2022

CLIMATE RESILIENCE PROJECTS FOR THE MID-EAST REGION

MID-EAST Commission

NCORR RISE
Regions Innovating for Strong Economies and Environment

N C DPS
DEPARTMENT OF PUBLIC SAFETY

EQUAL HOUSING OPPORTUNITY

Contents

LAND ACKNOWLEDGMENT

We wish to acknowledge and honor the Indigenous communities native to this region and recognize that this vulnerability assessment covers communities and structures that are built on Indigenous homelands and resources. We recognize the Chowanoke, Lumbee, Meherrin, Moratok, Pamlico (Pomouik), Secotan, and the Skaruuhreh/Tuscarora 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.

INTRODUCTION

North Carolina Office of Recovery and Resiliency Overview

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 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) funds and Community Development Block Grant – Mitigation (CDBG-MIT) funds, 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 the Economic Development Administration Disaster Supplemental Funds. NCORR manages programs statewide that include homeowner recovery, infrastructure, affordable housing, resiliency, and strategic buyouts. To learn more about NCORR programs, visit the ReBuild.NC.Gov website. NCORR is a division of the Department of Public Safety.

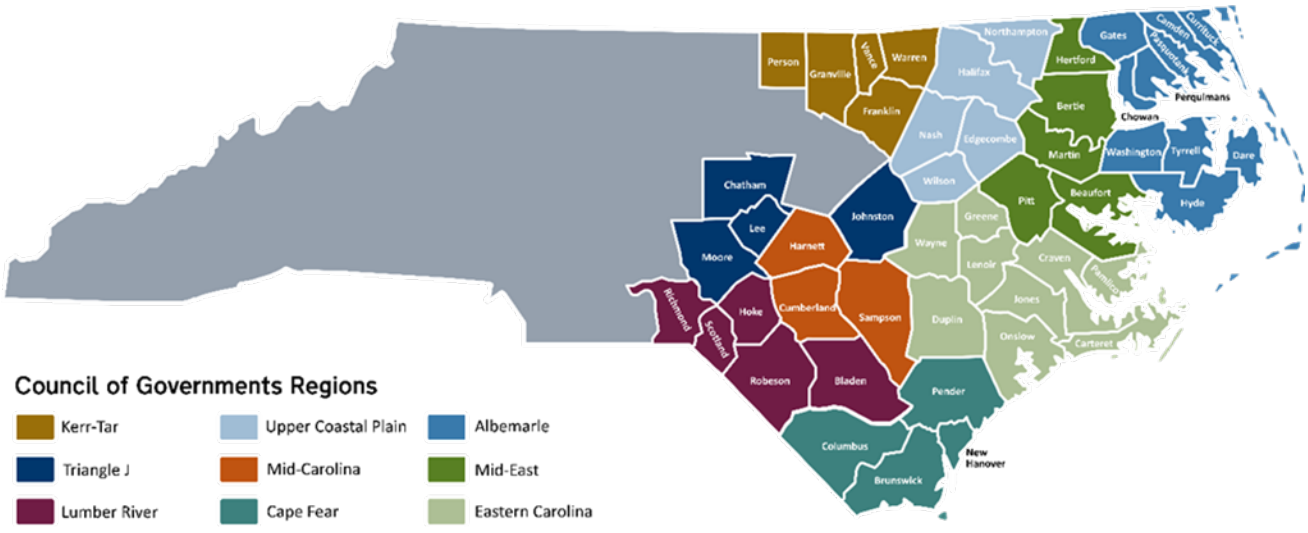
RISE Regional Resilience Portfolio Program Overview

Developed in partnership with North Carolina Rural Center, NCORR's Regions Innovating for Strong Economies and Environment (RISE) program supports resilience in 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, identify priority actions to reduce risk and enhance resilience in their region, and develop paths to 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 Rural Center leadership training workshop, which operates in the eastern half of the state, that emphasizes resilience as a tool for community economic development.

RISE is funded by the U.S. Economic Development Administration and the U.S. HUD CDBG – Mitigation funds, with in-kind support from NCORR and North Carolina Rural Center. In addition, the Duke Energy Foundation committed $600,000 in grant funding to support the Regional Resilience Portfolio Program.

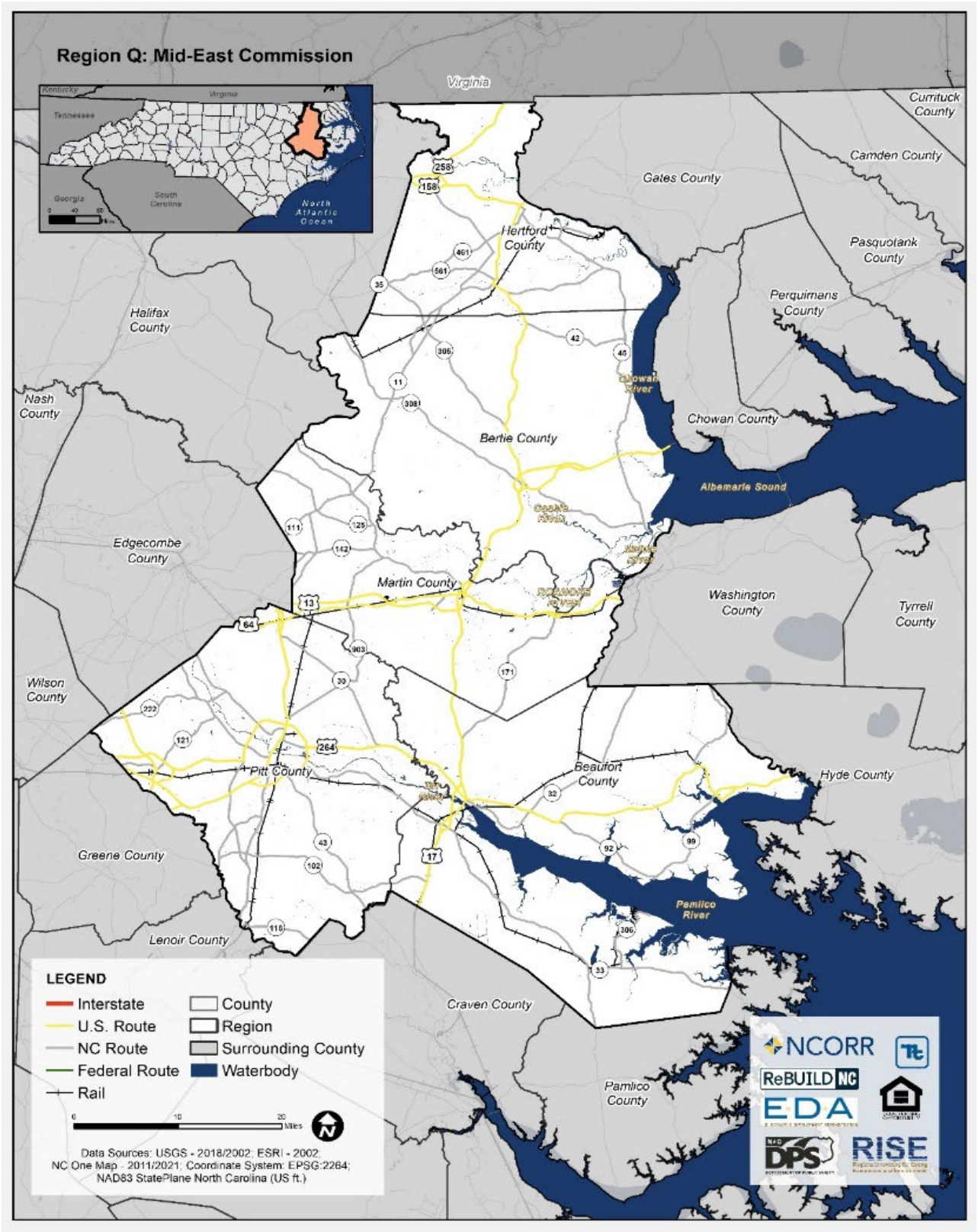
Figure 1. RISE Councils of Government



The Mid-East Region

The Mid-East Region is composed of Beaufort, Bertie, Hertford, Martin, and Pitt Counties. It is a wide, essentially flat, coastal plain lying within the inner coast along the Albemarle and Pamlico Sounds, as seen in **Figure 2** below. With 276,412 people, the region is dominated by rural, undeveloped, agricultural lands and woodland that is sparsely populated (US Census n.d.).

Figure 2. The Mid-East Region



Regional Team

The planning effort in the Mid-East Region is led by a project team composed of an NCORR representative, the Mid-East Commission, Tetra Tech, Inc., and a regional facilitator. The Mid-East Commission offered project guidance, and Tetra Tech, Inc. provided technical assistance. The North Carolina Rural Center hired a local leader to provide facilitation support at the many stakeholder and public meetings held during the planning process.

Stakeholder Partnership

The planning effort in the region is informed by a Stakeholder Partnership to ensure the vulnerabilities identified reflect local priorities. The Stakeholder Partnership:

1. Steered the choice of the project by providing local input and perspective;
2. Reviewed project materials to ensure materials reflect local priorities and address local concerns; and
3. Attended monthly meetings.

The Stakeholder Partnership, consisting of 34 local subject matter experts, represents a cross-section of stakeholders from the region, including representatives from all counties and sectors. Development of the Stakeholder Partnership also considered diversity in race, gender, abilities, and age.

People Working Together

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January 3, 2023

Dear Mid-East Commission Region Residents,

The Mid-East Commission region, encompassing Beaufort, Pitt, Martin, Bertie, and Hertford Counties, is dynamic, ever evolving, adapting, and changing to meet the needs of its residents, employees, and visitors. However, natural hazards continue to challenge and impact the region's social, environmental, and economic systems and infrastructure. The region has been working diligently through collective action and proactive planning efforts to reduce the impacts of future natural hazard occurrence.

The Mid-East Commission region has developed a Regional Resilience Project Portfolio in response to climate exacerbated natural hazards. The actions proposed in the portfolio address the major concerns identified in the Mid-East Commissions Vulnerability Assessment. The Resilience Project Portfolio provides an in-depth project overview and implementation pathway for each proposed project. The projects identified in the portfolio represent needs identified through numerous meetings and input from residents, elected officials, and local leaders with assistance from the North Carolina Office of Resiliency, the North Carolina Rural Center, Tetratech Consulting, East Carolina University, and the Mid-East Commission.

