations, including unified-development ordinances and has meant that some municipalities need to update Unified Development Ordinances. In the Upper Coastal Plain five-county region, there are approximately 15-25 municipalities that have comprehensive plans.

In conjunction with a comprehensive plan, zoning ordinances can act as the method of enforcement for policies specified in comprehensive plans. Zoning is a tool to promote and manage growth, regulating and controlling land to ensure there are complementary uses in a specific area (e.g., single-family homes next to single-family homes, instead of single-family

homes next to industrial operations). Often development goals identified in comprehensive plans are not attainable without related zoning ordinances. Areas that can be influenced by comprehensive plans and zoning include density of development, open space uses, impervious surface ratios, and landscape design. One example of a county including a section related to climate change in their comprehensive plan is Broward County, FL, which adopted a climate change element (2019) that included a policy stating:

> "Broward County, in conjunction with its municipalities and partner agencies, shall work to ensure that adaptation to climate change impacts, especially sea level rise, is incorporated into the planning, siting, construction, replacement, and maintenance of public infrastructure in a manner that is cost-effective and that maximizes the use of the infrastructure throughout its expected lifespan."

Additional examples of communities with climate change elements include:

- Everett, WA – Comprehensive Plan, Climate Change and Sustainability (2015)
- Milwaukie, OR – Comprehensive Plan, Climate Change & Energy (Ch. 6) (2020)

Future land use plans often accompany comprehensive plans, and these documents are used to guide decisions on rezonings and development regulations. These maps show desired land uses and can help decision makers decide where to focus development and where to avoid certain types of development. Through the identified project, the climate change component of a comprehensive plan can include language to designate areas that are at increased risk of flooding due to climate change and ensure zoning regulations are appropriate to limit certain land uses in these areas. These changes can benefit marginalized populations that may be more vulnerable to climate hazards based on where they live in relation to certain zoned areas.

Implementation

Description of Implementation

The following steps may assist the lead implementers in getting started.

Step 1 – Catalogue Upper Coastal Plain comprehensive plans

- Identify the status of comprehensive plans for all municipalities in the Upper Coastal Plain region.
- Create a library of plans for review.

Step 2 – Conduct a pilot audit of "climate change" for small number of comprehensive plans

- Project team will begin the audit for a select number of comprehensive plans to identify elements of climate change.
- As appropriate, the project team will expand the audit to all comprehensive plans to identify references to "climate change" and related terminology to be defined by the project team.
- Project team will conduct a gap analysis during comprehensive plan review to identify where existing plans could integrate climate-related goals and policies.

Step 3 – Guidance for integration

- Project team will review how similar communities have integrated climate change into comprehensive plans.
- Project team will provide recommendations and strategies for municipalities to update comprehensive plans to address climate change and vulnerabilities.

Step 4 – Zoning code and unified development ordinance amendments

- Project team will identify opportunities for each municipality to amend zoning ordinances and unified development ordinances to align with comprehensive plan objectives and policies related to climate change.
- Planning staff for each municipality will administer the process of codifying any new ordinances or amendments.

Barriers to Implementation

A challenge may be willingness of municipalities to update comprehensive plans, as most (if not all) have just finished this activity per Chapter 160D requirements. Comprehensive plan updates can be a large undertaking for municipalities that lack staff capacity and resources. Generally, comprehensive plans are updated every 5-15 years depending on need or requirements. To address this challenge, the lead implementer and project team may consider integrating the climate change component into comprehensive plans that have not been adopted by municipalities yet.

Needed Resources

- **Lead implementer**: Upper Coastal Plain Council of Governments.
- **Confirmed partner**: Working Landscapes.
- **Recommended partners**: ECU Department of Community and Regional Planning, Local and County Planning Departments.

This project will require involvement from multiple parties. The Upper Coastal Plain Council of Governments (COG), the project's lead implementer, is the planning organization for the five-county region. There are 40 municipal governments that hold membership in the Council. These municipalities can provide the project team with relevant documents (e.g., comprehensive plans, future land use maps, unified development ordinances, zoning ordinances, zoning maps, etc.) to aid in cataloguing and auditing comprehensive plans for related terminology. College planning and public administration students could also help with cataloguing and auditing. Local elected officials will be important partners to assist with zoning code and unified development ordinance amendments. The project team can also use data and findings from the Upper Coastal Plain Vulnerability Assessment to identify each community's climate vulnerabilities and vulnerable neighborhoods to consider local relevance.

