**KERR-TAR REGION**

**Building Inventory and Sustainable Business Opportunities**

This project would establish a regional inventory of buildings (businesses, offices, and industrial spaces) and identify opportunities to modify them with more sustainable elements. The inventory would consist of building attributes such as location, public access, age, opportunity for upgrades, construction materials, and physical site features. One component of the project is creation of materials, scorecards, and/or certification of sustainable buildings and business practices.

**Dam Safety Plan**

Throughout the Kerr-Tar region, there are 227 dams located on public and private lands regulated and inspected by state and federal agencies. Some of the structures are certified by the North Carolina Department of Environmental Quality (NC DEQ) under the Dam Safety Laws (Dam Safety Law of 1967. [1967, c. 1068, s. 1.] and G.S. 143-215.24) due to these dams having the potential to cause property damage, personal injury, and loss of reservoir storage. Working in partnership with NC DEQ’s Division of Energy, Mineral, and Land Resources (DEMLR) and local officials, the Kerr-Tar region will develop a plan that addresses dam safety and mitigation actions across the region. The project would include inspection of existing structures and their appurtenant features,[5] components of geotechnical and structural investigations to establish data for risk analysis, evaluation of the design life of a dam to ensure that it continues to perform effectively, and developing recommendations to address potential risks factors, repairs, and funding for repairs.

**Emergency Shelters and Facilities Needs Assessment**

A Needs Assessment of Emergency Shelters and Facilities in the region is an important issue for emergency management officials. In Granville and Vance counties, emergency managers indicate that the current hard copy filing system can be burdensome during times of emergencies and needs to be updated to a system that protects the information, and is accurate, duplicative, and accessible. During times of emergencies, schools, churches, and government facilities act as shelters. Of the documented shelters, many lack backup generators, transfer switches, heating and cooling capabilities, modern wiring, adequate capacity, ability to be used for special medical needs, equipment storage, and various supplies. A Needs Assessment provides the region with high-quality documentation to supplement grant applications for funding opportunities. The main elements that will be captured in a Needs Assessment of current emergency facilities at minimum include; All facilities used as emergency shelters, especially ones that are currently undocumented or are used on a more informal or temporary basis; Facilities that require upgrades, improvements, and/or relocation to withstand current and future climate hazards; and the needs of each shelter including generator availability, capacity (for use when in county or out of county demands are required), and alternative power and heat sources.

**Well Water Assessment in Environmental Justice Communities**

This project would undertake an analysis of well water issues related to environmental justice in the region. The project focus will be on assessing private drinking water wells and water quality in EJ communities to develop a final report with findings and recommendations. Accessing current information about private drinking water wells is limited and it is understood that private drinking water wells are not routinely inspected for water quality by regulatory agencies or health departments. Instead, private well owners in North Carolina are responsible for testing their own water to ensure it is safe to use. These information gaps have major impacts on populations who rely on the wells as the primary potable water source.

**Environmentally-Friendly Farming Practices to Improve Soil Health\*\*\***

This project includes recruitment of a diverse set of farmers (minority and small-scale operators) to participate in a regenerative farming program aimed at increasing soil health and reducing utilization of fertilizers. One to three farmers per county will be selected to participate in the project. There will be a total of 10-15 participating farmers across the region. There will be an emphasis on methods that also address overcoming drought, flooding, increased heat risks and/or risks to agricultural and transient workers. The study builds upon an existing pilot project. At the start, funding will be used for soil testing, soil processing and sampling, and equipment. Positive outcomes include greater opportunities for advancement for smaller farms, contribution to the field of soil health and soil science, and reduced usage of fertilizers.

**MID-EAST REGION**

**Regional Drainage Capacity Assessment\*\*\***

Poor debris management, dumping, and aging critical infrastructure have contributed to poor regional drainage capacity. Develop a regional drainage capacity assessment to identify blocked culverts, ditches, and natural systems within the region.

**Prioritized Vulnerability Inventory of Bridges and Culverts**

Natural hazards create debris that often blocks bridges and culverts along common evacuation routes. Create an inventory of bridges and culverts along most common evacuation routes for prioritized cleanup efforts.

**Upsizing Regional Stormwater Infrastructure\*\*\***

Aging infrastructure in the region is often overwhelmed during severe storm surges and nuisance flood events. Inventory and create a map of most vulnerable infrastructure to prioritize projects that increase the capacity of stormwater infrastructure.