As you read through the Mid-Carolina's Portfolio of Projects, 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,

Bryant Buck, Executive Director

Pat Harris, Director Planning, Economic Development, and Community Services

Lisa Williams, Disaster Recovery Specialist

Serving: Beaufort County ● Bertie County ● Hertford County ● Martin County ● Pitt County

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REGIONAL RESILIENCE PORTFOLIO DEVELOPMENT

The Regional Resilience Portfolio Program is a two-part effort consisting of the *Climate Change and Natural Hazards Vulnerability Assessment for the Mid-East Region* and a Project Portfolio (refer to ***Figure 3***). The vulnerability assessment bridges science and local knowledge to identify current and future hazards impacting the region and to determine the region's strengths and challenges when faced with those hazards. For a summary of the analysis completed for the vulnerability assessment please refer to the ***Analysis*** section. To view the vulnerability assessment in its entirety please visit the Mid-East Regional Resilience Portfolio website.

The Project Portfolio is a compilation of regionally focused projects that will provide benefits throughout the Mid-East Region. The portfolio is designed to identify funding opportunities, and potential project implementers, and provide a clear pathway to enable the successful implementation of each project. Projects identified for inclusion in the portfolio were vetted by local leaders and community members and further developed by technical and subject matter experts.

Figure 3. The Mid-East Region Regional Resilience Program Process

Additionally, public input was solicited through a series of online surveys, virtual meetings, and in-person meetings to identify vulnerabilities, challenges, and potential solutions throughout the region. The project team worked with the Regional Stakeholder Partnership during the first half of 2022 to identify vulnerabilities and challenges throughout the region. A series of virtual public workshops was held in April 2022 to engage community members in program, solicit feedback on vulnerabilities and challenges, and identify additional local concerns and needs.

Once the vulnerability assessment was completed, the project team and Regional Stakeholder Partnership identified potential projects to address the vulnerabilities and challenges identified in the assessment. Proposed projects included public awareness and messaging, construction and nature-based solutions, program and policy development, and studies and analyses.

The Regional Stakeholder Partnership prioritized seven projects to present to community members to gain feedback and input. In-person workshops were held in October 2022, where all seven projects were introduced to members of the public, stakeholders, and community leaders. These participants voted on the projects which they deemed most beneficial to the region and also submitted written and verbal comments.

The next step in prioritizing projects involved incorporating feedback from the public workshops and ranking each project based on criteria developed by the Regional Stakeholder Partnership. After projects were refined to include feedback or combined to increase efficacy, projects were ranked based if they did or did not meet the ranking criteria. The following criteria and questions were utilized to develop a resilience score card rating for each of the seven potential projects. The resilience score card ratings are available in Appendix B: Resilience Scorecard.

Table 1. Ranking Criteria

Category	Considerations
Reduction in Risk	How many hazards are addressed? What is the probability the hazard(s) will occur?
	Does the project protect life or property or both?
	Does the project address current and future hazards?
	Does the project reduce the risk at a regional scale?
	Does the project reduce a non-climate stressor?
Scale	Is the project regional?
	Can the project be replicated?
Cost	What is the range of cost? Low (Under $50K)? Medium ($50K–$1M)? High (Over $1M)?
Benefits	Do benefits outweigh the costs?
Timeframe	How long will it take to implement the project? Short: Less than 5 years. Medium: 5–15 years. Long: More than 15 years
Feasibility	Is the project technically and legally possible?
	Will permitting be required?
	Are project sponsors identified, engaged, and have the capacity to implement the project?
	Is a funding source identified?
Socioeconomic	Does the project aid in building a strong economy?
	Does the project supports improving community infrastructure (e.g., road network)?
Climate Justice and Equity	Does the project benefit areas with a high Social Vulnerability Index?
	Does the project have a positive, qualitative impact on populations that identify as Black, Indigenous, or People of Color (BIPOC)?

Category	Considerations
	Does the project improve health resources?
Environmental Impacts	Does the project address drivers of climate change?
	Does the project use nature-based solutions?
	Does the project provide habitat restoration for threatened and endangered species?
Public and Stakeholder Support	Is there strong support for the project? Was it ranked as a high priority by the Stakeholder Partnership and community?

The results from the resilience score card and general support of the Regional Stakeholder Partnership were combined to identify the five projects most likely to be successfully implemented. These prioritized projects are included in this Project Portfolio. The remaining projects that are not included in the portfolio are included in Appendix A: Full List of Proposed Resilience Projects in the Mid-East Region for reference.

Analysis

As a first deliverable, the Mid-East Region completed a vulnerability assessment to analyze risks to the Mid-East Region, which covers Beaufort, Bertie, Hertford, Martin, and Pitt Counties.

The Climate Change and Natural Hazards Vulnerability Assessment for the Mid-East Region is a report describing past problems and future risks associated with extreme weather events such as hurricanes, flooding, extreme temperatures, droughts, and wildfires. The report outlines the impacts of these climate hazards on housing, the environment, and the economy.

To view the report, click here: Mid-East Region Vulnerability Assessment

An overall summary of the impact of natural hazards and climate change on these impacted areas is presented below:

Social Vulnerability and Equity, Health, and Safety

- Roughly 16% of the population of the Mid-East Region live at or below the national poverty level. A lack of access to resources and opportunities can make disaster preparedness and recovery more difficult for people experiencing poverty than others in the community.

Housing, Critical Infrastructure, and Community Support Systems

- Limited safe and affordable housing options throughout the region increases recovery time post-disaster and exacerbates pre-existing disparities and social vulnerabilities. Disasters are felt more severely in communities that are already facing challenges with accessing safe and affordable housing.
- Roadway infrastructure throughout the region is vulnerable to multiple hazards. Past flooding and hurricane events have resulted in extended closures and put the population at risk when evacuation routes are inaccessible. High tide events and extreme rainfall events both cause regular road closures preventing travel to and from work, impacting school transportation, and disrupting the flow of goods and services throughout the region.

Economy

- Agriculture accounts for a significant sector of the regional economy. Flooding, extreme heat, erosion, sea level rise, and drought all threaten the farming and livestock operations which are fundamental to the Mid-East Region's economy.

Natural Environmental Systems

- Projected population increases will drive new development, particularly in areas that are currently suburban and rural. This development will reduce the number of natural lands available to absorb rainwater and will result in increased flooding.

Summary points for each of the hazards of concern are included below.

Drought

- The areas surrounding Williamston and west of Greenville are reliant on surface water and are at higher risk of the impacts of severe drought.
- Droughts could pose significant risk to the region's agricultural industry.

Extreme Temperature

- Due to climate change, extreme heat events are likely to become more frequent and severe in the region, while extreme cold events should become less frequent and less severe.
- Populations that lack proper heating and cooling are most at risk of extreme temperature events.
- Droughts associated with extreme heat events could pose significant risk to the region's agricultural industry.

Flood

- The region is exposed to various types of flooding, with coastal flooding and stormwater flooding being the largest concerns.
- Heavy rainfall is becoming more frequent in the Mid-East Region.
- Stormwater components are not designed to handle larger rainfall and can be damaged or contribute to stormwater flooding.

Hurricane and Severe Storms

- The region experiences a variety of severe weather events including numerous secondary hazards like wind, lightning, and hail.
- These events have led to significant damages and impacts, many taking years to recover from.
- The frequency and severity of these events are likely to increase in the future due to climate change.

Sea Level Rise

- Sea level rise is likely to increase the frequency and severity of coastal flooding. Flood maps do not account for sea level rise and therefore under-represent future risk. The region's rate of sea level rise (roughly 0.18 inches per year) is higher than the global average and roughly twice the rate of the southern portions of the state (Kunkel 2020).

Tornado

- All of the Mid-East Region is exposed to tornadoes and high wind. The Mid-East Region is located in FEMA Wind Zone III, where wind speeds can reach up to 200 mph (NIST 2011).
- Climate change is warming the atmosphere in the Mid-East Region, meaning storms have potential to be more intense and occur more often.

Wildfire

- Increasing frequency and severity of wildfire will lead to increased damage to natural systems and potential damage to structures.
- Projected increases in wildfire risks and associated emissions can have harmful impacts on health.

Portfolio of Projects

The second and final deliverable of each region's RISE Regional Resilience Portfolio Program is this Project Portfolio, which describes the high priority projects identified for the Mid-East Region. These projects were concepts identified by the Stakeholder Partnership after review of past impacts, the vulnerability assessment, and strategies that have been used before in the Mid-East Region or elsewhere in the nation. These project ideas were further developed through community input and expert consultation. This portfolio outlines implementation steps, funding opportunities, and potential project partners to enable a clear path toward implementation for each project. A summary of the projects included in the portfolio is located on the following pages.

SUMMARY TABLE OF PROPOSED PROJECTS

Project Name	Project Description	Hazards	Lead Agency	Estimated Cost	Scale
Regional Drainage Capacity Assessment	**DESCRIPTION** Poor debris management, dumping, and aging critical infrastructure have contributed to poor regional drainage capacity. **SOLUTION** Develop a regional drainage capacity assessment to identify blocked culverts, ditches, and natural systems within the region.	• Flood • Hurricanes and Severe Storms • Sea Level Rise	Local Floodplain Managers	Low	Regional
Prioritized Vulnerability Inventory of Bridges and Culverts	**DESCRIPTION** Natural hazards create debris that often blocks bridges and culverts along common evacuation routes. **SOLUTION** Create an inventory of bridges and culverts along most common evacuation routes for prioritized cleanup efforts.	• Erosion • Flood • Hurricanes and Severe Storms • Sea Level Rise • Tornadoes	The Mid-East Commission	Medium	Regional
Upsizing Regional Stormwater Infrastructure	**DESCRIPTION** Aging infrastructure in the region is often overwhelmed during severe storm surges and nuisance flood events. **SOLUTION** Inventory and create a map of most vulnerable infrastructure to prioritize projects that increase the capacity of stormwater infrastructure.	• Flood • Hurricanes and Severe Storms • Sea Level Rise	The Mid-East Commission	High	Regional

Project Name	Project Description	Hazards	Lead Agency	Estimated Cost	Scale
Green Infrastructure in Urban Flooding Hotspots	**DESCRIPTION** Chronic urban flooding is negatively impacting the structural integrity of homes, businesses, and critical infrastructure. **SOLUTION** Installing green infrastructure systems in urban flooding hotspots will prevent flood conditions from overwhelming critical infrastructure.	• Erosion • Flood • Hurricanes and Severe Storms • Sea Level Rise	Municipal Public Works Departments	Medium	Parcel level
Regional Hazard Information-Sharing Partnership	**DESCRIPTION** Mid-East residents have expressed frustration at the lack of public information available on community-specific natural hazard mitigation strategies and documents. **SOLUTION** Develop a Regional Hazard Information-Sharing Partnership to reduce the burden on local authorities to prepare and provide natural hazard-focused information.	• Drought • Erosion • Extreme Temperature • Flood • Hurricanes and Severe Storms • Sea Level Rise • Tornadoes • Wildfire	The Mid-East Commission	Low	Regional

Regional Drainage Capacity Assessment

Flooding is the dominant hazard facing the Mid-East Region. While persistent hurricanes, severe storms, and sea level rise are present, poor drainage capacity has been noted as an additional aspect to the flooding issue. Poor debris management, dumping, and aging critical infrastructure all have contributed to the issue, prompting calls in the community for improvements.

