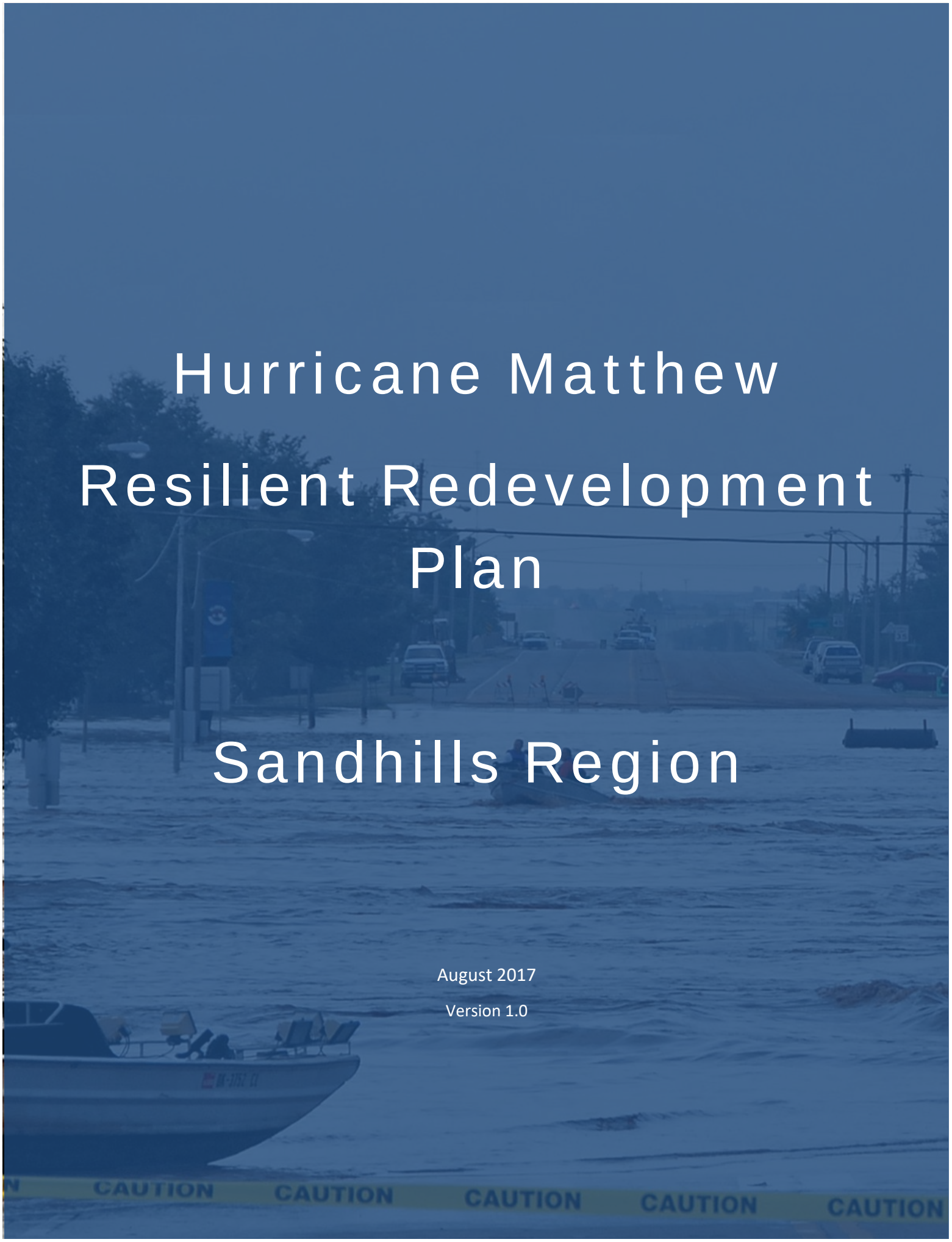

Hurricane Matthew Resilient Redevelopment Plan

Sandhills Region

August 2017

Version 1.0

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Change Log

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Executive Summary

In October 2016, Hurricane Matthew caused widespread destruction in the Caribbean and up the Eastern Seaboard of the United States. In North Carolina, at least 26 people lost their lives, and 100,000 homes, businesses, and government buildings sustained damage estimated at $4.8 billion.[1] At the storm's peak, 3,744 individuals fled to 109 shelters across the region. More than 800,000 households lost power and 635 roads were closed, including the major east-west and north-south corridors.

In December 2016, the North Carolina General Assembly established the North Carolina Resilient Redevelopment Planning (NCRRP) program as part of the 2016 Disaster Recovery Act (*Session Law 2016-124*). The purpose of the program is to provide a roadmap for community rebuilding and revitalization assistance for the communities that were damaged by the hurricane. The program empowers communities to prepare locally driven recovery plans to identify redevelopment strategies, innovative reconstruction projects, and other needed actions to allow each community not only to survive but also to thrive in an era when natural hazards are increasing in severity and frequency.

The NCRRP consists of planning and implementation phases and is managed through North Carolina Emergency Management.

Figure 1. NCRRP Counties

As part of the NCRRP, NCEM facilitated development of regional resilient redevelopment plans for four "prosperity zones" as identified by the North Carolina Department of Commerce. Prosperity zones were created by the North Carolina General Assembly in 2015 for the following purposes:

1) Facilitate collaborative and coordinated planning and use of resources,
2) Improve cooperation with other governmental and nonprofit entities at the local and regional level,
3) Facilitate administrative efficiencies within State government,
4) Receive advice on economic development issues by local boards established by a North Carolina nonprofit corporation with which the Department of Commerce contracts, and
5) To the extent feasible, establish one-stop sources in each region for citizens and businesses seeking State services at the regional level.

[1] State of North Carolina Supplemental Request for Federal Assistance Hurricane Matthew Recovery, https://governor-new.s3.amazonaws.com/s3fs-public/documents/files/Hurricane%20Matthew%20Relief--2017%20Federal%20Request%20%28002%29.pdf.

All of the impacted counties[2] fall into one of the following four economic prosperity zones:

- North Central Region
- Northeast Region
- Southeast Region
- Sandhills Region

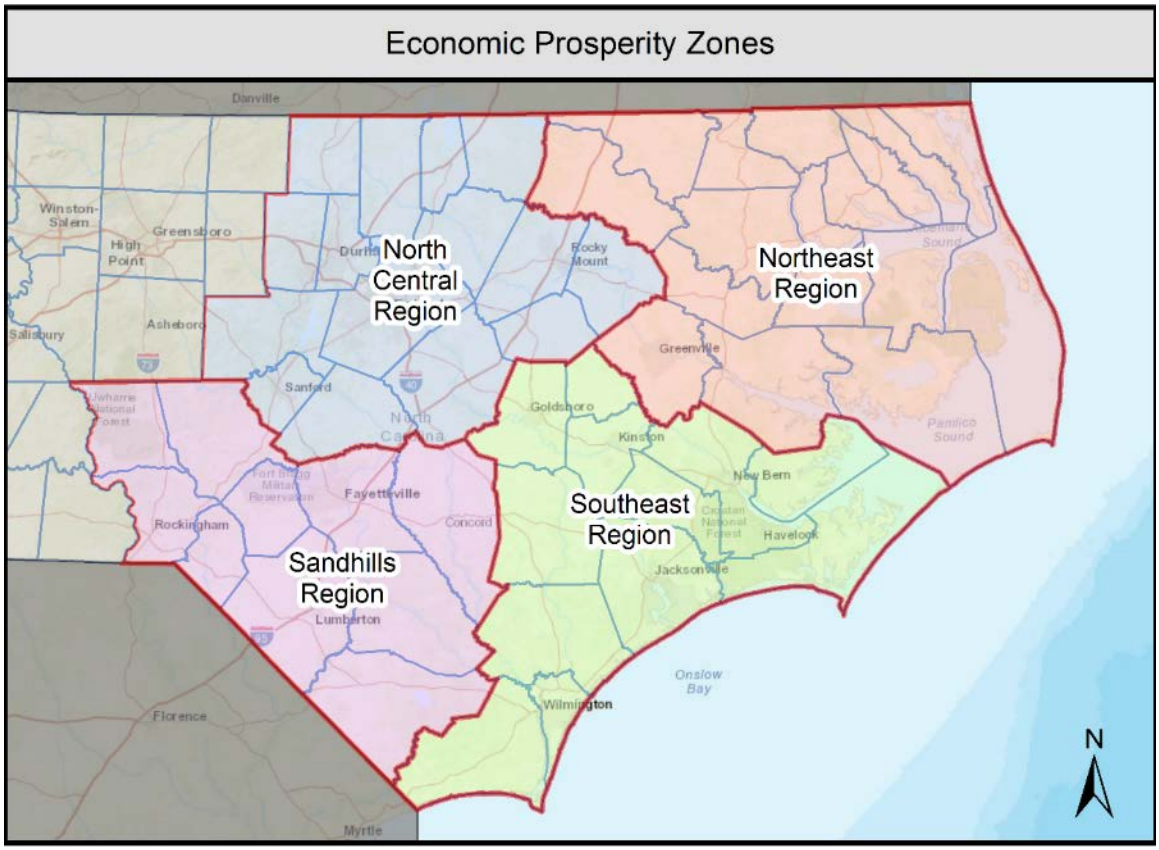


Figure 2. North Carolina Prosperity Zones

This document has been developed to provide summary information for the counties located in the Sandhills Region. These summary documents provide a snapshot of the current needs of the counties located in these regions regarding holistic recovery and redevelopment. The plan will evolve as the counties analyze their risk to their assets, identify needs and opportunities, determine the potential costs and benefits of projects, and prioritize projects. As projects are more fully defined, the potential impact on neighboring communities and the region may lead to modifications.

Implementation of the proposed projects and actions described in this plan is subject to applicable federal, state, and local laws and regulations. Proposed projects or actions may be eligible for state or federal funding, or could be accomplished with municipal, nonprofit, or private investments. However, inclusion of a project or action in this plan does not guarantee that it will be eligible for recovery funding.

[2] Except for Anson County. Anson County is located in the Southwest Region Prosperity Zone but for the purposes of these reports has been included in the Sandhills Region.