**Green Infrastructure in Urban Flooding Hotspots\*\*\***

Chronic urban flooding is negatively impacting the structural integrity of homes, businesses, and critical infrastructure. Installing green infrastructure systems in urban flooding hotspots will prevent flood conditions from overwhelming critical infrastructure.

**Regional Hazard Information-Sharing Partnership**

Mid-East residents have expressed frustration at the lack of public information available on community-specific natural hazard mitigation strategies and documents. Develop a Regional Hazard Information-Sharing Partnership to reduce the burden on local authorities to prepare and provide natural hazard-focused information.

**EASTERN CAROLINA REGION**

**Regional Resilience Staff Position (Part 1 of 2)\*\*\***

Coordination of resilience activities across Eastern Carolina requires the full-time effort of a staff member within an established organization. A Regional Resilience Coordinator would work to support projects and secure resources for regional and local resilience initiatives.

**Regional Resilience Funding (Part 2 of 2)\*\*\***

Necessary funding and support mechanisms to implement resilience projects are often lacking. Establish a circuit rider program in the region to provide grant application services.

**Regional Drainage Capacity Assessment\*\*\***

Poor debris management, dumping, and aging critical infrastructure have contributed to poor regional drainage capacity. Develop a regional drainage capacity assessment to identify blocked culverts, ditches, and natural systems within the region.

**Beneficial Reuse of Acquired Properties**

Flooding frequency and severity are expected to rise over the next few decades. As flood-prone properties get acquired by municipalities, development plans for the properties must be made. Prioritize “green” development of acquired flood-prone properties to support natural watershed functioning.

**Green Infrastructure to address Urban Flooding Hotspots\*\*\***

Chronic urban flooding is negatively impacting the structural integrity of homes, businesses, and critical infrastructure. Installing vegetated swales in urban flooding hotspots will prevent flood conditions from overwhelming critical infrastructure.

**CAPE FEAR REGION**

**Coastal Stormwater Management Tools\*\*\***

Due to the intersection of development, tourism, and coastal environmental systems, many coastal communities have inadequate stormwater management systems, especially given future growth and changing coastal hazards. Stormwater management in ocean-facing communities is technically challenging and often costly. Local stakeholders have suggested multiple knowledge and guidance gaps that could be filled by regional or state resources. These include guidance on sizing stormwater infrastructure, resources on jointly addressing water quality and flooding, and legal analysis on local regulatory tools for guiding stormwater-wise development.

**Regional Stormwater Engineer Services**

Stormwater management challenges are prominent throughout the region. Population growth supports economic opportunity in the region, but new development can make flooding challenges worse. Managing the new development process is one the best opportunities to ensure that new development does not worsen stormwater problems, but many communities do not have an engineer on staff who can enforce local stormwater regulations. Create a regional contract mechanism for interested local jurisdictions to contract externally for stormwater engineering services, coordinated by a central organization, in this case, the Council of Governments.

**Outreach and Education for Stormwater Management on Private Property\*\*\***

A significant portion of drainage and stormwater infrastructure are located on private property, sometimes with collective ownership on behalf of a subdivision. Problems with this infrastructure can lead to localized flooding on site or on neighborhood properties or roadways. Landowners may not be aware of their responsibility to ensure proper maintenance or may not have the resources to do so. Establish an outreach program for private entities to provide education and awareness of stormwater management infrastructure. The program would include material on stormwater management basics, understanding landowner and permit-holder responsibilities, green infrastructure techniques and other retrofits, and financing strategies.

**Living Shorelines Site Analysis and Best Practices\*\*\***

The region's beaches and shorelines are critical to the quality of life and economy of the region and state. These areas are also susceptible to erosion and damage from storm events. Many people recognize common defenses against erosion and storm damage as hard barriers like revetments and sea walls. However, these barriers are expensive to build and maintain, disrupt natural systems, and can displace the impact of wave energy and erosion onto nearby properties. Many coastal jurisdictions in Cape Fear are interested in implementing living shorelines, but do not have a clear pathway to identify the most suitable sites and installation. The proposed project would include a region-wide GIS-based analysis of strong site possibilities, overlaid with public ownership. It would also offer best practices and recommendations based on experiences of living shorelines experts in the state. Jurisdictions interested in participating in the project would be invited to connect with one another and be provided with technical assistance for grant applications for installation.