Funding Opportunities

The Upper Coastal Plain COG has funding for staff to work with local governments on climate resilience within strategic planning efforts. This project may be aligned well with partnership efforts between the COG, local governments, and academic institutions. It may also align well with the Duke Energy Accelerator Grant for $65,000.

The North Carolina Wildlife Resources Commission Partners for Green Growth program "will reimburse cost-share funds up to $20,000 and provide 80 hours of technical assistance from Commission wildlife biologists to support local government planning projects that consider wildlife and natural resource conservation in land use and development planning, incentives and ordinances." Local governments and Councils of Government are eligible to apply for funding, and requests can only be up to 75% of the entire project cost and 25% non-federal in-kind match is required to make up the remaining total project cost.

The project will result in unified efforts to plan for and steer land uses and development activity throughout the region, with respect to generational resilience efforts and climate adaptation. Comprehensive planning actions will be able to steer local government activity for the next 20-25 years. It is important that climate change and vulnerabilities are address now before it is too late to make decisions that increase the resilience of communities.

Table 6 - Funding Opportunities for Comprehensive Plan and Zoning Ordinance Updates to Manage Climate Change

Title	Project F Alignment	Source	Amount	Type	Timing
Partners for Green Growth (PGG) Technical Assistance Program	Step 3 – Step 4	N.C. Wildlife Resources Commission's (NCWRC) Green Growth Toolbox program	up to $20,000 (reimbursement-based)	Reimbursement	Annual
FEMA Building Resilient Infrastructure in Communities (BRIC)	All steps	FEMA; NC Emergency Management Hazard Mitigation Division	$2.295 billion to be distributed for FY22; See NC DPS website for more information	Grant	Annual; applications FY22 round were due in December 2022. The Notice of Funding Opportunity is typically posted in the summer and Communities (sub-applicants) must submit a Letter of Interest by October.

Project G – Using Regional Vulnerability Assessment to Inform Elected Officials about Resilient Decision-Making

Project Overview

Local government staff and elected officials are often aware of flood zones and FEMA flood maps for their jurisdiction. These maps communicate flood vulnerability for properties by categorizing them as inside or outside of 100-year floodplains and 500-year floodplains. However, elected officials and additional local government personnel (e.g., Board of Commissioners, Chamber of Commerce, and planners) may not be aware of the implications for pursuing or allowing development within and near flood zones.

This project would present information about data and findings from the Upper Coastal Plain Region Vulnerability Assessment to city, town and county elected officials and staff. The goal is to clearly articulate climate hazards and vulnerabilities in each county to increase resilient decision-making. This project would:

- Hold county-specific presentations for city and county commissioners and the public.
- Use data from the vulnerability assessment to show locations of greater vulnerability.
- Use FEMA or other flood map layers to portray land at risk of 100-year and 500-year flooding and projected future flooding influenced by climate change.
- Create simple maps for, at minimum, each county seat for the region visually depicting the floodplain within the jurisdiction.
- Provide and maintain this information: as a web-viewer (e.g., ArcGIS StoryMap or other platform), perhaps on all relevant city, town, and county websites; as a physical handout for elected officials; and hosted on the Upper Coastal Plain Council of Government's data portal.

The vulnerability assessment revealed informative data and conclusions related to climate hazards and vulnerabilities within the Upper Coastal Plain region. While the document is long and comprehensive, it is important that the critical components are recognized and understood by those with decision-making power. This project will help officials make science-based decisions related to current and future impacts from flooding, extreme heat and other climate impacts – always with the understanding that the most vulnerable residents are hit first and hardest. For example, social vulnerability data can be overlayed with floodplain maps to demonstrate how the most vulnerable populations are often impacted. Additionally, the same information can be

presented at local public meetings to inform residents of important findings and conclusions that may be relevant to them.

Locations for the project may begin with each county seat (Tarboro, Halifax, Nashville, Jackson, and Wilson), as this is where most elected officials and county functions are located. Populations within these towns may see benefits earlier than populations within the county; however, benefits are dependent on actions taken by elected officials.