Developing a Regional Drainage Capacity Assessment will serve to identify blocked culverts, ditches, and natural systems within the Mid-East Region. Using geographic information system (GIS) software to identify the areas with the greatest impact, the region will use this information to garner funding and resources to improve regional infrastructure and address chronic flooding.

REGIONAL DRAINAGE CAPACITY ASSESSMENT

Description

Nuisance flooding is a longtime issue in the Mid-East Region. Poor debris management, persistent flood events, and dumping have clogged many natural and man-made drainage areas within the region. This results in overwhelmed drainage systems that cause area flooding during any time of great precipitation.

Poor drainage impacts local commerce and quality of life. Communities that deal with blocked drainage cannot recover as quickly following a disaster, resulting in lost business revenues and essential services. Overflowing sewers and septic systems can lead to adverse health impacts, spreading disease throughout a community.

Hazards Addressed

Flood, Hurricanes and Severe Storms, Sea Level Rise

Sectors Addressed

- Social Vulnerability and Equity, Health, and Safety
- Housing, Critical Infrastructure, and Community Support Systems
- Economy
- Natural Environmental Systems

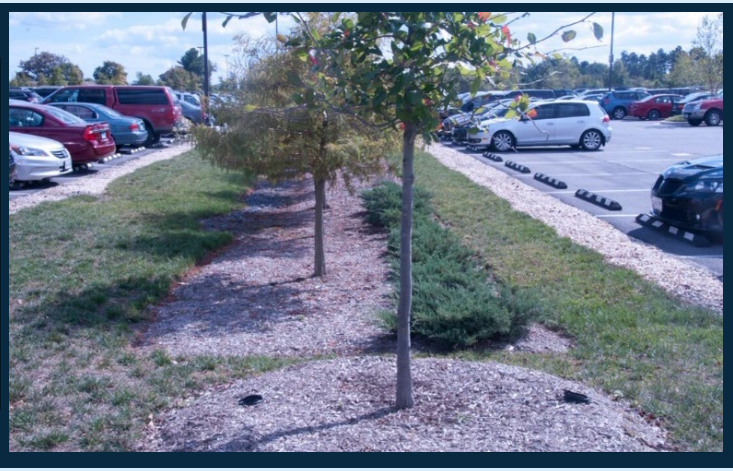
Location/Service Area

Mid-East Region

Potential Impact

An assessment of the drainage capacity of regional watersheds will help mitigate the impacts of flooding and provide benefit to ecosystems throughout the Mid-East Region. This assessment can be used to inform or prioritize mitigation projects in the future which will increase the natural flow and drainage of water. It can also be used to better understand how the ebb and flow throughout regional watersheds is impacting natural habitat of aquatic and terrestrial flora and fauna.

Bioretention systems such as the installation pictured at Fort Meade, Maryland, mitigate localized flooding and improve regional drainage capacity.



Two tools which would be beneficial in the development of a regional drainage capacity assessment are:

1. The U.S. Army Corps of Engineers (USACE)'s Hydrologic Engineering Center-River Analysis System (HEC-RAS) modeling tool, and;
2. NC Emergency Management's Flood Risk Information Systems (FRIS) mapping tool.

HEC-RAS software allows users to perform a variety of watershed modeling, including one-dimensional steady flow, one- and two-dimensional unsteady flow calculations, sediment transport/mobile bed computations, and water temperature/water quality modeling (USACE n.d.).

FRIS is a flood mapping tool maintained by the North Carolina Department of Environmental Quality. It contains digitally accessible flood hazard data, models, maps, risk assessments, and reports that are database driven. Users can also access and download geospatial base map data, imagery, LiDAR data, and hydraulic and hydrologic models.

The Mid-East region also has several countywide drainage districts that focus on maintaining ditches on private land, primarily to protect flood prone farmlands. Ditch locations and other relevant data from these districts would be helpful in determining the drainage capacity and vulnerability of private lands. Engaging with the boards of these districts could help inform regional research and/or assist in managing regional drainage-related projects.

Population(s) Served

All residents of the Mid-East Region, most particularly those who live or work near the water.

Roles of Lead and Supporting Agencies

The lead and supporting agencies chosen to head this effort will play key roles in seeing this project to completion.

Lead Implementer

The Mid-East Commission will serve as the lead agency for this project, utilizing their knowledge of regional planning efforts and their established relationships with regional drainage authorities.

Supporting Agencies

Local geographic information system (GIS)-trained staff, local public works staff, county drainage districts, Mid-East Commission staff, local engineering staff, the Stormwater Association of North Carolina (SWANC), the Southeast Stormwater Association (SESWA) soil and water conservation district staff, local drainage district representatives, environmental non-profit organizations, local community members.

Cost Estimate

The costs associated with this project are likely to be low. If prioritized by participating municipalities, staff time would be the biggest expense associated with this project.

Travel time to meetings with local and regional support agencies (IRS standard mileage rate is 62.5 cents/mile) and the use of GIS software (between $700 and $3,800/year depending on package) would add to the cost level. While addressing the drainage issue may be more costly, the assessment of problem areas could most likely be done without the purchase of additional software or materials.

Potential Funding Sources

Funding for projects such as drainage capacity assessments is currently plentiful through the American Rescue Plan Act (ARPA). Through ARPA, the North Carolina Department of Environmental Quality has created the Local Assistance for Stormwater Infrastructure Investments Fund. Other sources include:

- FEMA's Building Resilient Infrastructure and Communities (BRIC) program
- FEMA Flood Mitigation Assistance (FMA)
- The U.S. Department of Housing and Urban Development's (HUD) Community Development Block Grant (CDBG, CDBG-MIT, CBDG - Infrastructure)
- NC Department of Public Safety Emergency Management Transportation Infrastructure Resiliency Fund Grant
- NC Department of Environmental Quality (DEQ) Land and Water Fund (LWF, formally Clean Water Management Fund (CWMF)

- NC DEQ Water Resources Development Grant Program (WRDG via USDA NRCS EQUIP)
- NC DEQ / US EPA 319(h) and 205(j) Impaired Waters Restoration
- NC Department of Justice Environmental Enhancement Grant (EEG)
- NC Clean Water State Revolving Fund (CWSRF)
- NC Division of Water Infrastructure American Rescue Plan Act (ARPA) Asset Inventory and Assessment (AIA) Grant program for utilities (water, wastewater, and stormwater)
- NC Division of Water Infrastructure American Rescue Plan Act (ARPA) Local Assistance for Stormwater Infrastructure Investments (LASII) Program Funding
- NC DEQ Division of Mitigation Services Stream Mitigation and Restoration
- NC State Parks - Parks and Recreation Trust Fund (PARTF)
- NC Golden LEAF Foundation

Benefits Provided

Assessing regional drainage capacity will provide many benefits that increase regional resilience across the Mid-East Region.

Physical Benefits

Identifying problem areas for drainage will decrease flooding impacts in communities, providing greater protection for homes, businesses, and critical infrastructure.

This can lead to improvements that decrease flooding impacts in communities, providing greater protection for homes, businesses, and critical facilities. Physical sewer and septic systems will be less overwhelmed by flood waters, protecting physical structures, and community health.

Socioeconomic Benefits

Identifying problem areas for drainage provides regional Public Works Departments with invaluable information that can be used to improve regional infrastructure.

This can lead to improvements that decrease potential flooding impacts in communities, prioritizing valuable economic areas. This will protect local businesses from the worst flooding impacts, allowing communities to continue with essential functions and commerce during periods of heavy precipitation.

Environmental Benefits

Assessing regional drainage capacity in natural systems can allow municipal governments to take steps that allow those systems to perform more optimally. This will promote activity and growth with native flora and fauna, enhancing regional biodiversity.

Equitable Outcomes

Many of the region's floodplains are home to several vulnerable communities, including those who live in more vulnerable manufactured homes. At the intersection of social vulnerability and flood vulnerability are communities such as Ahoskie, Ayden, Bells Crossroads, Chocowinity, Farmville, Greenville, Mapleton, Pactolus, Parmele, Quitsna, Robersonville, Sans Souci, Washington, Williamston, and Windsor.

Assessing problem drainage areas within the region will protect all residents and will prevent the most vulnerable within the community from facing reoccurring flooding impacts.

Steps for Implementation

Regional floodplain managers and related officials should first examine the drainage capacity of regional natural systems to improve flood management. This team should also identify culverts and regional problem areas in watersheds where drainage is typically blocked and use GIS modeling to assess

likely flood impacts. This information will be used to identify the areas where drainage is most impeded and to apply for funding to mitigate those problem areas.

The steps to implementing the assessment would likely include the following:

1. Interested floodplain managers determine the best dates to meet for project discussions.
2. Floodplain managers develop a survey to collect information from relevant support agencies and members of the public about problem drainage areas.
3. Hydrologic data is used to calculate water flow across the region.
4. Survey results and GIS data are used to develop a map of the most common drainage problem areas.
5. All collected information is compiled into a report to inform future resilience projects such as upsizing stormwater infrastructure and future documents such as regional hazard mitigation plans.