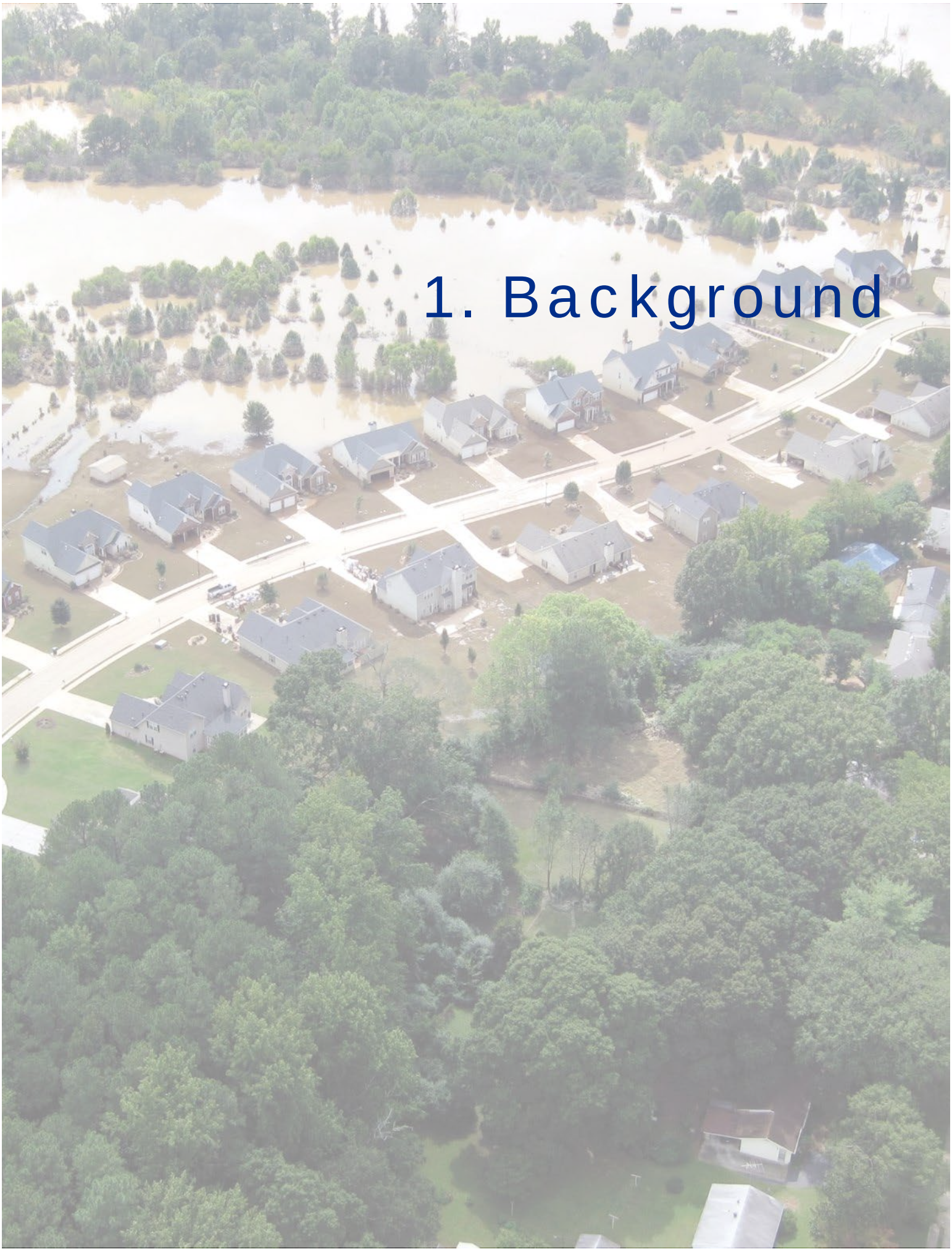
This regional RRP covers the following counties:

- Anson
- Bladen
- Columbus
- Cumberland
- Hoke
- Montgomery
- Moore
- Richmond
- Robeson
- Sampson
- Scotland

After multiple public meetings, the counties in this region identified projects in four pillars: Housing, Economic Development, Infrastructure, and Environment. Details of these projects can be found in Section 4 of this plan.

County	Housing Pillar	Economic Development Pillar	Infrastructure Pillar	Environment Pillar	Total Project/Action Count
Anson	2	3	3	3	**11**
Bladen	2	4	6	3	**15**
Columbus	2	3	9	3	**17**
Cumberland	3	3	8	4	**18**
Hoke	3	4	4	5	**16**
Montgomery	1	2	4	2	**9**
Moore	2	2	4	4	**12**
Richmond	3	2	5	5	**16**
Robeson	7	4	30	6	**47**
Sampson	5	9	4	4	**22**
Scotland	3	4	4	3	**14**
TOTAL	**33**	**40**	**81**	**42**	**197**

Table 1. Regional Summary of Projects



1. Background

1. Background

Summary of Hurricane Matthew Storm Damage

Hurricane Matthew was an extraordinarily severe and sustained event that brought record-level flooding to many areas in eastern North Carolina's coastal plain, sound, and coastal communities. Hurricane Matthew hit North Carolina on October 8, 2016, as a Category 1 storm. Communities were devastated by this slow-moving storm primarily by widespread rainfall. During a 36-hour period, up to 18 inches of heavy rainfall inundated areas in central and eastern North Carolina.

Riverine flooding began several days after Hurricane Matthew passed and lasted for more than 2 weeks. New rainfall records were set in 17 counties in the Tar, Cape Fear, Cashie, Lumber, and Neuse River watersheds. Entire towns were flooded as water levels throughout eastern North Carolina crested well beyond previously seen stages.

During the peak of the hurricane, 800,000 households lost power and 635 roads were closed, including a section of I-40 West in Johnston County that was closed for 7 days, and sections of I-95 North and South in Robeson and Cumberland Counties that were closed for 10 days.

Approximately 88,000 homes were damaged and 4,424 were completely destroyed. Losses totaled more than $967 million, representing an economic loss as high as 68% of the damages, or $659 million, not expected to be covered by insurance or FEMA assistance.

North Carolina Governor McCrory requested FEMA assistance on October 9, 2016, and FEMA subsequently declared a major disaster (DR-4285) for North Carolina on October 10, 2016, for 48 counties encompassing approximately 325 cities, towns, townships, and villages.

Preliminary estimates indicate more than 30,000 businesses suffered physical or economic damage, and 400,000 employees were affected as a result. Hurricane Matthew also had a significant impact on the agriculture and agribusiness economy in eastern North Carolina. The nearly 33,000 agricultural workers and 5,000 agricultural-support workers hit by the storm account for more than half of the state's agriculture and agriculture-support workforce.

Initial economic analysis of the impacts of crop and livestock losses caused by Hurricane Matthew estimated the loss of more than 1,200 jobs and roughly $10 million in state and local income and sales tax revenue.[3]

State / Legislative Response

North Carolina's response to Hurricane Matthew included 2,300 swift-water rescues using 79 boats and more than 90 air rescues. North Carolina also deployed over 1,000 National Guard and State Highway Patrol to assist with rescue and sheltering missions. There were 3,744 individuals transported to 109 shelters across central and eastern North Carolina during the storm's peak.

FEMA's disaster declaration made 50 counties eligible for FEMA assistance, 45 of which are eligible for Individual Assistance and Public Assistance and 5 of which are eligible for Public Assistance only.

[3] Governor McCrory's Request for Federal Assistance for Hurricane Matthew Recovery, November 14, 2016

- There were 81,832 individuals registered for FEMA/state assistance.
- Federal/state financial assistance in the amount of $92.5 million was approved to help flood survivors recover.
- Small Business Administration (SBA) loans approved for individuals after Hurricane Matthew totaled $65.6 million.
- SBA loans approved for businesses after Hurricane Matthew totaled $23.2 million.

After the immediate response period, North Carolina Governor McCrory and the North Carolina General Assembly took the steps summarized below to obtain and allocate long-term funding for Hurricane Matthew.

November 1: The Hurricane Matthew Recovery Committee is established. Preliminary damage assessments are completed, and the State Emergency Response Task Force continues to administer programs and identify needs unmet by existing federal programs.

November 14: Governor McCrory formally submits North Carolina's request for supplemental federal disaster assistance to the delegation as Congress returns to work.

Late November/Early December: Congress appropriates supplemental disaster assistance for North Carolina. After the supplemental federal disaster recovery assistance package is received, Governor McCrory submits a supplemental state disaster assistance package (House Bill 2) recommendation to the General Assembly and calls a special session. Governor McCrory then signs the Hurricane Matthew Recovery Act to fund disaster recovery efforts.

This supplemental federal assistance was to focus on housing, infrastructure, economic development, and the environment. These four pillars were to be funded through the following programs and agencies: The U.S. Department of Housing and Urban Development's Community Development Block Grant–Disaster Recovery (CDBG-DR) program, Army Corps of Engineers Operations and Maintenance, the FEMA National Dam Safety Program, the Federal Highway Administration's Emergency Highway Funding, and the U.S. Department of Agriculture's Emergency Conservation and Watershed Protection programs.

Resilient Redevelopment Planning

The purpose of the NCRRP program is to provide a roadmap for communities in eastern North Carolina to rebuild and revitalize after being damaged by Hurricane Matthew. The program empowers communities to prepare locally driven, resilient redevelopment plans to identify redevelopment strategies, innovative reconstruction projects, and other actions to allow each community not only to survive, but also to thrive in an era when natural hazards are increasing in severity and frequency.

The NCRRP process employs a holistic approach to planning that includes four pillars: housing, infrastructure, economic development, and the environment. Redevelopment strategies and reconstruction projects for each of the four pillars is included in each plan.

The NCRRP process consists of planning and implementation phases and is managed through North Carolina Emergency Management (NCEM).

Scope

This document is a snapshot of the Sandhills Economic Property Zone's current needs for achieving holistic recovery and redevelopment. The plan will evolve as the counties in the region analyze the risk to their assets, identify needs and opportunities, determine the potential costs and benefits of projects, and prioritize the projects. As projects are more fully defined, the potential impact on neighboring communities and the region may lead to modifications.

Planning objectives are to (1) develop strategic, resilient redevelopment plans and actions, and (2) to define any unmet funding needed to implement such actions after considering other funding sources.

The resulting resilient redevelopment plans will be the foundation for any supplemental funding received through Congress, the North Carolina General Assembly, and other funding sources. These plans will also be the basis for the state's Recovery Action Plan, which is required by the U.S. Department of Housing and Urban Development before the state can expend funds received from the CDBG-DR program.

Local Participation and Public Engagement

Stakeholder engagement and public involvement was an essential component of the NCRRP initiative. In each participating County, four rounds of discovery, analysis, collaboration, and interaction were held. Each meeting had two components: an in-depth working session with county officials, subject matter experts, and planners from the affective counties and municipalities; and a public open house. The purpose of each meeting was as follows:

Meeting 1 – Initiated the planning process and validated the existing data pertaining to damage and impacts.

Meeting 2 – NCEM presented draft documentation of resilient redevelopment strategies and received feedback from community leaders and the public.

Meeting 3 – NCEM presented refined resilient redevelopment strategies based on feedback from Meeting 2 and received additional feedback for finalization of the plan.

Meeting 4 – NCEM presented actions developed during the course of the planning process and allowed the county to rank actions; apply High, Medium, or Low Prioritization; and approve inclusion of the actions in the final plan.