Flooding was identified in the vulnerability assessment as the top climate hazard for the region, and by providing additional hazard data and strategies to elected officials, they would be able to influence decisions toward more resilient choices. For instance, municipal and county land use maps can be presented together or overlayed with areas at risk of flooding now or in the future, including areas where future development would put populations at risk of flooding.

This project can also help elected officials understand the importance of integrating climate resilience into comprehensive plans, as mentioned in Project F (Comprehensive Plan and Zoning Ordinance Updates to Manage Climate Change).

Implementation

Description of Implementation

The following steps may assist the lead implementers in getting started.

Step 1 – Create vulnerability assessment handouts and maps

- Use data and conclusions from the Upper Coastal Plain Vulnerability Assessment to create a plain language summary, perhaps in the form of a fact sheet, for each county.
- Create maps depicting the floodplain in each jurisdiction, especially where it overlaps with vulnerable populations.

Step 2 – Hold meetings with local elected and public officials

- Schedule approximately two meetings with elected officials and government staff in each of the five counties in the Upper Coastal Plain region.
- County Board of Commissioner and/or Town Council/Board meetings are likely good opportunities for the project team to attend:
    - Meeting examples include:
        - Edgecombe County – Tarboro Town Council, Edgecombe County Board of Commissioners.

  - Halifax County – Town of Halifax Board of Commissioners, Halifax County Board of Commissioners.
  - Nash County – Town of Nashville Town Council, Nash County Board of Commissioners.
  - Northampton County – Town of Jackson Board of Commissioners, Northampton Board of Commissioners.
  - Wilson County – Wilson City Council, Wilson County Board of Commissioners.
- Create a meeting agenda template and materials that can be modified for each meeting; ensure the agenda items encourage a discussion between all participants, avoiding a pure presentation format.
- Send the agenda and vulnerability assessment handouts to attendees in advance.
- Use each meeting to discuss specific locations of greater vulnerability within the jurisdiction, understand the most pressing issues related to climate hazards that local officials are managing, learn about projects underway, and identify opportunities for increasing climate resilience.

Step 3 – Connect communities with resources and continue conversations

- Following each meeting, provide attendees with resources to help the local government address its vulnerabilities.
- Check-in with each local government from time to time and continue conversations about increasing climate resilience.

Barriers to Implementation

Potential challenges include the willingness of local government staff to participate and level of effort to make changes to what is often the status quo. Commissioners and councils often have specific goals for their community or county and may be hesitant to make changes. It may also take time and repeated effort by the lead implementer(s) to convey the important information and findings from the vulnerability assessment and other climate hazard data.

Needed Resources

- **Lead implementers**: Upper Coastal Plain Council of Governments
- **Confirmed partners**: TBD
- **Recommended partners**: Local planning departments

Staff time, technical knowledge and data will be needed to complete this project. The project lead, the Upper Coastal Plain Council of Governments (COG), is the planning organization for the five-county region. The COG works closely with the 40 municipal governments who hold membership on the Council. Their leadership and existing connections will help with scheduling meetings. Additionally, the COG has ongoing efforts related to hazard mitigation and climate resilience that will contribute to fruitful meeting discussions. The COG currently has one planner proficient in GIS but will need dedicated funding to cover cost of efforts. The project team will need the final Vulnerability Assessment document, FEMA floodplain data layers, GIS data for jurisdictions, land use maps, and any other layers that can help communicate climate vulnerabilities.

Funding Opportunities

The Upper Coastal Plain COG has funding for staff to work with local governments on strategic planning with relation to resiliency planning. The Duke Energy Accelerator Grant for $65,000 may also align well with this project.

Rural Transformation Grants, administered by the NC Department of Commerce, “provide funding to local governments with grants and expert guidance to improve economic vitality and overcome the unique challenges many rural communities face.” This program can support initiatives that help create resilient neighborhoods, community enhancements that spur economic growth, and professional development and education programs to build local government capacity.

Table 7 - Funding Opportunities for Using Regional Vulnerability Assessment to Educate Local Officials about Resilient Decision-Making

Title	Project G Alignment	Source	Amount	Type	Timing
Council of Government	All steps	Annual budget	TBD	TBD	TBD
Rural Transformation Grants	Step 1 – Step 2	NC Department of Commerce	Varies depending on grant category	Grant	TBD

Appendix A – Initial Working List of Projects

The following table describes additional projects identified through stakeholder meetings, public input, and document review. Based on combination of scores from the Resilience Scorecard (see **Appendix B – Resilience Scorecard**), lack of stakeholder support, and technical feasibility, these projects are not included in the final Project Portfolio.