Implementation Timeframe

This project would take place over the short-term, within 5 years. If given high priority by all participating municipalities, gathering all essential municipal staff and community organizations would likely occur within several weeks.

Integration with Existing Plans, Programs, and Policies

Counties and municipalities throughout the Mid-East Region maintain plans such as stormwater management plans and water and sewer plans which are directly related to this project. Also related to drainage issues are local comprehensive and land use plans, as well as regional hazard mitigation plans including:

- Albemarle Regional Hazard Mitigation Plan;
- Neuse River Hazard Mitigation Plan;
- Northeastern NC Regional Hazard Mitigation Plan; and
- Pamlico Sound Regional Hazard Mitigation Plan.

These plans should inform the development of this project and be updated accordingly following its completion.

Challenges/Obstacles

This project may pose potential challenges and obstacles to local planning and zoning regulations.

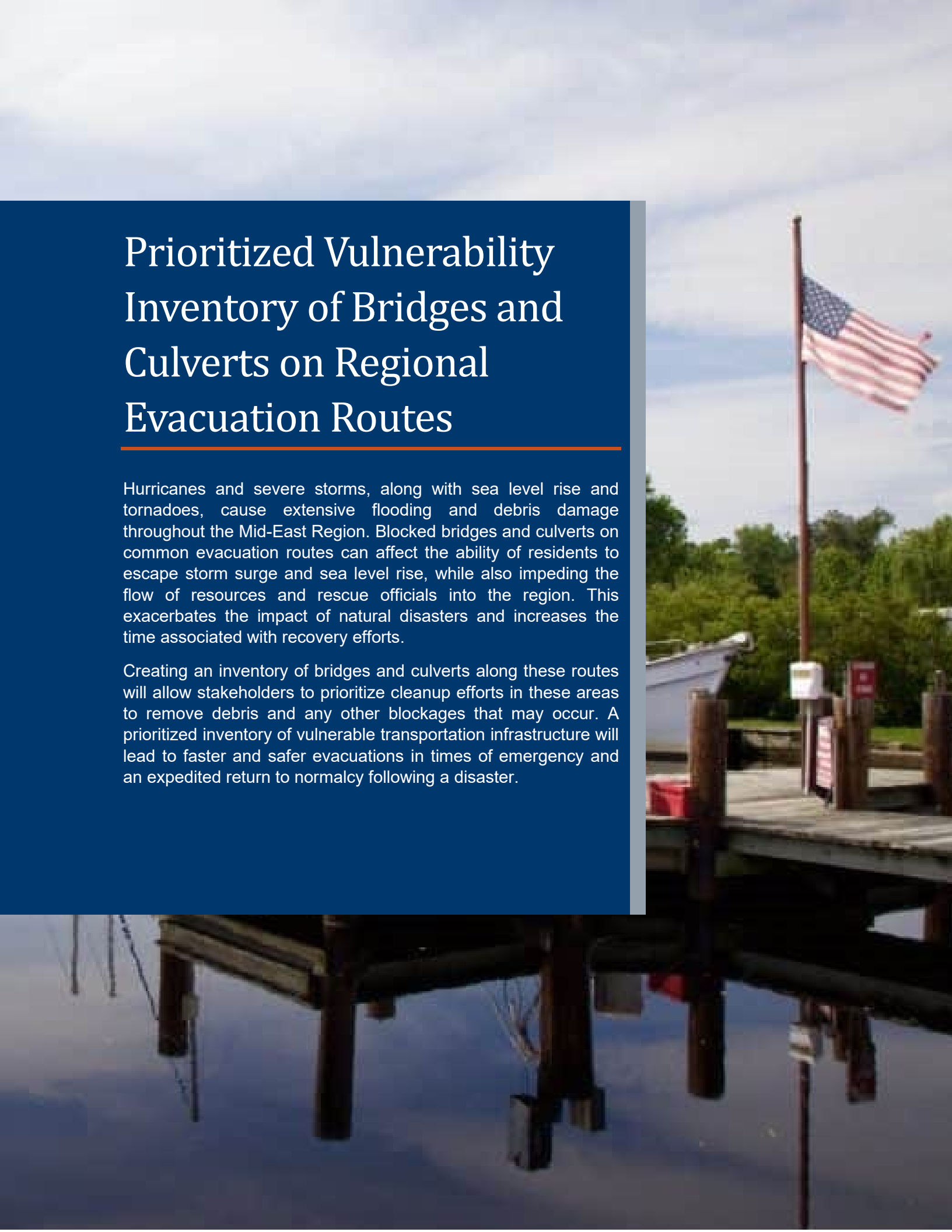
Legislative Challenges, Permitting, Zoning Requirements

Local and county governments may need to collaborate on drainage projects in natural systems, as impacts could affect issues noted in regional floodplain management plans.

Prioritized Vulnerability Inventory of Bridges and Culverts on Regional Evacuation Routes

Hurricanes and severe storms, along with sea level rise and tornadoes, cause extensive flooding and debris damage throughout the Mid-East Region. Blocked bridges and culverts on common evacuation routes can affect the ability of residents to escape storm surge and sea level rise, while also impeding the flow of resources and rescue officials into the region. This exacerbates the impact of natural disasters and increases the time associated with recovery efforts.

Creating an inventory of bridges and culverts along these routes will allow stakeholders to prioritize cleanup efforts in these areas to remove debris and any other blockages that may occur. A prioritized inventory of vulnerable transportation infrastructure will lead to faster and safer evacuations in times of emergency and an expedited return to normalcy following a disaster.



PRIORITIZED VULNERABILITY INVENTORY OF BRIDGES AND CULVERTS ON REGIONAL EVACUATION ROUTES

Description

Hurricanes and severe storms, along with sea level rise and tornadoes, cause extensive flooding and debris damage throughout the Mid-East Region. Blocked bridges and culverts on common evacuation routes can affect the ability of residents to escape storm surge and sea level rise, while also impeding the flow of resources and rescue officials throughout the region and beyond. This exacerbates the impact of natural disasters and increases the time associated with recovery efforts. While the North Carolina Department of Transportation (NCDOT) maintains ample data on State-owned transportation infrastructure, efforts to coordinate this information with regional and local data would significantly boost the Mid-East Region's capacity to plan for infrastructure resilience.

Hazards Addressed

Erosion, Flood, Hurricanes and Severe Storms, Sea Level Rise, Tornadoes

Sectors Addressed

- Social Vulnerability and Equity, Health, and Safety
- Housing, Critical Infrastructure, and Community Support Systems
- Economy

Location/Service Area

Mid-East Region

Potential Impact

This project will determine the locations of bridges and culverts on regional evacuation routes, prioritizing those of highest vulnerability for expansion and improvement funding. This developed mechanism will allow for regular updates with new locations added as well as list any mitigation actions that have been taken on specific bridges and culverts.

A prioritized inventory of vulnerable bridges and culverts will lead to faster and safer evacuations and a faster return to normal after a disaster.

Source: Ayres Associates

Creating an inventory of bridges and culverts along these routes will allow stakeholders to prioritize cleanup efforts in these areas to remove debris and any other blockages that may occur. A prioritized inventory of vulnerable transportation infrastructure will lead to faster and safer evacuations in times of emergency and an expedited return to normalcy following a disaster.

This project will support the goals and objectives of existing regional transportation documents such as the Bertie County Comprehensive Transportation Plan, which being updated at the time of publication of this portfolio.

Population(s) Served

All residents and visitors of the Mid-East Region, particularly those who must evacuate their homes in times of emergency.

Roles of Lead and Supporting Agencies

This project would require the collaboration of several organizations across all five counties within the region.

Lead Implementer

The Peanut Belt Rural Planning Organization and the Mid-East Rural Planning Organization through its existing relationship with the NCDOT will lead this project. Their expertise in regional transportation planning and their reputation as regional collaborations makes them ideal to coordinate state and local efforts for region-wide benefits.

Supporting Agencies

Local public works departments, North Carolina Department of Transportation, local emergency management agencies.

Cost Estimate

The cost estimate for this project is medium.

The largest expense of the first phase of the project will be staff time needed to identify and map bridges and culverts that are the most vulnerable to debris and blockages. This will include travel time to visit state and county stakeholders to obtain project data. Grant funding will likely be needed to address bridge and culvert improvements.

The costs of the second phase of the project can vary greatly depending on the size, location, and degree to which the bridge or culvert needs to be repaired. Based upon analysis of sub applicants for FEMA's BRIC program, smaller culverts can be upsized for approximately $42K while the upsizing of bridges can cost over well over $1,000,000 (FEMA 2021). For instance, the City of Washington, NC was having severe flooding in the Medical District of Jack's Creek. To replace several undersized culverts and reduce flooding to nearby homes, costs were estimated at over $8,00,000. This included design, permitting, acquisition, and construction. The project was estimated to take approximately 36 months.

Potential Funding Sources

Funding for the prioritized inventory of bridges and culverts is expected to be supported through normal county, local, and organizational operating budgets. Larger studies or analysis could be supported by applications to federal grants such as 1) FEMA's BRIC program, 2) USDOT funding sources such Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grants and 3) the State Highway Bridge Fund are potential funding sources for this purpose.

Benefits Provided

There are many benefits to creating a prioritized inventory of vulnerable bridges and culverts which will increase regional resilience in a variety of ways.

Physical Benefits

Creating a prioritized inventory of bridges and culverts will reduce impacts on transportation systems in the event of a disaster. This will allow critical resources to move quickly to areas of highest impact while allowing residents to retreat to shelter in less-impacted areas.

Socioeconomic Benefits

Prioritizing bridges and culverts for improvement will allow critical economic systems to function continually in the event of a natural disaster. This will protect transportation infrastructure, preventing people from being trapped in the event of a disaster.

Environmental Benefits

There are no known direct environmental benefits associated with identifying vulnerable bridges but addressing vulnerable culverts can reduce debris-caused flooding and serve to enhance natural watershed functioning.

Equitable Outcomes

Identifying the most blocked bridges and culverts for improvement will allow the most vulnerable community members to not be trapped in the event of a disaster. Emergency services will also be able to address vulnerable populations faster since they will be less likely to be diverted to alternate routes.