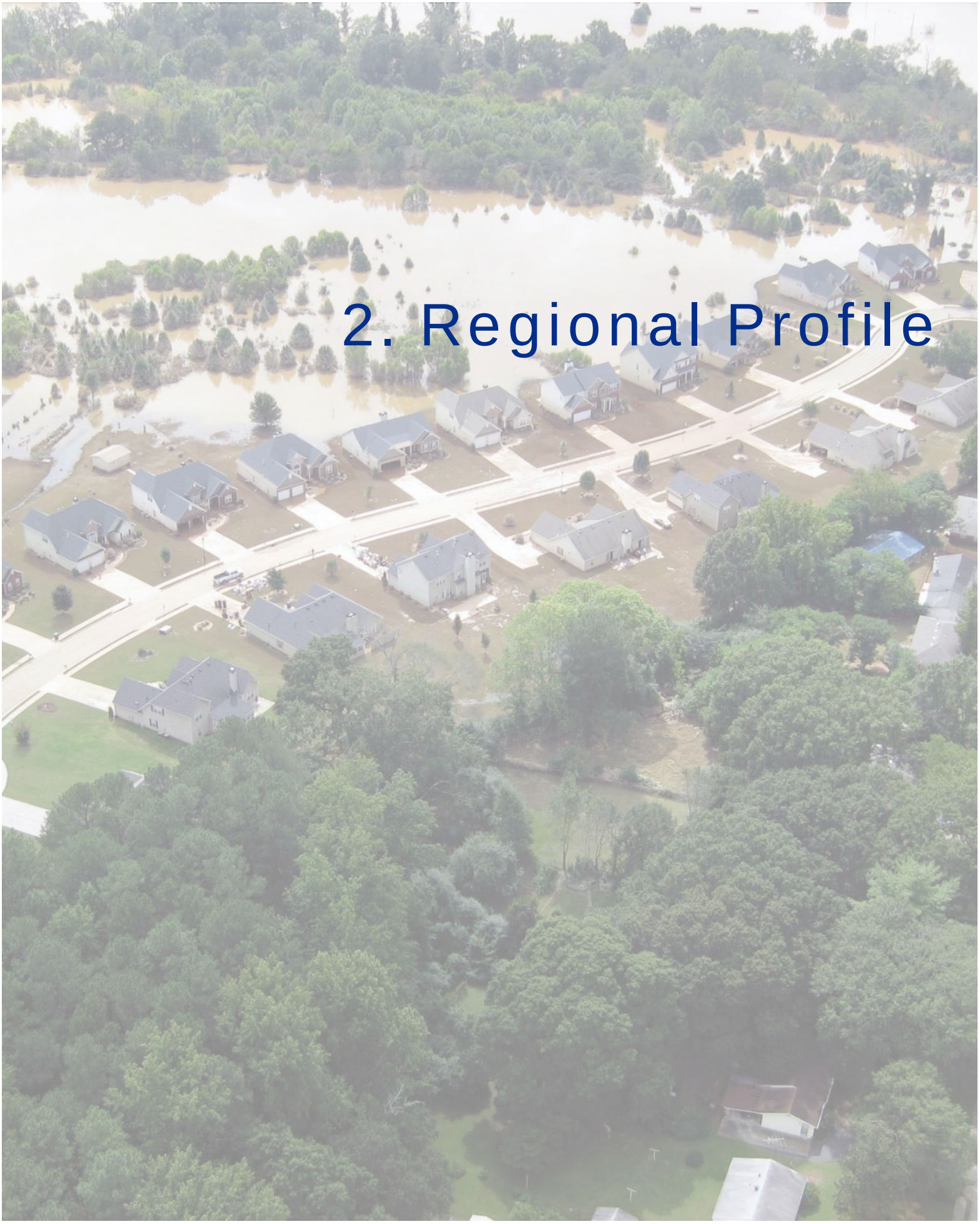
Each of the 50 counties that were declared a major disaster by the President of the United States as a result of Hurricane Matthew under the Stafford Act (P.L. 93-288) participated in the resilience redevelopment planning process. Each municipality in those counties, as well as the four economic development regions that sustained damage from Hurricane Matthew, were also invited to participate.

The counties impacted by the storm cover the eastern half of North Carolina and occupy parts of the piedmont, sand hills, and coastal areas of the state.

Assumptions and Methodologies

NCEM has assembled a wealth of data, resources, and technical expertise from state agencies, the private sector, and the University of North Carolina system to support the development of innovative best practice strategies.

Implementation of the proposed projects and actions described in this plan is subject to applicable federal, state, and local laws and regulations. Inclusion of a pro in this plan does not guarantee that it will be eligible for recovery funding. However, proposed projects or actions may be eligible for state or federal funding or could be accomplished with municipal, nonprofit, or private investment.



2. Regional Profile

2. Regional Profile

The Sandhills Economic Prosperity Zone is comprised of the counties of Bladen, Columbus, Cumberland, Hoke, Moore, Montgomery, Richmond, Robeson, Sampson, Scotland. All of these 10 counties were part of the Presidential disaster declaration. This section provides a summary of demographics, income, housing, economy, infrastructure and environment of the impacted counties within this region. The County level plans have more detailed information.

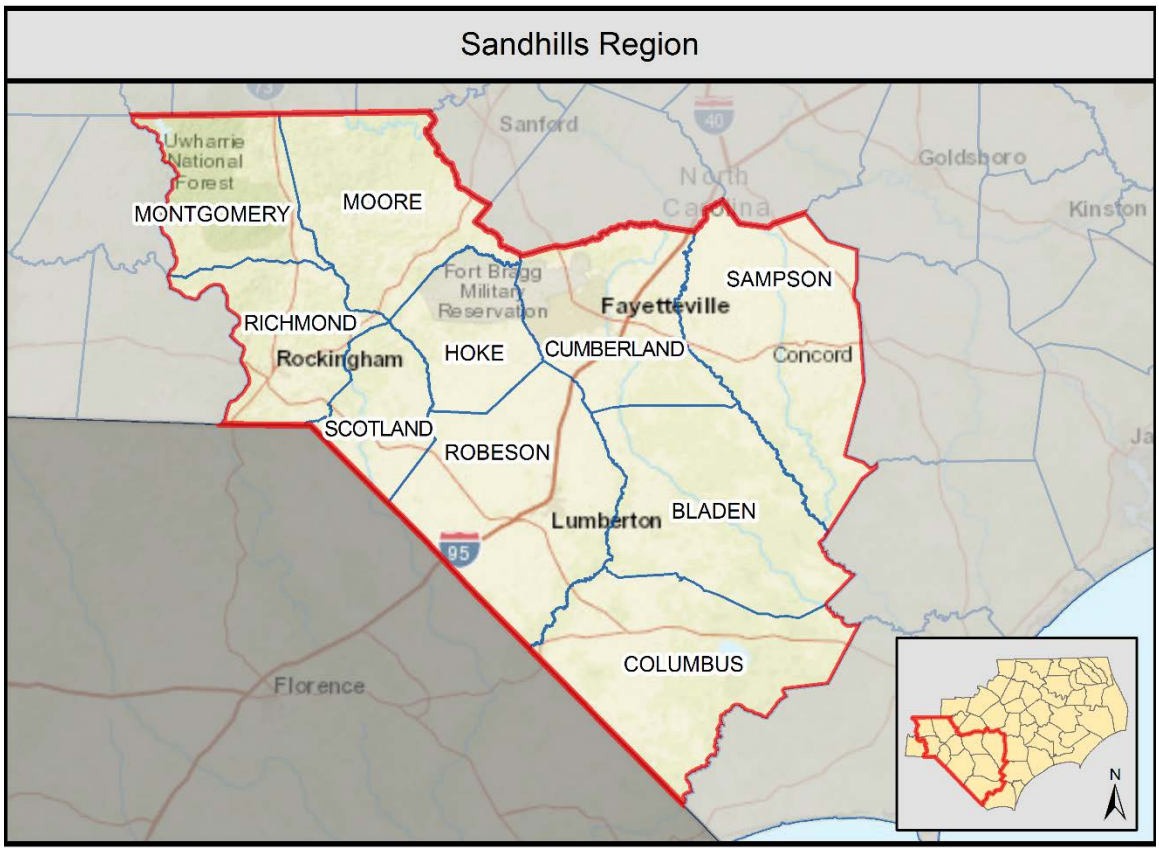


Figure 3. Sandhills Prosperity Zone

Demographics, Income, and Housing

Demographic, income and housing information for the region is summarized by county in Table 2. The data is from the 2000 Census, 2010 Census, and 2011-2015 American Community Survey five-year estimates.

Table 2. County Summary of Demographics, Income and Housing

County	Population (2010)	Population Change in between 2000 & 2010 (%)	Median Age (5-year estimate 2011-2015)	Low, Moderate and Medium Income (% of population (2006-2010)	Affordable Housing Units (#) (2016)	Zero-Car Households (% of households 5-year estimate 2011-2015)
Anson	25,275	6.6%	39.7	42.3%	549	11.3%
Bladen	32,278	9.0%	42.6	46.6%	867	8.7%
Columbus	54,749	6.1%	41.5	40.4%	1,879	8.3%
Cumberland	302,963	5.4%	31.1	37.5%	6,016	6.6%
Hoke	33,646	39.5%	31.4	40.4%	611	6.8%
Montgomery	26,822	3.6%	41.1	42.7%	480	9.5%
Moore	74,774	18.0%	45.1	40.9%	1,396	5.5%
Richmond	46,596	0.1%	39.9	49.0%	1,781	10.5%
Robeson	123,339	8.8%	35.2	51.6%	4,481	10.2%
Sampson	60,161	5.4%	39.2	42.0%	1,001	7.9%
Scotland	35,966	0.5%	39.1	49.6%	1,460	10.9%
Region	**816,569**	**9.4%**	**38.7**	**43.9%**	**20,521**	**7.9%**
North Carolina	**9,535,483**	**18.5%**	**42**	**55%**	**156,964**	**6.5%**

Sources : Population - Minnesota Population Center. National Historical Geographic Information System: Version 11.0 [Database]. Minneapolis: University of Minnesota. 2016. http://doi.org/10.18128/D050.V11.0. Census 2000/Census 2010 Time Series Tables Geographically Standardized
Age - US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B01001, "Sex by Age."
Low, Moderate and Medium Income - based on the 2006-2010 American Community Survey (ACS) - https://www.hudexchange.info/programs/acs-low-mod-summary-data/acs-low-mod-summary-data-block-groups-places/
Affordable Housing - Public and Affordable Housing Research Corporation and National Low Income Housing Coalition, National Housing Preservation Database, 2016. http://www.preservationdatabase.org/
Zero-Car Households - US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B25044, "Tenure by Vehicles Available."

In terms of population, the region is growing at a lower rate (9.4%) than the State (18.5%). Hoke, Moore and Bladen counties have the highest growth rates, and population is growing in all of the counties in the region. Median age of the region (38.7) is younger than that of the State (42).

The American Community Survey (ACS) 5-year 2006-2010 Low and Moderate Income Summary Data from the Housing and Urban Development Exchange (HUD Exchange) website shows that the region has a lower Low, Moderate, and Medium Income (LMMI) population proportion (43.9%) than the State (55%).

According to the National Housing Preservation Database, Montgomery and Anson counties have lower numbers of affordable housing units when compared with the other counties in the region. Census data on zero-car households shows that Anson (11.3) and Richmond (10.5) counties have a higher percentage of households that do not have a car, relative to the rest of the region, and may need greater assistance in case of evacuation.