**Mitigating Risk in Manufactured Housing**

Residents of mobile and manufactured housing (MHUs) endure disproportionately higher impacts from natural hazards. MHUs do not withstand severe weather as well as stick-built homes. Furthermore, they tend to be less energy efficient, exposing residents to higher risks of heat illness and energy cost burden. Compounding these issues, MHUs comprise a significant portion of the affordable housing available to low- and moderate-income (LMI) households, especially in inland areas. Conduct a study to examine the challenges and feasible solutions for hazard mitigation in diverse types of MHUs and MHU communities. Identify a solution to implement as a pilot project that may be replicated in other interested communities within the region.

**Regional Resilience Planner and Grant Writer\*\*\***

Local governments in the region would like to build long-term resilience but have limited capacity to pursue new opportunities or to hire a subject matter expert. Create a regional position to provide resilience planning and grant writing assistance to local communities for resilience planning and grant writing.

**Community-Government Resilience Collaboration Centers**

Building resilience, especially in our changing climate, is too large of a task for government to accomplish alone. Community based organizations and institutions play an essential role in supporting resilience day-to-day and in emergencies. Partnerships between community-serving entities and government can channel government resources toward the resilience needs of the community before, during, and after disasters, in addition to other programming led by the organization or institution. There are numerous community organizations and institutions that already play this role, with or without government collaboration, throughout North Carolina and in the Cape Fear region. Better understand and support existing community organizations and institutions in the state and region that support, or could support, the resilience of communities to climate change. Examine ways to support existing organizations through technical assistance, direct funding, relationship-building, and direct upgrades. Explore the possibility of building a partnership with government to enhance climate resilience services offered on site. If there is community support, develop a feasibility study and proposal to submit for funding.

**Flood Data**

During recent major storm events (e.g., Hurricanes Florence and Matthew) extreme flooding occurred outside of the FEMA Special Flood Hazard Area (SFHA) or 'mapped floodplain'. As hazards, such as flooding and hurricanes, evolve over the course of the next several decades it will be helpful to understand where flooding occurs outside the floodplain. Create a dataset on historic flooding that occurs outside the FEMA-mapped SFHA. Utilize historic water marks from past flood events and local knowledge about areas of frequent flooding. The project could also include the development and/or refinement of existing projections of future floodplain in the region based on climate data.

**TRIANGLE J REGION**

**Develop a River Warning System**

The river warning system would include a mile-marker system, a notification system and educational programming. The mile-marker system would be created in coordination with emergency responders to improve locational awareness for both river users and emergency management response teams to ensure that, if a river rescue is needed, responders can accurately locate individuals relevant to river access points.

**Plan and Prioritize Stream Restoration\*\*\***

The project would identify local sources of impairment and develop a process for identifying and prioritizing stream restoration solutions in a manner that takes downstream and upstream actions into consideration. The locations along stream networks that are most vulnerable would be prioritized in coordination with state and local officials as well as stream restoration experts.

**Install Back Up and Redundant Power Sources**

The project would identify the correct alternative power solutions for 22 locations identified by staff at Lee and Moore County governments, and provide the equipment and connections to ensure sufficient power to maintain operations during and post-disaster. Backup power sources include but are not limited to generators, voltage converters and automatic transfer switches that enable continuous delivery of electrical power during disasters.

**Establish a Locally-Administered Repetitive Loss Program**

This project is a county-administered repetitive loss program to address vulnerabilities related to flooding. The goal of the project is two-fold: (1) identify structures that repetitively flood and need flood mitigation and (2) fund and implement flood mitigation activities for the identified structures. The proposed program will fund flood mitigation activities such as structure elevation, property acquisitions and reconstruction for residences and businesses susceptible to repetitive flooding.

**Develop a Privately Owned Dam Inventory and Dam Ownership Guidebook**

This project contains three key components: (1) create an inventory of privately-owned dams and stormwater facilities, (2) prioritize needed maintenance and repairs at high impact dam and stormwater facilities and (3) develop a dam ownership guidebook for property owners with responsibility over these facilities.

**Develop Regional Guidance for Coordinated Stormwater Infrastructure Improvements\*\*\***

This project would provide guidance to local governments on how to coordinate and prioritize stormwater infrastructure projects together and with projects planned by the NC Department of Transportation (NCDOT). Note: this is not a regular project. The only fix is legislative.