Steps for Implementation

The steps to implement the project would likely include the following:

1. The lead and supporting agencies would meet to identify vulnerable bridges and culverts in the region, compiling state, regional, and local data of transportation infrastructure.
2. Once identified, the lead and supporting agencies would prioritize project implementation based on the vulnerabilities identified in each bridge and culvert.

Implementation Timeframe

This project would be implemented over a medium-term timeframe. Taking inventory of all bridges and culverts along regional evacuation routes is a task that can be completed quickly. Determining the priority of each for expansion or retrofit will likely be more complicated due to competing priorities across jurisdictional lines.

Integration with Existing Plans, Programs, and Policies

As this project is developed, regional partners should work closely with the North Carolina Department of Transportation to ensure consistency of knowledge across state, regional, and local authorities. Regional partners should also review any countywide comprehensive transportation plans. At the time of this publication, Bertie County is updating their Comprehensive Transportation Plan.

Challenges/Obstacles

The most significant challenge to this project is securing funding for the expansion or retrofit of bridges and culverts along evacuation routes following the completion of the inventory. During the inventory and prioritization process, regional partners should make efforts to prepare grant applications to state and federal funding sources.

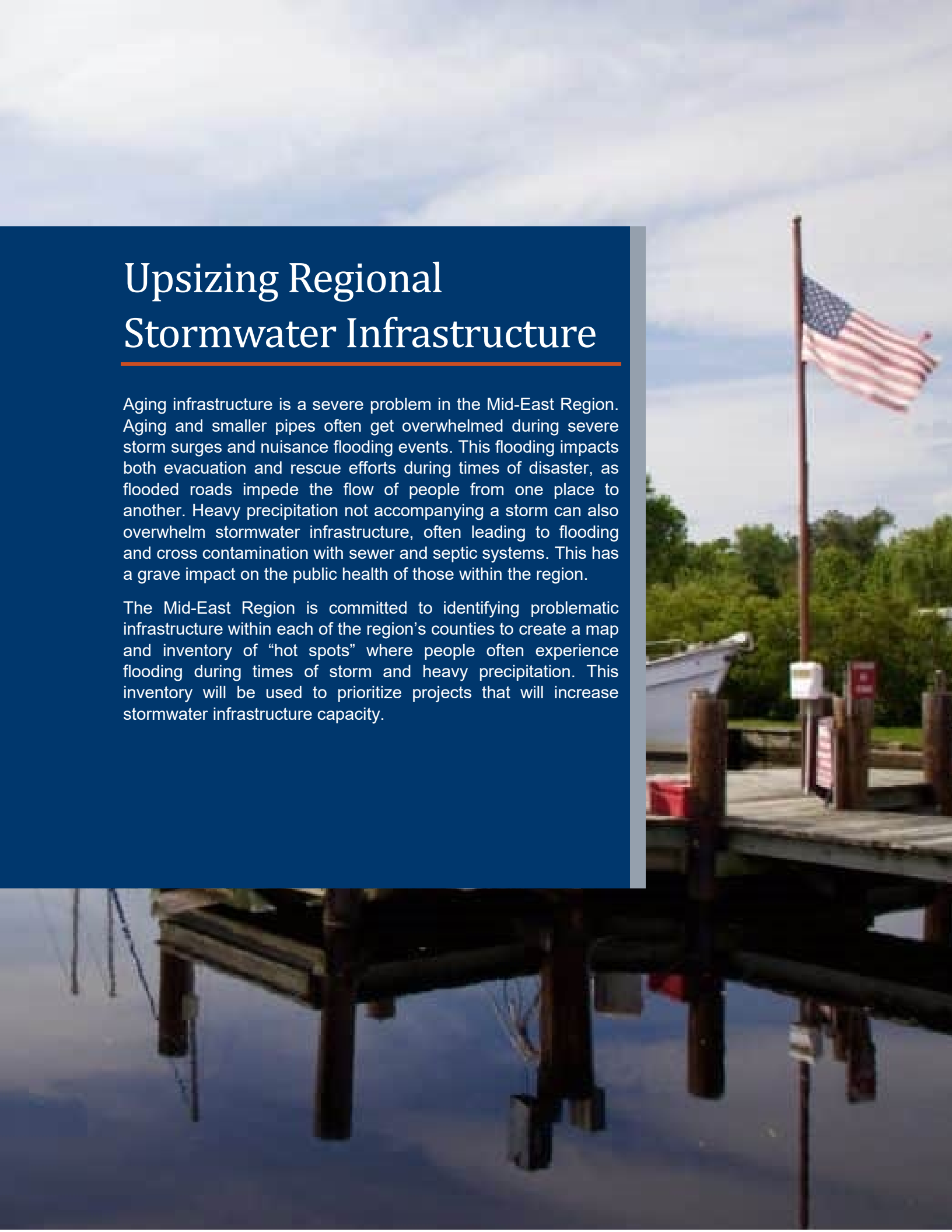
Legislative Challenges, Permitting, Zoning Requirements

There are no known legislative, permitting, or zoning challenges that may arise resulting from this project. Removing debris impacts from culverts and bridges support the goals of regional hazard mitigation plans, Hurricane Matthew Resilient Redevelopment Plans, and regional stormwater management plans.

Upsizing Regional Stormwater Infrastructure

Aging infrastructure is a severe problem in the Mid-East Region. Aging and smaller pipes often get overwhelmed during severe storm surges and nuisance flooding events. This flooding impacts both evacuation and rescue efforts during times of disaster, as flooded roads impede the flow of people from one place to another. Heavy precipitation not accompanying a storm can also overwhelm stormwater infrastructure, often leading to flooding and cross contamination with sewer and septic systems. This has a grave impact on the public health of those within the region.

The Mid-East Region is committed to identifying problematic infrastructure within each of the region's counties to create a map and inventory of "hot spots" where people often experience flooding during times of storm and heavy precipitation. This inventory will be used to prioritize projects that will increase stormwater infrastructure capacity.



UPSIZING REGIONAL STORMWATER INFRASTRUCTURE

Description

The Mid-East Region is highly susceptible to flooding and storm surge. Several stakeholders have commented that local stormwater infrastructure is insufficient when dealing with the intensifying hazard events that the region has seen recently. Many pipes are much older and do not have the capacity to deal with intensifying storm surges, flood events, and increasing sea level rise.

Hazards Addressed

Flood, Hurricanes and Severe Storms, Sea Level Rise

Sectors Addressed

- Social Vulnerability and Equity, Health, and Safety
- Housing, Critical Infrastructure, and Community Support Systems
- Economy
- Natural Environmental Systems

Location/Service Area

Mid-East Region

Potential Impact

The Mid-East Region will inventory and create a map of stormwater infrastructure "hot spots" where flooding and overflow often occur. These "hot spots" will then be prioritized for upsizing projects. With the inventory, the project lead and supporting agencies will prioritize specific hot spots for project ideas that increase the capacity of current stormwater infrastructure.

Creating a map and inventory of stormwater infrastructure "hot spots" will help lead and supporting agencies prioritize upsizing projects.

Source: Coastal Review

Upgrades can include plans such as the installation of "smart ponds" that self-regulate stormwater runoff.

Population(s) Served

All residents of the Mid-East Region

Roles of Lead and Supporting Agencies

The team formed for this project will need to include several stakeholders to see it to fruition.

Lead Implementer

Local stormwater administrators and engineering staff would be the ideal individuals to lead this effort.

Supporting Agencies

Local GIS-trained staff, local public works staff, Mid-East Commission staff, North Carolina Department of Transportation, the Stormwater Association of North Carolina (SWANC), the Southeast Stormwater Association (SESWA), soil and water conservation district staff, and environmental non-profit

organizations.

Cost Estimate

The estimated cost for this project is high. Staff time of Mid-East Commission employees, along with county and municipal government personnel and other supporting agencies, will cover much of the identification of infrastructure locations in greatest need of upgrading. Staff time will also be needed for GIS mapping.

The physical upsizing of pipes and drainage systems will likely drive costs to a high level. The costs of pipes and drainage can cost several million dollars (FEMA 2021). Grant and foundation funding will likely be necessary to cover the cost of improvements. Additional staff time will be needed to apply for grant and foundation funding.

Potential Funding Sources

Funding for projects such as stormwater upsizing is currently plentiful through the American Rescue Plan Act (ARPA). Through ARPA, the North Carolina Department of Environmental Quality has created the Local Assistance for Stormwater Infrastructure Investments Fund. Other sources include:

- FEMA's Building Resilient Infrastructure and Communities (BRIC) program
- The U.S. Department of Housing and Urban Development's (HUD) Community Development Block Grant (CDBG)

Benefits Provided

This project will provide benefits across multiple sectors, resulting in increases in whole community resilience.

Physical Benefits

Upsizing regional stormwater infrastructure will improve the functioning of critical infrastructure within the region. Reducing flood impacts during both disaster and non-disaster events will protect homes, businesses, and historic structures in the region.

Socioeconomic Benefits

Identifying stormwater infrastructure for upsizing will help create better drainage within the region. This will allow communities to return to their normal functions faster during disasters and will prevent nuisance flooding during non-disaster precipitation events.

Environmental Benefits

Upsizing regional stormwater infrastructure will better protect cross contamination between natural systems septic systems. This will better protect local flora and fauna, allowing regional environmental systems to thrive. This project will also better promote better drainage, allowing local riverine systems and watersheds to better maintain natural function.

Equitable Outcomes

Many communities in the Mid-East Region are rural and have limited resources to address chronic infrastructure issues. Identifying and addressing infrastructure "hot spots" will allow these communities to evacuate easier during times of disaster, protect them from the harms of cross contamination between stormwater and septic systems, and reduce the damage done to homes and economic structures.

Steps for Implementation

Implementing this project will need to include the following steps:

1. The lead agency will gather all supporting agencies on a regular schedule (e.g., quarterly).
2. The lead and supporting agencies will discuss areas of concern within the regional stormwater infrastructure.

3. The lead and supporting agencies will prioritize areas of concern by frequency of failure and the level of exposure to impacts from failure.
4. The lead agency will solicit funding for infrastructure upsizing from federal, state, local, and/or private funding sources.

Implementation Timeframe

This project is expected to be completed over the long term, likely taking several years to complete the projects. It will take weeks to months to undertake the inventory and produce documentation.