PROJECTS UNDER CONSIDERATION	DESCRIPTION
Environmental health assessment	Evaluate factors related to climate equity and public health
Stormwater management analysis and planning	Consider the development and adoption of a stormwater management plan that can include: • Modeling and assessment of flooding potential along streams based upon new developments that occur upstream • Establishing stormwater utility funds in jurisdictions throughout the region to pay for stormwater management projects • Encourage low impact development (LID) techniques in urbanized areas at the lot and subdivision level to reduce stormwater runoff and flooding • Identify locations for detention facilities and best management practices to mitigate peak flow and runoff in needed locations
Community emergency preparedness plan	With many channels of information related to ways to prepare yourself and home for natural hazard events, this project can create a plan to: • Identify relevant and trusted channels of communication • Explore utilizing early flooding notification tools • Explore ways to encourage residents to enroll in local emergency warning systems • Create preparedness programs targeted towards vulnerable populations (including LEP, Latine, seniors, low-income, disabled, mobile home communities) • Partner with volunteer groups or other organizations to create preparedness survival kits

PROJECTS UNDER CONSIDERATION	DESCRIPTION
Food network and agriculture resilience plan	Build upon opportunities and recommendations from the Upper Coastal Plain Health Food Access Mapping assessment by: • Identifying strategies to build redundancy into food systems to mitigate supply disruptions • Identifying agricultural assets in the five-county region that are vulnerable to climate hazards • Supporting the development of local food distribution centers, small community gardens, and/or pop-up farmers markets • Aligning efforts with Tri-COG Food Ecosystem Economic Development Strategy (Tri-COG FEEDS)
Critical facilities assessment	An assessment of critical facilities can: • Build upon existing data from the Vulnerability Assessment and other sources to determine which critical facilities may need possible improvements to reduce exposure to hazards • Create a plan to secure and maintain supplemental equipment necessary for operations during hazards • Determine options for relocating or flood proofing critical facilities in/near the floodplain • Provide strategies for actions to address improvements
Waterway clearing and maintenance	Create a program to ensure that waterways stay clear of debris so they can effectively move water during storm events. The project can: • Establish and maintain a coordinated program to identify locations of debris and create a process for debris removal • Identify partnerships at the local, state, and federal level to clear and snag stormwater conveyances • Identify sustained funding opportunities for continued maintenance of waterways
Regional flood analysis	A flood analysis can: • Build upon the Vulnerability Assessment's identification of flooding impact to sectors across the region

PROJECTS UNDER CONSIDERATION	DESCRIPTION
	• Analyze flood risk across the five-county region using current data and future projections • Identify additional hot spots along roads and at critical locations that experience repetitive flooding • Procure and place flood sensors and gauges at needed locations to provide real-time data • Install signage at hot spots warning about flooding
Transportation and mobility analysis	The Upper Coastal Plain region has areas outside of cities and towns that lack transportation options, including residents that lack the use of a car. This analysis can: • Analyze current public transportation options for each municipality and county in the region • Survey residents about their individual mobility needs • Identify established emergency evacuation routes and examine usability
Local resiliency hubs	Identify strategies to replicate the resiliency hub model throughout the five-county region to build local capacity.
Regional culvert analysis and improvements	A regional culvert analysis can: • Build upon existing data to identify aging and undersized stormwater infrastructure across the five-county region • Create a plan to upgrade and retrofit undersized culverts where needed • Create a plan to build new culverts where needed • Clean and remove debris from culverts where identified

Appendix B – Resilience Scorecard

The Resilience Scorecard contains a detailed set of criteria that was informed by a variety of sources, including FEMA's STAPLEE criteria for hazard mitigation project prioritization, Rocky Mount's Resilience Scorecard, and the project team's expertise on the subject matter. The Resilience Scorecard was approved by NCORR staff and Upper Coastal Plain stakeholders. The Resilience Scorecard ranks projects across three categories—Effectiveness, Implementation, and Benefits. There are five questions per category, for a total of fifteen questions on the Resilience Scorecard.