**Develop a Heat Wave Response Protocol Template**

The document would include community educational materials to be distributed during summer months (e.g., materials on heat-related illness prevention strategies and warning signs, available resources and where to find them) and organize government and community activities to prevent heat-related morbidity and mortality.

**UPPER COASTAL PLAIN REGION**

**Housing Needs Assessment**

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.

**Regional Emergency Shelter Feasibility Analysis**

This 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.

**Electrical Assessment and Procurement of Transfer Switches for Emergency Shelters**

This project would procure and install transfer switches at designated emergency shelters.

**Flood-Resilient Roadways for Critical Facilities**

This project will create a prioritized list of regionally significant critical facilities that are vulnerable to flooding. In addition, the project will apply for funding to prevent flooding in priority locations that experienced inundations in previous storms (e.g., Hurricanes Matthew, Florence, Floyd).

**Heat Wave Response Protocol Template**

This project would use this CDC guidance document to create a template that defines response procedures for emergency managers and other relevant officials when a heat wave is forecasted. The project will also create educational materials to 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.

**Comprehensive Plans and Zoning Ordinances Address Climate Change\*\*\***

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.

**Inform Elected Officials about Climate Resilient Decision Making\*\*\***

This project would develop a template to 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.

**LUMBER RIVER REGION**

**Stormwater Infrastructure and Drainage Assessment (Mapping)\*\*\***

This project would create a comprehensive map of stormwater and drainage infrastructure for areas in the region that want this data and do not currently have it. This information will support the development of infrastructure to manage current and future stormwater flows and reduce flooding. Utilizing Geographic Information Systems (GIS) software, this project would map existing ditches, canals, drainage easements, pipes, culverts, and other stormwater conveyance systems, including flow direction and connectivity, within the region.

**Stormwater Infrastructure - Hydrologic and Hydraulic Modeling\*\*\***

As described in Project A, flooding from stormwater runoff is a consistent natural hazard that affects many communities across the Lumber River region. Most stormwater infrastructure in the region consists of a complex network of canals and ditches rather than concrete pipes and culverts. The proposed project would conduct hydrologic and hydraulic (H&H) modeling for select stormwater systems within the region. H&H models help describe the volume, speed, depth, and elevation of stormwater runoff. Modeling problematic areas within the region is an interim step between mapping infrastructure and drainage (Project A) and proposing shovel-ready projects for implementation.

**Housing Needs Assessment for Older Adults**

The project would conduct a baseline assessment of the housing needs of older adults and the resources currently available. This assessment can focus on where older adults live in more detail, and how well their housing serves their needs, from accessibility to disaster safety. The assessment can also document gaps and needs in the existing programs that fund repairs and weatherization. A secondary component to the project, if wanted and supported by local agencies, would establish a working group of local and state agency representatives that have existing programs that assist with home repairs and weatherization upgrades to coordinate program requirements and serve low-income and older adult populations in the Lumber River region. The working group will be positioned to document gaps and needs in programs, while strengthening relationships needed to accurately refer residents to available resources.

**Community-Government Resilience Collaboration Centers**

The proposed project would 1) examine the interest for developing one or more community-government resilience collaboration centers in the region, through discussions with grassroots leaders and local emergency management and then 2) conduct a feasibility study for starting and operating a center in the Lumber River region, looking at relevant examples in and outside of North Carolina. The final product for this project would be a feasibility assessment and, if warranted, a proposal for establishing one or more resilience collaboration centers in the region.

**Wetland Restoration for Flood Mitigation\*\*\***

The proposed project will identify a suitable location or locations within the five-county Lumber River region and conduct restoration and rehabilitation efforts to wetland areas to reduce flooding risk and benefit local communities. The project will also capture lessons learned and the value of wetland restoration for flood mitigation to encourage other similar projects across the region.

**Stream Gauge Installation**

The proposed project will procure and install stream gauges for identified locations in the five-county region. Where possible, coupling the installation of rain gauges with stream gauges should be considered, as rain gauges provide additional data on precipitation totals and drought.

**Lumber River Resilient Routes: Flood-Resilient Roadway Accessibility for Secondary Roads**

The proposed project includes creating a prioritized list of regionally significant roadways that are vulnerable to flooding. In addition, interested local governments, with support from state entities, may package, co-develop, and apply for funding for priority locations that flooded in previous storms (e.g., Hurricanes Matthew, Florence, etc.).