Economy and Labor Force

Table 3 shows each county's civilian population in the labor force and the proportion of that population that is unemployed. According to the local area unemployment statistics (LAUS) from the Labor and Economic Analysis Division (LEAD) for the unadjusted data for all periods in 2016, the Sandhills region has a higher average annual unemployment rate (6.5%) than the State's (5.1%), with Scotland, Robeson, and Richmond being the counties with the highest unemployment rates in the region.

Table 3. County Summary of Unemployment and Top Employers

County	Civilian Population in Labor Force (2016)	Civilian Unemployment Rate (2016)	Top Employer (Second Quarter, 2016)	Top Employer's Industry Sector (Second Quarter, 2016)
Anson	10,776	5.8%	Anson County Schools	Education and Health Services
Bladen	14,722	6.9%	Smithfield Foods Inc.	Manufacturing
Columbus	22,777	6.4%	Columbus County Board of Educations	Education and Health Services
Cumberland	127,861	6.3%	Department of Defense	Public Administration
Hoke	19,973	6.5%	Hoke County Board of Education	Education and Health Services
Montgomery	11,790	5.2%	Montgomery County Board of Education	Education and Health Services
Moore	39,462	5%	First Health of the Carolinas	Education and Health Services
Richmond	16,883	7%	Richmond County Schools	Education and Health Services
Robeson	50,767	7.9%	Public Schools of Robeson County	Education and Health Services
Sampson	29,800	5.4%	Smithfield Foods Inc.	Manufacturing
Scotland	11,693	9.2%	Scotland County Schools	Education and Health Services
Region	**356,504**	**6.5%**		
North Carolina	**4,875,702**	**5.1%**		

Sources: Civilian Population and Unemployment Rate - Labor and Economic Division of North Carolina Department of Commerce – Local Area Unemployment Statistics http://d4.nccommerce.com/LausSelection.aspx
Top Employer - Labor and Economic Division of North Carolina Department of Commerce – Quarterly Census of Employment and Wages (QCEW) Largest Employers http://d4.nccommerce.com/QCEWLargestEmployers.aspx

The table also includes the largest employer in each county, with the corresponding industry, which shows that education and health services, public administration, manufacturing, and leisure and hospitality are the major industries in the region. The source of employer data is the Labor and Economic Analysis Division (LEAD) of the North Carolina Department of Commerce.

Infrastructure and Environment

Major transportation infrastructure includes I-95, which cuts across Robeson and Cumberland Counties in the southern and central portions of the region. Future I-74 runs through the region in Montgomery, Anson, Scotland, Robeson and Columbus counties. US routes 501, 401 1 are other major highways in the region. There is a regional airport located in Fayetteville, and general aviation airports are located in all of the other counties in the region.

Power supply to the region is through major utility companies, and supplemented by solar farms and wind energy farms located in most of the counties in the region.

Majority of the water and wastewater facilities are managed by public water and sewer districts. There are a few independent entities, or municipal water systems, and a small population has wells.

Educational and medical facilities are spread throughout the region. Notable regionally important education facilities include UNC Pembroke, located in Pembroke, Fayetteville State University, Methodist University, and St. Andrews University.

Medical facilities in the region include: Anson Community Hospital (Anson County), Cape Fear Valley Bladen County Hospital (Bladen County), Columbus Regional Healthcare (Columbus County), Cape Fear Valley Behavioral Health Center, Cape Fear Valley Medical Center, Highsmith-Rainey Specialty Hospital, Womack Army Medical Center on Ft. Bragg, Cape Fear Valley Rehabilitation Center, Fayetteville-VA Medical Center (Cumberland County), Hoke Campus of FirstHealth Moore Regional Hospital, Cape Fear Valley Hoke Hospital (Hoke County), First Health Montgomery Memorial Hospital, Sandhills Mental Health Counseling Center (Montgomery County), FirstHealth Moore Regional Hospital (Moore County), Richmond Memorial Hospital, Sandhills Regional Medical Center (Richmond County), Southeastern Regional Medical Center (Robeson County), Sampson Regional Medical Center (Sampson County), and Scotland Memorial Hospital (Scotland County).

Figures 4 and 5 show the major infrastructure in the region.

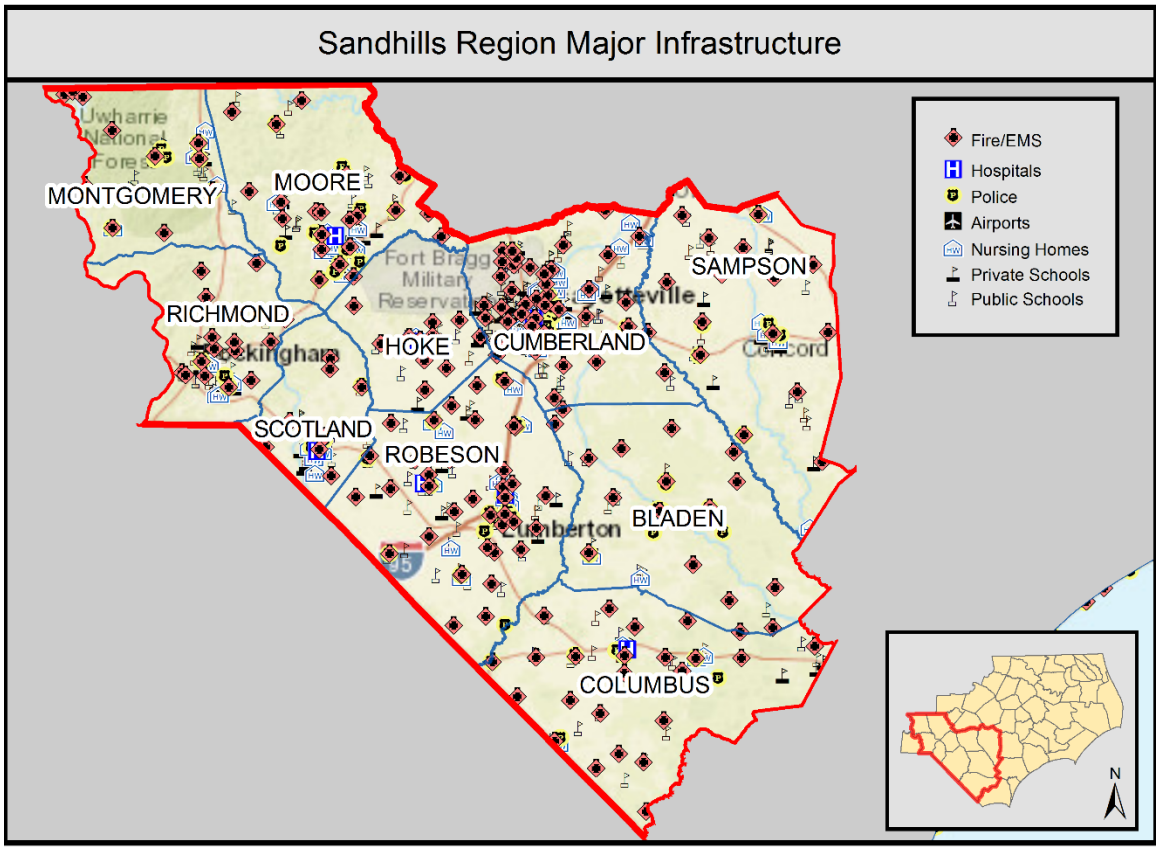


Figure 4. Major Infrastructure in the Sandhills region – 1 of 2 maps

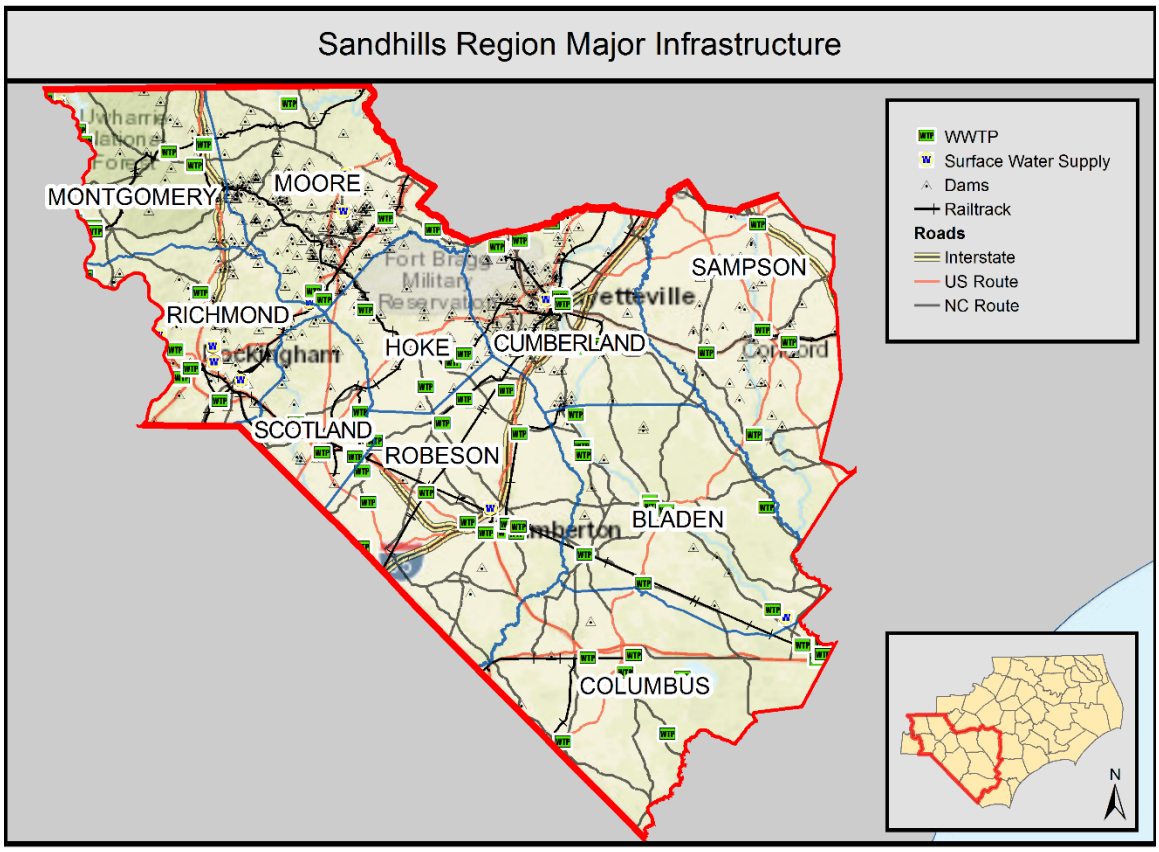
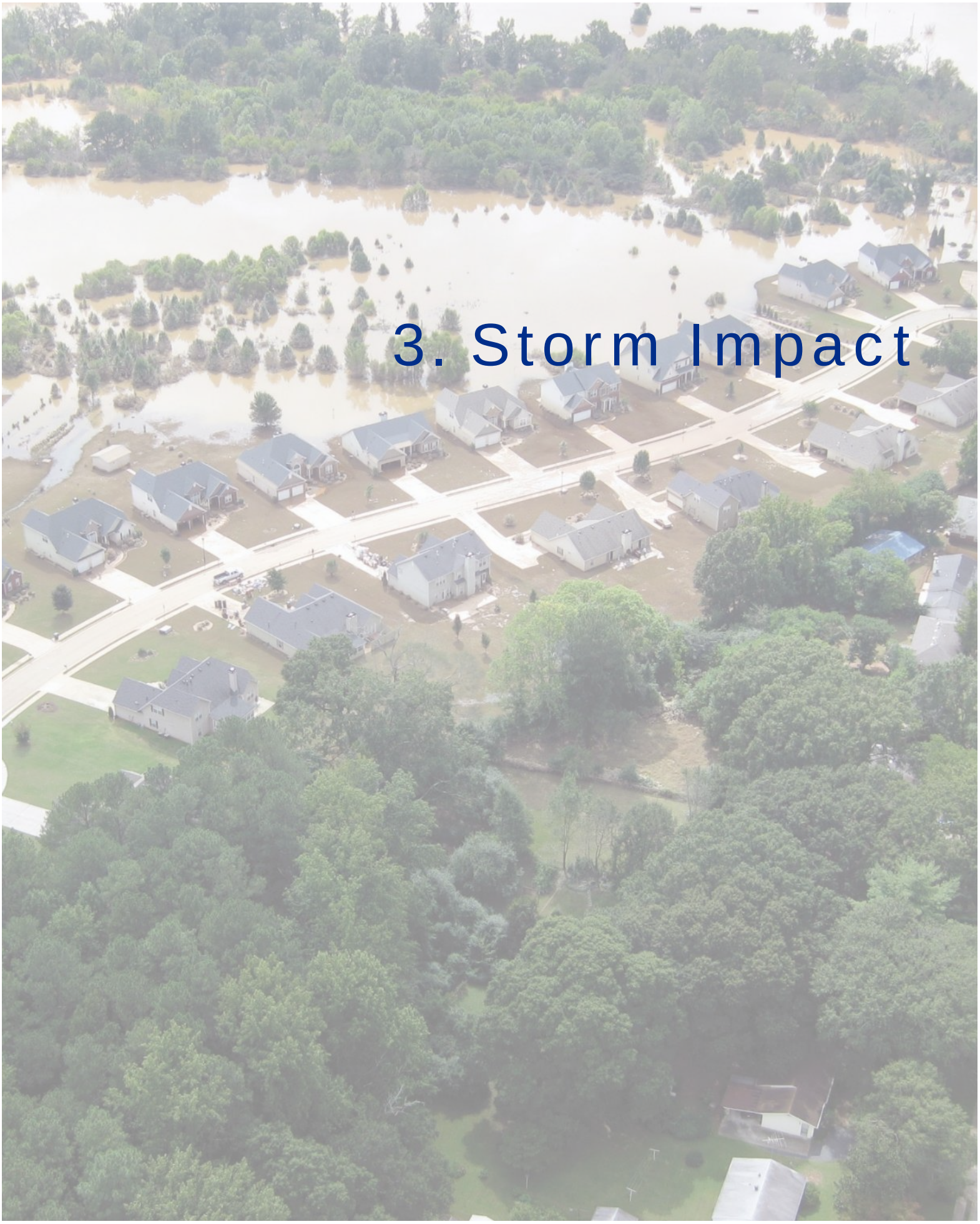