Integration with Existing Plans, Programs, and Policies

Counties and municipalities throughout the Mid-East Region maintain stormwater management plans and water and sewer plans which are directly related to this project. These plans should inform the development of this project and be updated accordingly following its completion.

Challenges/Obstacles

Projects of this magnitude can face several challenges and obstacles from start to completion. Projecting regional population growth is a critical component of calculating the need for stormwater infrastructure changes. Striking the appropriate balance between “gray infrastructure” – traditional man-made stormwater solutions – and “green infrastructure” or natural stormwater solutions will involve many competing opinions and priorities. Additionally, stormwater projects can be extremely costly, and a project such as this will likely require careful management of grant funds potentially from multiple sources.

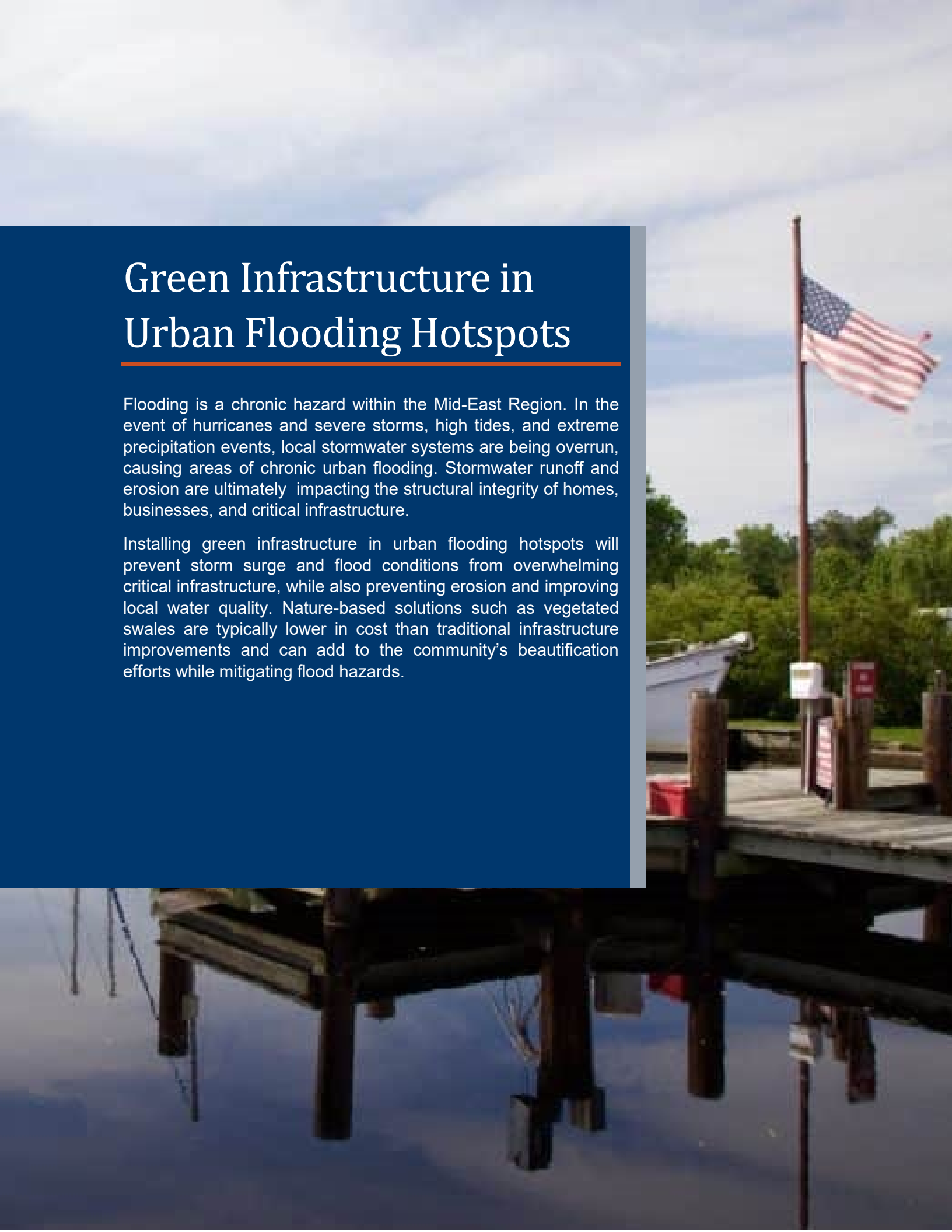
Legislative Challenges, Permitting, Zoning Requirements

Upsizing regional stormwater infrastructure is in line with the goals of regional hazard mitigation plans and floodplain management plans. However, upsizing infrastructure may alter current land use patterns, leading to potential permitting and zoning challenges.

Green Infrastructure in Urban Flooding Hotspots

Flooding is a chronic hazard within the Mid-East Region. In the event of hurricanes and severe storms, high tides, and extreme precipitation events, local stormwater systems are being overrun, causing areas of chronic urban flooding. Stormwater runoff and erosion are ultimately impacting the structural integrity of homes, businesses, and critical infrastructure.

Installing green infrastructure in urban flooding hotspots will prevent storm surge and flood conditions from overwhelming critical infrastructure, while also preventing erosion and improving local water quality. Nature-based solutions such as vegetated swales are typically lower in cost than traditional infrastructure improvements and can add to the community's beautification efforts while mitigating flood hazards.



GREEN INFRASTRUCTURE IN URBAN FLOODING HOTSPOTS

Description

Greater frequency and intensity of heavy rains, rising waters and strong storms cause increased flooding events in the coastal communities of the Mid-East Region. This chronic inundation of water weakens structures and critical infrastructure, floods streets and neighborhoods and disrupts the livelihoods of the region.

Hazards Addressed

Erosion, Flood, Hurricanes and Severe Storms, Sea Level Rise

Sectors Addressed

- Housing, Critical Infrastructure, and Community Support Systems
- Natural Environmental Systems

Location/Service Area

Flood-prone areas of the Mid-East Region

Potential Impact

The federal Water Infrastructure Improvement Act of 2019 defines green infrastructure as "the range of measures that use plant or soil systems, permeable pavement, or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters." These measures differ from gray infrastructure, which are systems of gutters, pipes, and tunnels used to move stormwater away from residential areas to treatment plants or straight to local water bodies (US EPA 2022). Green infrastructure and nature-based strategies can “promote adaptation and resilience. Such solutions enlist natural features and processes in efforts to combat climate change, reduce flood risks, improve water quality, protect coastal property, restore and protect wetlands, stabilize shorelines, reduce urban heat, add recreational space, and more” according to the Federal Emergency Management Agency (FEMA).

Installing green infrastructure in urban flooding hotspots will mitigate flooding in a low-cost fashion while improving green space and community beautification.

Source: City of Raleigh

The Mid-East Region will seek funding to install green infrastructure in urban areas that are known for heavy flooding and rising waters. This project will mitigate flooding in a lower-cost fashion than traditional stormwater infrastructure, while also improving community green space and fostering nature-based solutions to critical infrastructure issues.

Population(s) Served

This project will primarily serve residents and visitors of the Mid-East Region’s most flood-prone urban area locations, including:

- Ahoskie
- Ayden
- Belhaven

- Greenville
- Murfreesboro
- Washington
- Williamston

Roles of Lead and Supporting Agencies

Close collaboration between lead and supporting agencies will be required throughout the development of this project to properly address the unique needs of each affected community in the Mid-East Region and their stormwater management strategies.

Lead Implementer

County or local public works departments should lead this project locally as they would determine local flooding hot spots and work with partners to design and install green infrastructure projects best suited for the community.

Supporting Agencies

County or local planning departments, North Carolina Sea Grant, North Carolina Coastal Federation, Mid-East Commission, Albemarle-Pamlico National Estuary Partnership, North Carolina Department of Transportation.

Cost Estimate

The cost estimate for this project is medium. Project costs will be dependent on the type of green infrastructure chosen and its size and scale. Projects like vegetated swales can cost about $1,500/acre (Federal Highway Administration n.d.) and other green infrastructure projects can vary from over $100,000 to over $1,000,000 depending on complexity, size, and type (FEMA 2021).

Grant funding and staff time will be used to identify the best areas in the region for green infrastructure. Most federal and state grants accept in-kind services such as staff planning time as part of the local cost-share.

Potential Funding Sources

Funding for this project could be partially supplemented by local municipalities where the green infrastructure would be installed. Other sources of funding include federal sources like EPA's grant programs and FEMA's Building Resilient Infrastructure and Communities (BRIC) program. State sources include NC DEQ Division of Water Infrastructure's Local Assistance for Stormwater Infrastructure Investments (LASII) Fund, NC DEQ Land and Water Fund, and the Resilient Coastal Communities Grant program.

Benefits Provided

There are several benefits that can be gained from installing green infrastructure projects to reduce flooding in urban areas.

According to FEMA "Nature-based solutions can also help communities save money by reducing losses from future floods and other natural disasters. The U.S. Environmental Protection Agency (EPA) studied this issue in a landmark 2015 study. The study estimated the flood losses that would be avoided nationwide by adding requirements to manage stormwater onsite. It found that, over time, using nature-based solutions in new development and redevelopment could save hundreds of millions of dollars in flood losses."

Physical Benefits

Green infrastructure can reduce the volume of stormwater runoff to protect property, businesses, and critical infrastructure within the Mid-East Region.

Socioeconomic Benefits

Green infrastructure projects are often lower in cost than conventional "grey" stormwater infrastructure improvements, reducing the amount of taxpayer dollars applied to improvements.

Green infrastructure projects can filter pollutants from flooding, potentially lowering water treatment costs, facilitating better water quality, and improving public health. These projects can also mitigate the heat island effect and lessen the impacts from extreme heat events. The heat island effect occurs in urbanized areas where more structures hold more heat, causing higher temperatures than areas with more natural landscapes.

Environmental Benefits

Green infrastructure can decrease the number of impervious surfaces and result in more natural habitat and permeable surfaces. In addition, they increase stormwater infiltration and storage capacity to slow down and soak in the rain which reduces pollutant discharges to surface waters.

Equitable Outcomes

Communities that have been typically underserved by lack of adequate drainage infrastructure can be prioritized.