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

The projects were scored using a point scale from -1, 0, 1 where:

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

The project team provided a rationale for scoring of each criterion. Each project can generate an overall score between -15 and 15. Projects that scored between 10 to 15 are considered high priority strategies, those with scores between 5 to 9 are medium priority, and those with scores of less than 5 are low priority.

Appendix C – Project D Locations Map

Error! Reference source not found. depicts the location of the emergency communications tower (red X) in relation to Stony Creek (blue waterway) and N. 1st Street.

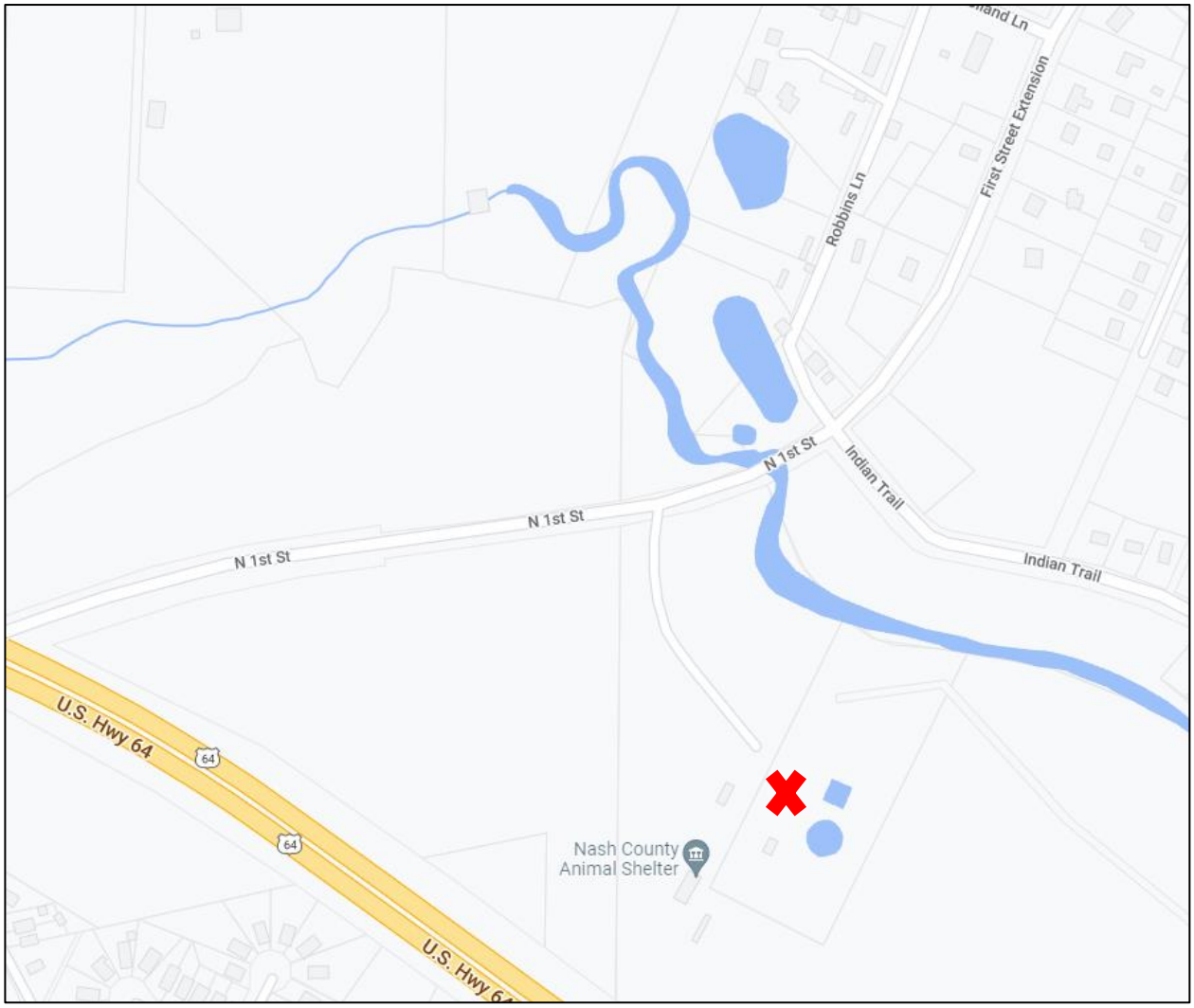


Figure 1 - Stony Creek/N. 1st Street (Nashville, NC)

Figure 2 depicts the location of the ECU Health North Hospital in relation to Chockoyotte Creek (blue waterway) and Smith Church Road.