Figure 5. Major Infrastructure in the Sandhills Region - 2 of 2 maps

As reflected in the name, the region is noted for the sandhills (a physiographic region) located in many of the counties. The sandhills are known for their sandy soils and distinctive vegetation and wildlife. According to the NC Natural Heritage Program, there are a number of natural areas of high, very high, or exceptional value in the region, and are designated as protected lands and natural heritage areas.

The region is home to a variety of areas of environmental importance such as:

- Pee Dee River (Anson, Richmond, and Montgomery Counties)
- Blewett Falls Lake (Anson and Richmond Counties)
- Brown Creek (Anson County)
- Lanes Creek (Anson County)
- Pee Dee Wildlife Refuge (Anson County)
- Cape Fear River (Bladen, Cumberland County)
- Black River (Bladen and Sampson Counties)
- South River (Bladen, Cumberland and Sampson Counties)
- Bladen Lakes State Forest (Bladen County)
- Jones Lake/Salters Lake (Bladen County)
- Singletary Lake State Park (Bladen County)
- White Lake State Park (Bladen County)
- Bay Tree Lake State Park (Bladen County)
- Lake Waccamaw State Park (Columbus County)
- Waccamaw River (Columbus County)
- Juniper Creek (Columbus County)
- Lumber River (Columbus, Hoke, Scotland and Robeson County)
- Little River (Cumberland, Moore and Montgomery County)
- Bear Path Bay (Cumberland County)
- Big Pond Swamp (Cumberland County)
- Bucks Bay (Cumberland County)
- Galiberry Swamp (Cumberland County)
- Reedy Marsh (Cumberland County)
- Vineyard Swamp (Cumberland County)
- Drowning Creek (Hoke County)
- Lumber River State Park (Hoke County, Robeson County)
- Uwharrie National Forest (Montgomery County)
- Badin Lake (Montgomery County)
- Lake Tillery (Montgomery County)
- Falls (Narrows) Lake (Montgomery County)
- Yadkin River (Montgomery County)
- Uwharrie River (Montgomery County)
- Deep River (Moore County)
- Great Coharie Creek (Sampson County)



3. Storm Impact

3. Storm Impact

Rainfall Summary

Hurricane Matthew officially made landfall as a Category 1 storm southeast of McClellanville, South Carolina early on October 8, 2016. The track and speed of the storm resulted in nearly two days of heavy precipitation over much of North Carolina that caused major flooding in parts of the eastern Piedmont and Coastal Plain. The storm produced widespread rainfall of 3-8 inches in the central regions of North Carolina and 8 to more than 15 inches in parts of eastern North Carolina. A number of locations received all-time record, one-day rainfall amounts. Many locations in the Coastal Plain of North Carolina had received above normal rainfall in the month of September leading to wet antecedent conditions prior to Hurricane Matthew. Total rainfall depth for Sandhills region is highlighted graphically in the figure below.

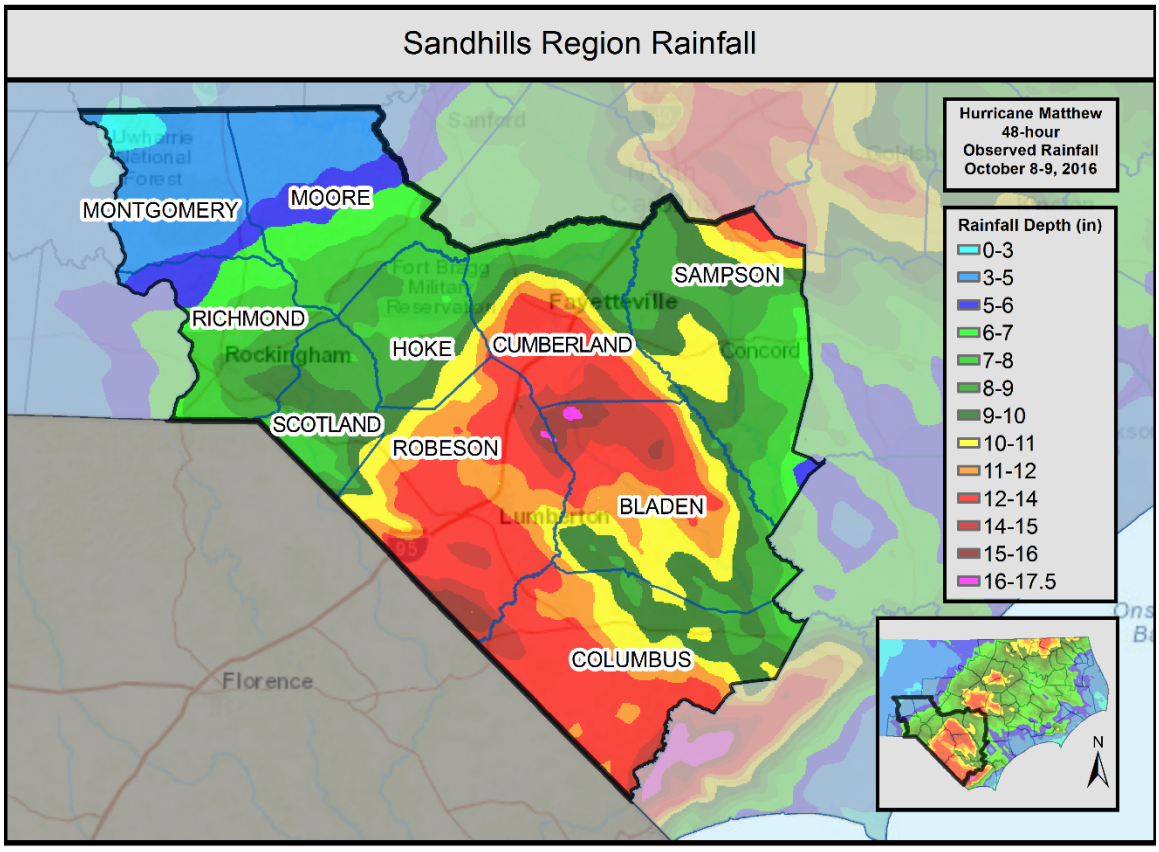


Figure 6. 48-hour Observed Rainfall Depth (October 8-9, 2016)

Housing and Infrastructure Impacts

According to Individual Assistance (IA) claims information as of July 2017, there were 46,915 impacted houses in the Sandhills region because of Hurricane Matthew. It should be noted that additional claims from Hurricane Matthew might still be pending, so this number may not reflect the final claims data from the event.

According to Public Assistance (PA) claims information, which are often closely tied to infrastructure, as of May 2017 there were 259 submitted projects and $17,304,216 of federal share obligated in the Sandhills region as a

result of Hurricane Matthew. It should be noted that additional claims from Hurricane Matthew might still be pending, so this number may not reflect the final claims data from the event.

Table 4 lists IA and PA claims as of July 2017.

County	Individual Assistance		Public Assistance	
	Total Registrations	Total Individual & Households Program (IHP) $ Approved	Submitted Projects	Federal Shares Obligated
Anson	96	$12,627	8	$488,355
Bladen	2,972	$2,438,821	24	$677,551
Columbus	5,188	$6,371,381	37	$1,046,925
Cumberland	14,803	$16,169,531	38	$3,567,978
Hoke	1,939	$775,552	15	$369,590
Montgomery	0	$0	0	$0
Moore	397	$364,252	19	$1,638,642
Richmond	175	$70,726	6	$54147
Robeson	18,546	$25,798,191	64	$8,033,585
Sampson	2,251	$2,046,883	29	$420,041
Scotland	548	$99,354	19	$1,007,402
Region	**46,915**	**$54,147,318**	**259**	**$17,304,216**
North Carolina	**81,498**	**$97,585,240**	**718**	**$62,663,672**

Table 4. County Summary of IA and PA Claims

The highest number of IA claims in the region is for Robeson County with 18,546 claims. The highest number of PA submitted projects is also Robeson County with 64 projects and the largest federal share obligated at $8,033,585.