Steps for Implementation

The steps towards implementation would likely be the following:

1. Local planning, public works, and engineering staff would meet to discuss urban flooding hotspots and identify the best sites in the communities for green infrastructure projects.
2. Staff will collaborate with support agencies such as the Mid-East Commission, the North Carolina Coastal Federation, and consulting engineering and planning firms to design and install green infrastructure projects as well as secure funding for each project site.

Implementation Timeframe

This project could be implemented within a medium time frame.

Integration with Existing Plans, Programs, and Policies

This project aligns with goals listed in the Hurricane Matthew Resilient Redevelopment Plans as well as those in Eastern Carolina Regional Hazard Mitigation Plans, local floodplain management plans, the North Carolina Climate Risk Assessment and Resilience Plan, and plans developed by the Resilient Coastal Communities Program.

Challenges/Obstacles

Challenges and obstacles may arise in this process as local governments assess their capacity to oversee, facilitate, fund, and implement green infrastructure projects. Transitioning from conventional “grey” infrastructure practices to green infrastructure may require the development or revision of local policies, codes, and standards.

Legislative Challenges, Permitting, Zoning Requirements

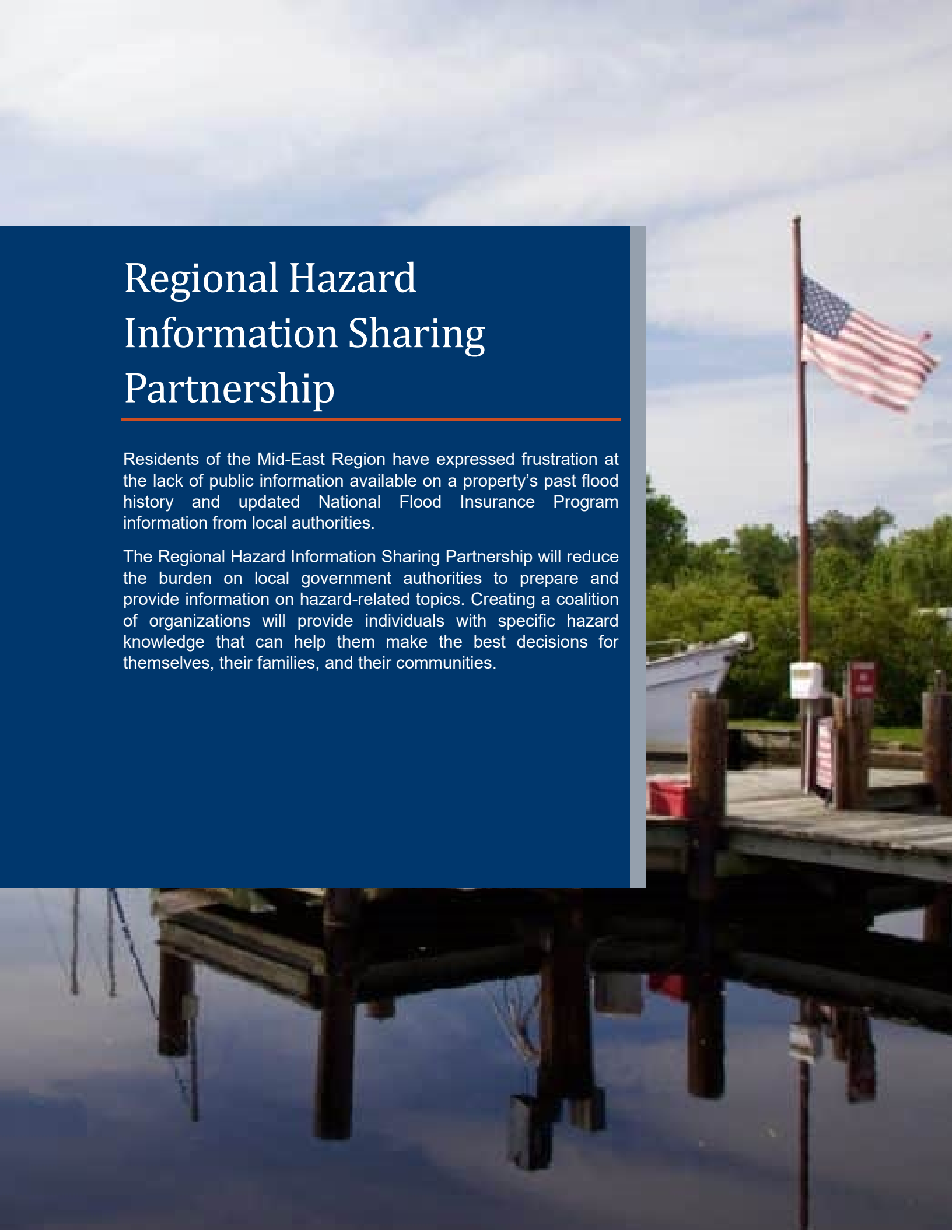
Green infrastructure projects are being embraced with new legislation and state agency support. They are unlikely to face legislative or permitting challenges. Local zoning requirements should be evaluated and modified to facilitate the use of green infrastructure for new development projects.

Green infrastructure systems such as vegetated swales and rain gardens support regional goals and objectives outlined in regional hazard mitigation plans, Hurricane Matthew Resilient Redevelopment Plans, and local floodplain management plans.

Regional Hazard Information Sharing Partnership

Residents of the Mid-East Region have expressed frustration at the lack of public information available on a property's past flood history and updated National Flood Insurance Program information from local authorities.

The Regional Hazard Information Sharing Partnership will reduce the burden on local government authorities to prepare and provide information on hazard-related topics. Creating a coalition of organizations will provide individuals with specific hazard knowledge that can help them make the best decisions for themselves, their families, and their communities.



REGIONAL HAZARD INFORMATION-SHARING PARTNERSHIP

Description

Residents of the Mid-East Region have expressed confusion about where they can obtain information on community and personal hazard vulnerabilities and programs. Information on the flood histories of homes and local businesses, or on funding resources for mitigation may not be readily available, leaving many confused about what hazard impacts they may face in the future and how much assistance is available to them or will be made available in the future.

Hazards Addressed

Drought, Erosion, Extreme Temperature, Flood, Hurricanes and Severe Storms, Sea Level Rise, Tornadoes, Wildfire

Sectors Addressed

- Social Vulnerability and Equity, Health, and Safety
- Housing, Critical Infrastructure, and Community Support Systems

Location/Service Area

Mid-East Region

Potential Impact

The Mid-East Region will start a Regional Hazard Information-Sharing Partnership to make it easier for residents to gain access to hazard-related information. The Regional Hazard Information-Sharing Partnership will reduce the burden on local government authorities to prepare and provide information on hazard-related topics. Creating a coalition of organizations that can provide individuals with specific hazard knowledge that can help them make the best decisions for themselves, their families, and communities. The proposed project will additionally earn credit for communities participating in the Community Rating System (CRS) under Activity 330 – Outreach Projects. Sharing hazard information with the public can earn jurisdictions significant CRS credit. The table below indicates the current CRS class rating of communities in the region.

Source: NCEM

North Carolina Emergency Management (NCEM)'s Know Your Zone campaign exemplifies the sharing of critical hazard information with the public.

CRS Communities in the Mid-East Region		
Community Name	**County Name**	**Class Rating**
Town of Belhaven	Beaufort County	7
Town of Farmville	Pitt County	7
City of Greenville	Pitt County	7
Pitt County	-	8
City of Washington	Beaufort County	7
Town of Washington Park	Beaufort County	8
Town of Winterville	Pitt County	10

Population(s) Served
All residents of the Mid-East Region

Roles of Lead and Supporting Agencies

The lead and supporting agencies will play a critical role in establishing this project.

Lead Implementer
The Mid-East Commission will serve as the lead agency for this project. The Commission has the best knowledge on local stakeholders to include in this project, including community coalitions, real estate agencies, and key municipal staff members.

Supporting Agencies
Community colleges and universities located in the five counties of the Mid-East Region (East Carolina University, Roanoke-Chowan Community College, Martin Community College, Pitt Community College, and Beaufort County Community College), real estate coalitions such as the North Carolina Real Estate Commission, county boards of realtors, Mortgage Bankers Association of the Carolinas, North Carolina Home Finance, local chambers of commerce, local libraries, community centers, FEMA Region IV.

Cost Estimate

The cost of this project is anticipated to be low.

Most of the costs associated with this project will be the printing of National Flood Insurance Program (NFIP) materials and any travel that occurs when needing to present to specific real estate stakeholders or community members. The IRS standard mileage rate for travel is 62.5 cents/mile (IRS 2022) and printing materials are typically factored into the budgets of the partnership participants.

Potential Funding Sources
Production of hazard information will be funded through local general funds and staff time. Supplemental funding for large-scale printing of materials such as flyers and brochures may need to be supported through state grant opportunities such as the Awareness and Digital Literacy Grants or Digital Learning Grants.

Benefits Provided

Creating a Regional Hazard Information-Sharing Partnership will provide many benefits to the Mid-East Region.

Physical Benefits
There are no direct physical benefits to this project. Information shared within the partnership may lead to increased hazard mitigation efforts from property owners within the region, reducing the risks to life, property, and economy.

Socioeconomic Benefits
Information such as updated local flood maps, NFIP requirements, and other hazard-specific guidelines could allow Mid-East residents to mitigate their properties from flood hazards and promote the development of improved codes and standards. More stringent codes and standards can improve property values and decrease the costs of natural hazard events.

Environmental Benefits
Environmental benefits associated with this project would be provided indirectly, as information provided on hazards such as flooding and sea level rise could also address topics such as water pollution, land conservation, and restoration of habitat.

Equitable Outcomes
Community centers and local libraries regularly serve as lifelines for vulnerable populations. Using those locations to provide access to up-to-date and regionally specific hazard information

ensures all Mid-East residents have access to information they can use to protect their lives and property.

Steps for Implementation

The steps to implement the partnership should include the following:

1. The lead agency will contact supporting agencies to coordinate sharing of hazard knowledge among all coalition partners.
2. Coalition partners will develop common messaging templates in order to communicate hazard information consistently across the region.
3. Coalition partners will update regional templates for their jurisdiction, including locally specific information such as evacuation zones and shelter locations.
4. Coalition partners participating in the CRS will log their activities associated with this project to receive Program for Public Information credit (Activity 330).
5. The lead agency will contact local colleges and universities, libraries, and community centers to create a permanent hazard information section to be regularly updated.