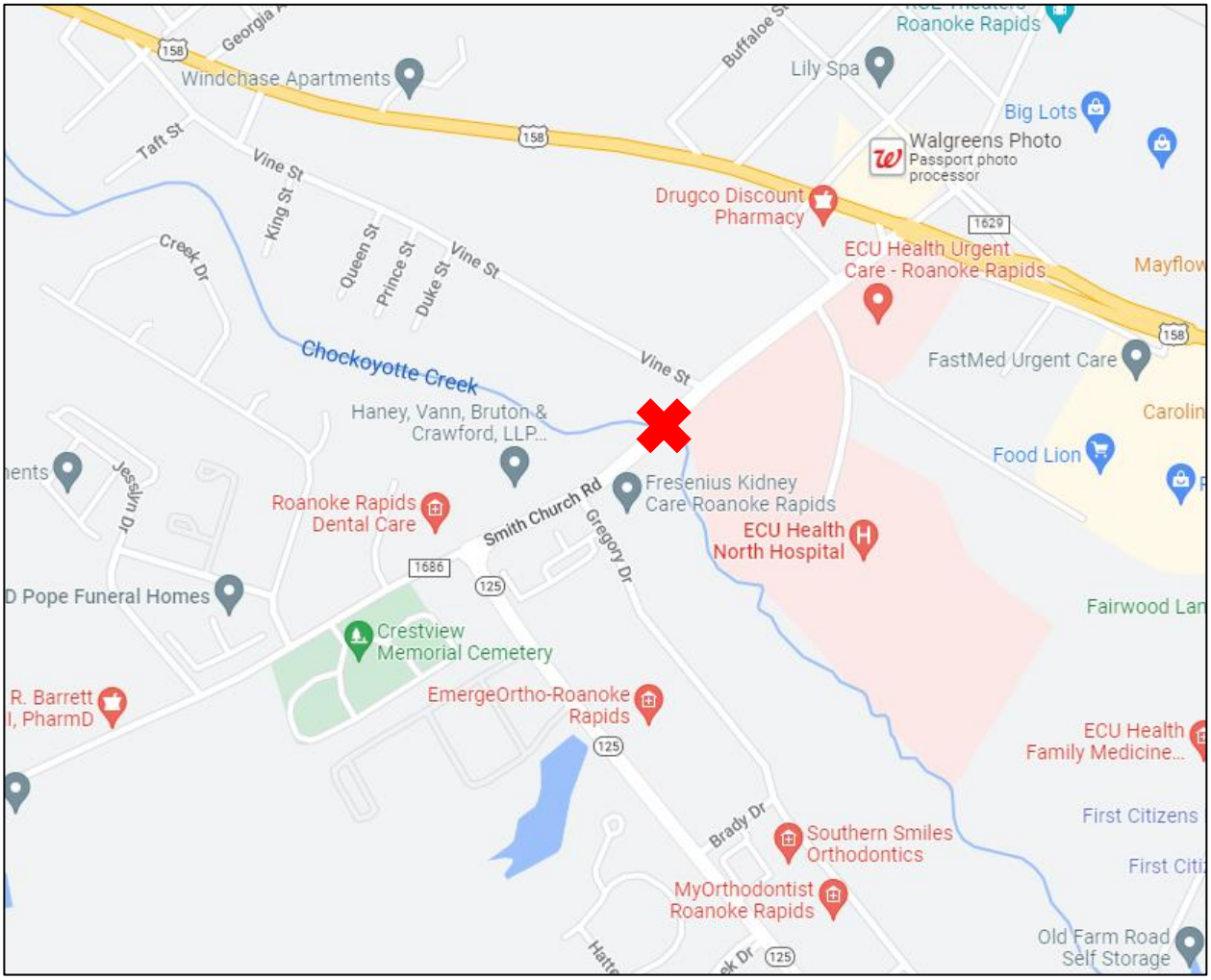


Figure 2 - Chockoyotte Creek/Smith Church Road (Roanoke Rapids, NC)

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