Infrastructure was one of the greatest areas of concern in the wake of Hurricane Matthew as there were several types of infrastructure that were damaged in multiple locations. Road closures were the major impacts identified by local officials; a map of road impacts in the region is included.

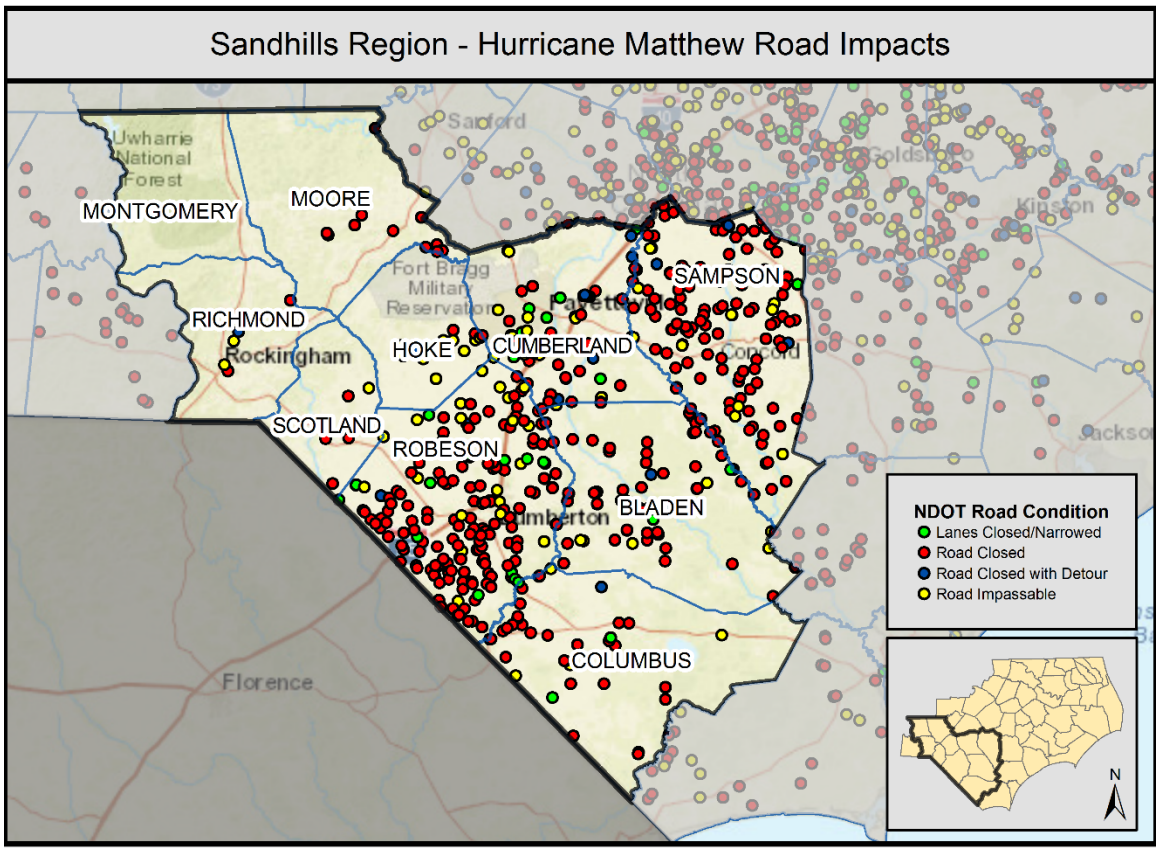
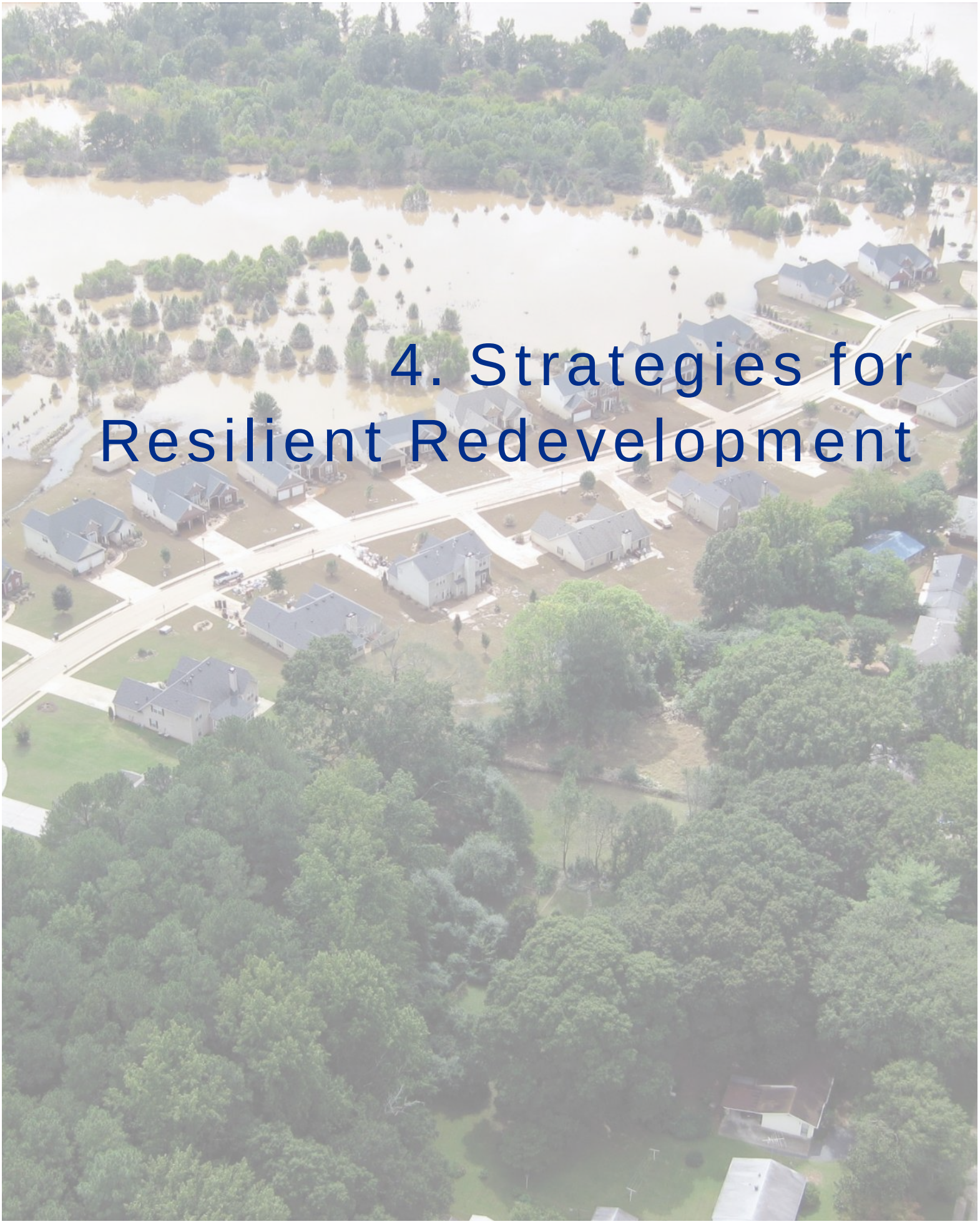


Figure 7. Regional Road Impacts

The County level plans have more detailed information about impacts to the local economy and environment.



4. Strategies for Resilient Redevelopment

4. Strategies for Resilient Redevelopment

This section provides details about the resilience and revitalization strategies and actions identified in the Sandhills Prosperity Zone that are regional in nature or that require coordination across jurisdictional boundaries. These actions were identified and refined during four public meetings with local officials and county residents held in March and April 2017. The actions are tied to impacts from Hurricane Matthew and organized by the pillars of housing, economic development, infrastructure, and environment. In addition to the public meetings, frequent coordination calls with County officials and data gathered from state agencies and organizations were utilized to formulate the actions listed below.

The table below provides the total number of regional resilience strategies that have been developed in the Sandhills Region under each pillar.

Pillar	Number of Projects in the Region	Number of Regional Projects
Housing	33	0
Economic Development	40	4
Infrastructure	81	11
Environment	42	10
Grand Total	**197**	**25**

Table 5. Summary of Regional Projects by Pillar

The following table lists all the regional actions for the Sandhills Prosperity Zone organized by project type.

Project Type	Number of Projects in the Region	Number of Regional Projects	Regional Project Name(s)
Agriculture related facilities and infrastructure	3	0	
All other non-hazard mitigation/recovery projects	14	1	• Scotland County: Update Zoning Codes to Reflect Current Best Practices to Improve Coastal Water Quality through Improved Stormwater Management and Hazard Mitigation
Dams and Levee Repairs and Improvement	8	4	• Fayetteville and Cumberland County: Dam Rehabilitation and Replacement • Robeson County: Implement Lumberton Levee Enhancements • Hoke County: Dams Rehabilitation/Replacement • Bladen County: Dam Analysis and Modification
Economic Development/Environment/Energy (3Es)	36	7	• Anson County: Carolina Thread Trail Access • Montgomery County: Extend Utilities on a Regional Scale to Encourage Development • Moore County: Southeast Sector Revitalization and Natural Park • Scotland County: Engage State Legislators, Major Employers, and Schools in Scotland County to Support Economic Development and Job Growth • Moore County: Extend Utilities on a Regional Scale to Encourage Development • Bladen County: Stream Restoration • Columbus County: Stream Restoration and Debris Removal

Project Type	Number of Projects in the Region	Number of Regional Projects	Regional Project Name(s)
Mitigation for Damaged Homes-Acquisition/Reloc	6	0	
Mitigation for Damaged Homes-Elevation/Recon	7	0	
Mitigation for Damaged Homes-Minor Repairs	4	0	
Mitigation for Public/Business Buildings	20	0	
Stormwater Management/Other Flood Mitigation	28	7	• Cumberland County: Stream Gauges and Flood Warning System • Hoke County: Stormwater System Upgrades • Hoke County: Stream Gauges and Flood Warning System • Moore County: Stream Gauges, Early Warning Network, and Dam Modification • Bladen County: Stream Gauges, Early Warning System, and Communications Network for Operators • Montgomery County: Stream Gauges, Early Warning Network and Dam Modification • Anson County: Stream Gauges/Early Warning Network
Studies and all other recovery activities	38	2	• Robeson County: Perform Detailed Studies of Unmapped Flood Sources • Moore County: Hydrologic and Hydraulic Study
Temp/Affordable Housing Construction outside SFHA	8	0	
Transportation Infrastructure	13	4	• Cumberland County: Interstate-95 Multi-County Coordinated Evacuation/Rerouting Plan • Robeson County: Upgrade Vulnerable Roads and Bridges • Scotland County: Secure Funding to Add a Minimum of 1,500 Feet to the Existing Length and 50 Feet in Width (25 Feet on Each Side) of the Laurinburg-Maxton Airport's Longest Runway • Columbus County: Upgrade Vulnerable Roads and Bridges
Waste Water & Water System Repairs & Hardening	15	0	
TOTAL	**197**	**25**	

Table 6. Regional Projects

Detailed information about the regional projects listed above is included on the following pages.