Implementation Timeframe

The implementation timeframe for this project is short-term.

Integration with Existing Plans, Programs, and Policies

Existing local and regional documents such as emergency operations plans, hazard mitigation plans, and floodplain management plans should all be referenced when developing regional hazard information for distribution.

Challenges/Obstacles

Given the large number of stakeholders involved in this project, the most significant challenge is likely to be related to scheduling meetings and attaining the desired level of input from each representative. Strong leadership from the Commission will keep stakeholders engaged, and clear expectations will help stakeholders understand the types of information they are expected to contribute to the project.

Legislative Challenges, Permitting, Zoning Requirements

No known legislative, permitting, or zoning challenges or requirements will affect this project.

APPENDIX A: FULL LIST OF PROPOSED RESILIENCE PROJECTS IN MID-EAST REGION

Project Name	Project Description	Hazards	Lead Agency	Estimated Cost	Scale
Regional Drainage Capacity Assessment	**DESCRIPTION** Poor debris management, dumping, and aging critical infrastructure have contributed to poor regional drainage capacity. **SOLUTION** Develop a regional drainage capacity assessment to identify blocked culverts, ditches, and natural systems within the region.	• Flood • Hurricanes and Severe Storms • Sea Level Rise	Local Floodplain Managers	Low	Regional
Prioritized Vulnerability Inventory of Bridges and Culverts	**DESCRIPTION** Natural hazards create debris that often blocks bridges and culverts along common evacuation routes. **SOLUTION** Create an inventory of bridges and culverts along most common evacuation routes for prioritized cleanup efforts.	• Erosion • Flood • Hurricanes and Severe Storms • Sea Level Rise • Tornadoes	The Mid-East Commission	Medium	Regional
Upsizing Regional Stormwater Infrastructure	**DESCRIPTION** Aging infrastructure in the region is often overwhelmed during severe storm surges and nuisance flood events. **SOLUTION** Create a map and inventory of most vulnerable infrastructure to prioritize projects that increase the capacity of	• Flood • Hurricanes and Severe Storms • Sea Level Rise	The Mid-East Commission	High	Regional

Project Name	Project Description	Hazards	Lead Agency	Estimated Cost	Scale
	stormwater infrastructure.				
Green Infrastructure in Urban Flooding Hotspots	**DESCRIPTION** Chronic urban flooding is negatively impacting the structural integrity of homes, businesses, and critical infrastructure. **SOLUTION** Installing green infrastructure systems in urban flooding hotspots will prevent flood conditions from overwhelming critical infrastructure.	• Erosion • Flood • Hurricanes and Severe Storms • Sea Level Rise	Municipal Public Works Departments	Medium	Parcel level
Regional Hazard Information-Sharing Partnership	**DESCRIPTION** Mid-East residents have expressed frustration at the lack of public information available on community-specific natural hazard mitigation strategies and documents. **SOLUTION** Develop a Regional Hazard Information-Sharing Partnership to reduce the burden on local authorities to prepare and provide natural hazard-focused information.	• Drought • Erosion • Extreme Temperature • Flood • Hurricanes and Severe Storms • Sea Level Rise • Tornadoes • Wildfire	The Mid-East Commission	Low	Regional
Multi-Jurisdictional Sheltering Collaboration	**DESCRIPTION** Natural hazard events produce widespread damage and can isolate communities from sheltering for several days. **SOLUTION** A multi-jurisdictional sheltering collaboration will provide all Mid-East	• Extreme Temperature • Flood • Sea Level Rise • Hurricanes and Severe Storms • Tornadoes • Wildfire	The Mid-East Commission	Medium	Regional

Project Name	Project Description	Hazards	Lead Agency	Estimated Cost	Scale
	residents with greater access to shelter from natural disasters.				
Establishing a Resilience Hub	**DESCRIPTION** The region needs resources for communities to adapt and thrive in the face of increasingly severe natural disasters. **SOLUTION** Create a resilience hub in the region to provide opportunities to address root causes of disproportionate exposure and sensitivity to disaster impacts.	• Drought • Erosion • Extreme Temperature • Flood • Hurricanes and Severe Storms • Sea Level Rise • Tornadoes • Wildfire	The Mid-East Commission	High	Regional

APPENDIX B: RESILIENCE SCORECARD

Category	Considerations	Program and Policy		Construction			Public Awareness and Messaging	Community Resilience
Reduction in Risk	How many hazards are addressed? What is the probability the hazard(s) will occur?	0	0	0	0	0	1	1
	Does the project protect life or property or both?	1	1	1	0	1	0	0
	Does the project address current and future hazards?	1	1	1	1	1	1	1
	Does the project reduce the risk at a regional scale?	1	1	0	0	1	1	1
	Does the project reduce a non-climate stressor?	1	1	1	1	1	1	1
Scale	Is the project regional?	1	1	-1	1	1	1	1
	Can the project be replicated?	1	1	1	1	1	1	1
Cost	What is the range of cost? Low (Under $50K)? Medium ($50k-$1m)? High (Over $1m)?	1	1	0	0	-1	1	-1
Benefits	Do benefits outweigh the costs?	1	1	1	1	1	1	0
Timeframe	How long will it take to implement the project? Short: Less than 5 years. Medium: 5-15 years. Long: More than 15 years	1	1	1	0	-1	1	-1
Feasibility	Is the project technically and legally possible?	1	1	1	1	1	1	1
	Will permitting be required?	1	1	-1	-1	-1	1	-1
	Are project sponsors identified, engaged, and have the capacity to implement the project?	0	0	0	0	0	0	-1
	Is a funding source identified?	-1	-1	-1	-1	-1	-1	-1
Socioeconomic	Does the project aid in building a strong economy?	-1	-1	0	1	0	0	0
	Does the project supports improving community infrastructure (e.g., road network)?	1	-1	1	1	1	-1	-1
Climate Justice and Equity	Does the project benefit areas with a high Social Vulnerability Index?	1	1	1	1	1	1	1
	Does the project have a positive, qualitative impact on populations that identify as Black, Indigenous, or People of Color (BIPOC)?	0	0	0	0	0	0	0
	Does the project improve health resources?	-1	-1	-1	-1	0	0	0
Environmental Impacts	Does the project address drivers of climate change?	1	-1	1	1	1	1	1
	Does the project use nature-based solutions?	0	-1	1	-1	-1	-1	0
	Does the project provide habitat restoration for threaten and endangered species?	-1	-1	-1	-1	-1	-1	0
Public and Stakeholder Support	Is there strong support for the project? Was it ranked as a high priority by the stakeholder partnership and community?	1	-1	0	1	1	-1	-1
TOTAL		**11**	**4**	**6**	**6**	**6**	**8**	**2**
		Regional Drainage Capacity Assessment	**Multi-Jurisdictional Sheltering Collaboration**	**Vegetated Swales in Urban Flooding Hotspots**	**Prioritized Vulnerability Inventory of Bridges and Culverts**	**Upsizing Regional Stormwater Infrastructure**	**Regional Hazard Information Sharing Partnership**	**Establishing a Resilience Hub**

Priority	Scoring	Total projects
Low Priority	<1	
Medium Priority	1-3	
Medium-High Priority	4-6	
High Priority	>6	

APPENDIX C: REFERENCES

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APPENDIX D: MID-EAST REGION STAKEHOLDER PARTNERSHIP PARTICIPANT LIST

First Name	Last Name	Affiliation	Title/Role
Reide	Corbett	East Carolina University/Coastal Studies Institute	Dean & Executive Director
Cayla	Cothron	NC Sea Grant	Climate Resilience Extension Associate
Eliud	De Jesus	Greenville Urban Area MPO	Transportation Planner
Heather	Deck	Sound Rivers	Executive Director
Eryn	Futral	Department of Public Safety, Risk Management	NFIP Eastern branch Planner
Carlton	Gideon	Mid-East Commission COG	Planner
Catherine	Glover	Washington-Beaufort County Chamber of Commerce	Executive Director
Chantae	Gooby	City of Greenville	Chief Planner
Joseph	Griffin	Martin Co Code Enforcement & Safety	Director
Charlotte	Griffin	Town of Bear Grass	Mayor
Stephanie	Harmon	Peanut Belt RPO	Transportation Planner
Mavis	Hill	Tyrrell County Community Development Corporation	Executive Director
Camille	Jenkins	Bethel Advocacy Committee	Chair
Jimmy	Johnson	Albemarle-Pamlico National Estuary Partnership	Coastal Habitats Coordinator
Kevin	Keyzer	Greenville Utilities Commission	Operations Support Manager

First Name	Last Name	Affiliation	Title/Role
Brooke	Massa	NC Wildlife Resources Commission	Land Conservation Biologist
Emily	Michaud	Mid-East Commission	
Desmond	Miller	North Carolina cooperative extension	4H Agent
Daryl	Norris	City of Greenville	Civil Engineer III - Stormwater
Robin	Payne	Bertie County Government	Projects and Communities Consultant
Mary	Perkins-Williams	Pitt County Board of Commissioners	Commissioner
Derrick	Remer	Duke Energy	District Manager | Government and Community Relations
James	Rhodes	Pitt County Planning Department	Assistance County Manager for Planning & Environment
Veronica	Roberson	Winterville Town Board	veronica.roberson@wintervillenc.com
Juvencio	Rocha Peralta	Association of Mexicans in North Carolina in North Carolina, Inc. (AMEXCAN)	Executive Director
Ben	Rogers	Pitt County Government	Planner II
Wayne	Rollins	Pitt County Economic Development	Business Retention and Expansion Specialist
Rick	Savage	Carolina Wetlands Association	Executive Director
Jason	Semple	Martin County Economic Development Corporation	President/CEO
Sarah	Spiegler	NC Sea Grant	Coastal Resilience Specialist
Lynn	Whitehurst	Soil & Water Conservation District	

First Name	Last Name	Affiliation	Title/Role
Chester	Williams	A Better Chance A Better Community	CEO
Emily	Yeager	East Carolina University	Assistant Professor