**ALBEMARLE REGION**

**Stormwater Working Group\*\*\***

Throughout the Albemarle Region, stormwater infrastructure is undersized, failing, or in need of maintenance. All of these factors increase the risk of flooding, especially as heavy rainfall events increase in frequency and severity, and development increases the volume of stormwater runoff. Establish a Working Group to evaluate the region’s stormwater capabilities, identify needs, and develop collaborative approaches to reducing stormwater flooding in the Albemarle Region.

**Stormwater & Watershed Management Planning\*\*\***

To bring stormwater management in the Albemarle Region to a level that will address current and future needs and account for new development and a changing climate, robust planning needs to be completed to identify strategies and maintenance requirements at the local and watershed level scales. Provide training and collaboration opportunities that will result in development of stormwater management plans and watershed master plans throughout the Albemarle Region. Distribute outreach materials to address stormwater flooding issues.

**Harmful Algal Blooms Prevention & Identification\*\*\***

Harmful Algal Blooms (HABs) present unique ecosystem and health hazards. HABs have occurred in the past in the region but have become a more frequent problem in the last ten years. While there has been research and involvement by many partners, an exact cause has not yet been determined. Conduct outreach to educate the public on the harms of HABs, identification, and reporting of blooms, and how to reduce exposure. Work with partners to develop a response protocol for notification of the blooms to stakeholders in the region.

**Community Rating System User Group**

The Albemarle Region has a high flood exposure. At the same time, flood insurance rates are becoming more expensive. Some residents are considering dropping their flood insurance as a result. Establish regional coordination through the Albemarle Commission to encourage each county/municipality to enroll in the CRS program to reduce the cost of flood insurance. Provide leadership for the development of a CRS User Group that will meet throughout the year. This group consists of municipal, county, regional, and state networks that collaborate to meet local flood mitigation goals and support one another in qualifying for CRS credit.

**Public Outreach\*\*\***

Hazards have long-lasting and repetitive impacts, and long recovery times, and cause a variety of lingering issues such as substandard housing. Without public awareness about these hidden impacts, the public is less likely to make personal choices to mitigate their property. Develop a multi-faceted public awareness program, partnering with non-profit organizations, academia, and businesses. Use museums, planetariums, and education centers in the Albemarle Region to conduct outreach on past hazard events and frame potential future impacts.

**MID CAROLINA REGION**

**Green Infrastructure County Pilot Projects\*\*\***

The scope of this project will be to implement one (1) green infrastructure project in each of the three (3) counties in the Mid-Carolina Region (Cumberland, Harnett, and Sampson) to address issues of local vulnerability and bolster resilience against natural hazards. All three project sites were identified as problem areas in the Vulnerability Assessment for the Mid-Carolina Region. The pilot projects will exhibit the co-benefits offered by green infrastructure to neighboring communities.

**Heatwave Early Warning Systems (HEWS) and Action Plans**

The objective of this project is to implement a heatwave early warning system to forecast heatwave events to increase public awareness.

**Install Additional Stream Gauges**

The installation of additional stream gauges and sensors at multiple locations throughout the region has been identified as a need that will help improve flood warning and forecasting in areas that repetitively flood. The additional gauges will provide information to map and communicate real-time water levels and flood risk.

**Feasibility Assessment for Energy Backup Installation in Marginalized Communities & Critical Facilities**

Conduct an assessment to determine the best suited solutions for energy backup across the region that would benefit marginalized communities and simultaneously provide redundant systems for critical facilities. The assessment aims to identify optimal locations for energy backup to serve two crucial functions. The first function is to provide backup power generation to selected critical facilities to ensure continuity of operations and time sensitive response during a disaster (flood, extreme heat, hurricane, drought, or wildfire). The second function is to provide marginalized communities with reliable power.

**Stream Debris Removal**

Stream debris removal, on identified streams, throughout the region was identified as a high priority resilience action for the Mid-Carolina Region. Based on input gathered through the public and Stakeholder Partnership meetings, locations were selected based on need and their potential impact on the region.

**Climate Equity Index Tool\*\*\***

Using GIS technology, the Mid-Carolina Regional Council will lead the development of an interactive mapping tool that overlays available hazard data with socially vulnerable populations data to display increased risk for marginalized communities to better understand existing disparities that challenge resilience within these communities. The tool will display different layers including climate impacts, social vulnerability, natural resources, and built assets.