Update Zoning Codes to Reflect Current Best Practices to Improve Coastal Water Quality through Improved Stormwater Management and Hazard Mitigation.

County: Scotland

Priority Grouping:

Priority Ranking: 0

Project Timeframe: 1 to 5 years

Location: Scotland County

Project Summary: Even though Scotland County is an inland county, smaller creeks, rivers, or streams eventually feed out to the coast. By creating zoning policies that are cognizant of water flowing through the county, Scotland can have a positive environmental impact on the entire region. To accomplish this, Scotland County will perform a gap analysis of the county's current policies and best practices. This will inform future zoning decisions

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Flooding was a main source of damage from Hurricane Matthew in Scotland County and North Carolina. By creating zoning policies that are cognizant of water flowing through the county Scotland can have a positive impact on the entire region.	N/A
Consistent with existing plans (describe points of intersection/departure)	To accomplish this project Scotland County will perform a gap analysis of the county's current policies and best practices related to stormwater management. This will inform future zoning decisions.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Protecting the quality of North Carolina's coastal water sources will contribute to prolonged enjoyment of the coastline which is a major tourism attraction for out-of-state visitors. If the coast continues to attract tourists the communities that they travel through will also continue to experience economic boosts. This strategy ultimately supports the economic development of Scotland County by ensuring that a tourist site with statewide impacts is maintained.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Even though Scotland County is an inland county smaller creeks rivers or streams eventually feed out to the coast.	N/A

	Improving the state's coastal water quality will provide environmental benefit to the county as a result.	
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	$0- $50K	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Unknown	N/A
Who will administer this project?	County	N/A

Fayetteville and Cumberland County Dam Rehabilitation and Replacement

County: Cumberland

Priority Grouping: High Priority

Priority Ranking: 7

Project Timeframe: 24 months

Location: Rayconda Dam, Loch Lomond Dam, Arran Lake Dam, Watson Dam, Long Valley Dam, Jessups Mill Pond, Rhodes Pond Dam, Mount Vernon Estates Dam (see map attachments)

Project Summary: Implement a comprehensive dam safety program, including dam replacement, rehab and/or retrofit, which helps address small dams generally owned by neighborhood associations, farmers, utilities, or other private owners. Technical assistance should be made available to re-engineer dams in need of retrofit, repair and/or rebuild. The State should establish minimum standards for construction and maintenance including hardening to avoid damage from future storms and prevent dam failure. Additional funds in the form of micro loans should be made available to dam owners for the actual repair and construction. In exchange for loans and design work, dam owners will agree to comply with annual maintenance agreement and set aside funds for future maintenance.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	One of the most noticeable impacts of Hurricane Matthew in Cumberland was the destruction of dams due to high water levels and upstream dam breaches. These dam failures led to additional damages to infrastructure downstream homes and posed danger to residents. The dry lake beds have caused rapid drops in property values. The loss of dams has changed the water flow in previously dammed streams. The replacement of the breached dams will help restore habitat property values and pre-storm flow.	N/A
Consistent with existing plans (describe points of intersection/departure)	Many of these dams were built in before any standards and mostly likely without much development around it. As urbanization has occurred around these areas it is time to apply consistent standards to lower the risk of continued dam breaches. The project is consistent with Action #3 from the approved Cumberland Hoke Mitigation Plan: Conduct a countywide infrastructure vulnerability assessment to identify priority needs for updating ill-designed	
or outdated critical structures.	Agree	
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	The dam breaches cause immediate flood damage but also left behind dried up lake beds that have become breeding grounds for vermin (some ponds/lakes filtered storm water). The property values of homes around the dry lake beds have plummeted which reduce the level of tax revenue for the city or county.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree

To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	Agree
What impacts to the environment of the county will result from this project?	The normalization to pre-Hurricane Matthew stream flow is the goal of this project. The project is intended to improve the environmental conditions. Sedimentation caused by drainage of empty lake beds creates downstream water quality issues. The drained lake itself with mud and sediment is an environmental hazard to people and wildlife. Lakes provide habitat for fish and waterfowl.	N/A
What is the capability of the local government to administer this project?	Low	Agree
What is the financial range of this project?	$1M+	Agree with Modifications
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Between 51 and 75%	Agree

Robeson County Implement Lumberton Levee Enhancements

County: Robeson

Priority Grouping: High Priority

Priority Ranking: 2

Project Timeframe: 3-7 years

Location: Lumberton, NC

Project Summary: During Hurricane Matthew, floodwaters poured though the opening in the levee where VFW road and CSX Railroad pass through. This flow inundated the city's water plant and caused excessive flooding in the areas behind the levee. Implement actions that will prevent the 500-yr flood from flowing through the levee opening at VFW Road and CXS crossing Details-Rebuilding and reinforcing I-95 bridge abutments to minimize opening and protect from scour.
Installing flood gate on road. Installing flood gate on railroad.
Install floodwall from gates to road embankments.
Resiliency- Help to mitigate flooding in future events in West and South Lumberton.
Contact: Brandon Love; City of Lumberton, Needed - NCDOT, Needed - CSX.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	If this project is not completed future flooding similar to what occurred could be experienced again in the future.	N/A
Consistent with existing plans (describe points of intersection/departure)	No known inconsistencies with existing plans.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Reduced future flooding will have a tremendous impact on the economy by preventing shutdowns as those seen following Matthew.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	>200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Higher than 75%	N/A
What impacts to the environment of the county will result from this project?	Minimal environmental impacts	N/A
What is the capability of the local government to administer this project?	High	N/A
What is the financial range of this project?	$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	Local	N/A

Hoke County: Dams Rehabilitation / Replacement

County: Hoke

Priority Grouping: High Priority

Priority Ranking: 5

Project Timeframe: 12-24 months

Location: Repair/Rehab: Townsend Dam, Beaver Lake Dam, McLaughlin Lake Dam, Kako English Dam; Replace: Hodgins Pond Dam, Sunset Lake Dam

Project Summary: Comprehensive dam safety program, including dam replacement and/or retrofit, which help address small dams generally owned by neighborhood associations, farmers, utilities, or other private owners.
Technical assistance should be made available to re-engineer dams in need of retrofit, repair and/or rebuild. The State should establish minimum standards for construction and maintenance including hardening to avoid damage from future storms and prevent dam failure.
Additional funds in the form of micro loans should be made available to dam owners for the actual repair and construction.
In exchange for loans and design work, dam owners will agree to comply with annual maintenance agreement and set aside funds for future maintenance.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	One of the most noticeable impacts of Hurricane Matthew in Hoke County was the destruction of dams due to high water levels. These dam failures led to additional damages to infrastructure downstream homes and posed danger to residents. The dry lake beds have caused rapid drops in property values. The loss of dams has changed the water flow in previously dammed streams. The replacement of the breached dams will help restore habitat property values and pre-storm flow.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with Cumberland - Hoke Regional Hazard Mitigation Plan Hoke Actions 1-4: Implement dam overspill and protection controls in the Puppy Creek Rockfish Johnson Mill Rd areas of unincorporated Hoke County and along Fort Bragg Military Reservation.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The dam breaches cause immediate flood damage but also left behind dried up lake beds that have become breeding grounds for vermin (some ponds/lakes filtered storm water). The property values of homes around the dry lake beds have plummeted which reduce the level of tax revenue for the county.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A

To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A
What impacts to the environment of the county will result from this project?	Sedimentation caused by drainage of empty lake beds creates downstream water quality issues. The drained lake itself with mud and sediment is an environmental hazard to people and wildlife.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

Bladen County: Dam Analysis and Modification

County: Bladen

Priority Grouping: Low Priority

Priority Ranking: 5

Project Timeframe: 3-5 years

Location: Dam near Cromartie Road, Dam on Highway 53, north of county line, and Dam near Dublin Race Track (Map ID: IN6)

Project Summary: Problem: Dam failures caused sudden and uncertain impacts for downstream areas, releasing additional volumes of water that caused flooding problems.

Strategy: Modify and upgrade dams located near Cromartie Road, on Highway 53 north of county line, and near the Dublin Race Track. During Hurricane Matthew all of these dams failed and caused downstream flooding. All of these dams are less than 15 feet high.
The program should consist of the following:
• Dam risk analysis and potential inundation impacts
• Dam improvements to include upgraded water release mechanisms and other modifications to reduce risk of failure
• Incentive Program to encourage private dam owners to repair to a higher standard
• Expanded Dam Inventory Program at the state level to give State Dam Safety Program a better idea of the status and structural integrity of dams in the county and region

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	As mentioned during Hurricane Matthew communities in Bladen County suffered from upstream dam breaks that could not have been anticipated. In addition dam breaks within the county were caused by these upstream failures and from the heavy rains. It was clear after the event that especially many privately owned dams were not properly maintained and need to be addressed if they are to be rebuilt.	N/A
Consistent with existing plans (describe points of intersection/departure)	Better dam protection is a key components of EAPs and other planning efforts to provide as little flood risk from a dam failure as possible.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Dams may be used as a source of hydroelectric power or to create recreational opportunities.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	No Impact	Agree

What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Low	Agree
What is the financial range of this project?	$251K - $500K	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	State	Agree

Anson County: Carolina Thread Trail Access

County: Anson

Priority Grouping: Low Priority

Priority Ranking: 11

Project Timeframe: 12 months

Location: Improved Access Points to the Carolina Thread Trail along Rocky and Pee Dee Rivers in Anson County - Griffin Road/Pee Dee River NWR preserve; Pinkston River Road at Buffalo Creek; Stanback Ferry Road

Project Summary: Expand access to the Carolina Thread Trail, which is a multi-county recreational trail. In Anson and neighboring Stanly, Montgomery, and Richmond Counties, this trail is designed as a 'blue trail' along the Rocky and Pee Dee Rivers. By creating better access to this multi-county trail, it will help bring visitors to Anson County who may also visit commercial areas like downtown Wadesboro.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The strategy for getting the economic community back-on-their-feet after the storm requires some public involvement in staging the projects to instill private sector investment. This project will contribute to the visitor attraction to Anson County. The access site could also be used as a temporary housing site (e.g. travel trailer setup) after a storm.	N/A
Consistent with existing plans (describe points of intersection/departure)	Key to downtown revitalization and a regional goal of eco-tourism to the region. More visitors to the Pee Dee National Wildlife Refuge will likely spend more time and funds in Wadesboro which is close by and the largest municipality. Supported at the second meeting by the Centralina Council of Governments.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	This is a core strategy proposed by the new Economic Development Director of the Anson Economic Development Partnership. Attracting the out-of-towner to stay overnight will help bring more visitors to Wadesboro which is the other key economic development strategy for Anson County.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	Unknown	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	Agree
What impacts to the environment of the county will result from this project?	Helps preserves essential wetlands and protects wildlife habitats from human development. Provide a great opportunity for residents and visitors to learn more about	N/A

	local natural areas and appreciate them which can help support future conservation.	
What is the capability of the local government to administer this project?	Low	Agree
What is the financial range of this project?	$101K - $250K	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	County	Agree

Montgomery County: Extend Utilities on a Regional Scale to Encourage Development

County: Montgomery

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 3 years

Location: Regional Corridor along Eastern section of the County. Industrial Park at the Intersection of 24/27 and 73/74, Industrial Park near Mount Gilead, and Pee Dee River near Highway 731 and Hydro Dam Road

Project Summary: Problem: There is a need for industry growth to include industrial parks expansion and support of existing poultry industries in the county to promote jobs and to handle future growth of the population and the economy
Strategy: Utility service needs to be extended regionally to encourage future development. An extension of services could facilitate commercial and industrial enterprises and would be especially helpful in several existing industrial park locations to foster economic development in the area and provide a consistent source of natural gas. Currently, the nearest natural gas line has only been extended to Rockingham, North Carolina, which is located to the south of Montgomery County. An extension of the line up from Rockingham along the I-73/74 corridor would require approximately 30-35 miles of additional gas pipeline. Expansion of the natural gas pipeline from the Pee Dee River location to the Mount Gilead area and Industrial Park would require enlargement and extension of the 6-inch pipe that is currently in place.
As a first step, this strategy may include a needs assessment study to identify current and future capacity needs for extending gas services in the county, and potentially water and sewer. The study should address multiple concerns to include current shortfalls in capacity as well as expected growth, assess resilience for future disasters and provide an analysis of infrastructure support to encourage the future development of county Industrial Parks and existing businesses.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane Matthew temporarily shut down some businesses in Montgomery County. County officials feel that to improve resiliency overall in the community it is be important to provide as many utility options as possible to key businesses to ensure they have the best chance possible of remaining open in the post-storm environment. In many cases when businesses are able to bounce back from events more quickly hourly workers in industrial jobs do not lose shifts and paychecks.	N/A
Consistent with existing plans (describe points of intersection/departure)	Current economic development plans in the county and region have identified the need for natural gas service to be extended in order for economic growth to take place in the eastern part of the county. This would also provide a benefit to individual citizens in this area as natural gas service would become available to many additional homes.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	As mentioned above the impacts to the economy are great as this is a project primarily related to economic development.	Agree
For how long will this solution be effective?	More than 50 years	Agree
How effective is the risk reduction?	Unknown	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	>6	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree

To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	Agree
What impacts to the environment of the county will result from this project?	In order to extend the lines it is likely that some excavation and general construction will have to take place throughout the eastern part of the county and this may have some negative impacts on the environment although those are expected to be relatively minimal overall.	N/A
What is the capability of the local government to administer this project?	Minimum	Agree
What is the financial range of this project?	$1M+	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Between 26 and 50%	Agree
Who will administer this project?	Regional	Agree

Moore County: Southeast Sector Revitalization and Natural Park

County: Moore

Priority Grouping: High Priority

Priority Ranking: 2

Project Timeframe: 3-5 years

Location: Crystal Lake Dam (Vass) down to Spring Lake – Southeast corner of county (Map ID: EN1)

Project Summary: Problem: Frequent flooding in southeastern county of homes and roads. Repetitive loss properties, repetitive flooding, road washout, access issues. All of this has occurred in an area of the county that is known for its natural beauty and pristine water bodies.
Strategy: From Crystal Lake Dam down to Spring Lake (southeast corner of county) create a recreational park and a natural, preserved, open space area that can be used to foster eco-tourism in the southeast sector through various recreational activities such as walking, running, biking, hiking, kayaking, and fishing among others. This process may involve potential buyout and redevelopment to increase open space and will require trail development and stream restoration to improve natural areas for recreation.
Determine the potential for buyouts or easements to ensure public access in areas where trail system will run. Assess the river system and needs – bank restoration, river alignment, buyouts to increase open space preservation to allow the river to return to its natural floodplain. Additional options for further carrying out this strategy include:
Assess viability of parks, recreation areas, sports fields, trails, and other recreational uses along the river for biking, kayaking, running, etc.
Create several "put-in" and "take-out" locations along the river for those using the river for recreation
Add picnic and shelter facilities at locations along the river
Highlight positive effects this project can have to reduce potential flood risk reduction through increased pervious surface area.
Assess potential economic benefits for surrounding communities – bringing people back to downtown commerce areas through increased tourism. Consider financial benefits of aligning and leveraging existing eco-tourism in the area.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Frequent flooding in southeastern county of homes and roads. Repetitive loss properties repetitive flooding road washout access issues. All of this has occurred in an area of the county that is known for its natural beauty and pristine water bodies.	N/A
Consistent with existing plans (describe points of intersection/departure)	Community has identified a holistic approach to risk reduction and economic development to benefit the county.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Growth of green space can provide increased tourism traffic to enjoy parks and outdoor activities. The increased traffic can contribute to increased revenue for local business and potentially increase value of property. This may contribute to an overall growth of the economy and increased tax base for the surrounding communities and the county. Open space can be turned into recreational space and used to promote eco-tourism and improve the desirability of surrounding areas to new growth.	Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree

Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	There is an intrinsic ROI when you can return a natural flood plain to its natural state reducing damages to structures located in high risk areas and providing a safe location for bikes and pedestrians to enjoy nature. The additional benefits of restoring rivers and streams through debris removal and embankment repair can provide positive impacts to the surrounding environment and wildlife as well as providing a resource for outdoor enthusiasts to enjoy the waterways for a variety of activitie	N/A
What is the capability of the local government to administer this project?	High	Agree
What is the financial range of this project?	$1M+	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	County	Agree

Scotland County: Engage State Legislators, Major Employers, and Schools in Scotland County to Support Economic Development and Job Growth

County: Scotland

Priority Grouping:

Priority Ranking:

Project Timeframe: 1 to 5 years

Location: Scotland County

Project Summary: The intent of this strategy is to increase access to the funding necessary to implement the programs and actions decided upon in the Economic Development Corporation in order to strengthen and diversify Scotland County's local economy. A series of workshops will take place in Scotland County with a participant pool that includes state legislators, major employers in the county, and schools, to address a strategy to support the economic development opportunities that 1) Scotland County already provides, and 2) Scotland County seeks to provide in order to further develop a resilient and growing workforce. The outcome of the workshops will be the drafting of a Workforce Development Strategy, which will provide guidance and tasks to Scotland County's Economic Development Corporation to address. Over a period of 8-12 months, the Economic Development Corporation will be tasked to build or adapt workforce development tools and strategies to align with the workshop outcomes. Following the development of these tools and strategies, an implementation period will begin, supported by a robust outreach campaign that includes traditional (newspapers, flyers,) and social media. Progress of the workforce strategy will be reported by 12 and 24-months after implementation period begins.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Increasing employment opportunities in the county will benefit the local economy and contribute to resilience.	N/A
Consistent with existing plans (describe points of intersection/departure)	Strategies developed by the Economic Development Corporation	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	By funding this strategy the county has the potential to address a number of issues impeding the county's economic growth and development. Engaging major employers in meaningful discussions about economic development and developing strategies to address these challenges can strengthen the county's local economy.	N/A
For how long will this solution be effective?	Less than 10 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Higher than 75%	N/A
What impacts to the environment of the county will result from this project?	N/A	N/A

What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	County	N/A

Moore County: Extend Utilities on a Regional Scale to Encourage Development

County: Moore

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 3 - 5 years

Location: Western Moore County Corridor and an Industrial Park at the Intersection of 24/27 and 73/74 (Map ID: ED2)

Project Summary: Problem: Lack of Utilities/Infrastructure in Industrial Park to support industry growth. Small town in the northern part of the county – manufacturing opportunities have reduced across the county.
Strategy: Utility service needs to be extended regionally to encourage future development. An extension of services could facilitate commercial and industrial enterprises and would be especially helpful in several existing industrial park locations to foster economic development in the area and provide a consistent source of natural gas. Currently, the nearest natural gas line has only been extended to Rockingham, North Carolina which is located to the south of Moore County. An extension of the line up from Rockingham along the I-73/74 corridor through Montgomery County would require approximately 30-35 miles of additional gas line. As a first step, this strategy may include a needs assessment study to identify current and future capacity needs for extending water, sewer, and gas services in the county. However, the county has identified that building out utility infrastructure for industrial parks could support economic growth in the Town of Robbins, which has been stalled by this lack of infrastructure.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	No direct unmet need - but homeowners without backup power did see a reduction in access to water and extension of utilities could help offset this impact in future events - with greater reach of natural gas.	N/A
Consistent with existing plans (describe points of intersection/departure)	County has identified need for extended utilities to support regional economic development.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	There could be a significant positive economic benefit by growing business and job opportunities within the county.	Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	Unknown	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	No known impacts.	N/A
What is the capability of the local government to administer this project?	Low	Agree
What is the financial range of this project?	$1M+	Agree
What is the level of public support for this project?	Medium	Agree

What is the technical feasibility of this project?	Between 26 and 50%	Agree
Who will administer this project?	Regional	Agree

Bladen County: Stream Restoration

County: Bladen

Priority Grouping: High Priority

Priority Ranking: 1

Project Timeframe: 1-3 years

Location: South River, Black River, Big Swamp, Bryant Swamp Channel and areas around Bladenboro (Map ID: EN2)

Project Summary: Problem: As a result of Hurricane Matthew, many trees and other debris litter waterways across the County. During heavy rains, this debris will continue to dam up water and alter flows. These unnatural changes in the water flow puts more properties at risk to future flooding. In many cases, the stream's natural channel has been degraded and is in need of restoration.

Strategy: Restoration of streams, including but not limited to debris removal, streambank stabilization, and naturalization of channel. Additionally, develop a statewide or regional program to ensure this process is repeated as needed to keep streams and rivers clear and flowing properly in the interim period between major storm events.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Buildup of debris and non-natural stream channels has been one of the primary causes identified by local officials of many of the flooding issues that occurred during Matthew and also during Hurricane Floyd in 1999. This issue is something that local officials have been concerned about since 1999 and they feel it has not been comprehensively addressed since that time and fear these issues will continue in the future unless a program is developed to address these problems.	N/A
Consistent with existing plans (describe points of intersection/departure)	Stream restoration activities are consistent with local plans to ensure environmental features are well-kept and that buildup in streams does not cause additional flood issues.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	The benefits of restoring rivers and streams through debris removal and embankment repair can provide positive impacts to the surrounding environment and wildlife as well as providing a resource for outdoor enthusiasts to enjoy the waterways for a variety of activities.	Agree
For how long will this solution be effective?	Less than 10 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	0	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	No Impact	Agree
What impacts to the environment of the county will result from this project?	Stream restoration through debris removal can also reduce impacts of high rainfall events – allowing water to flow	N/A

	unobstructed through waterways – reducing impacts to land and structures.	
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	$251K - $500K	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Regional	Agree

Columbus County: Stream Restoration and Debris Removal

County: Columbus

Priority Grouping: High

Priority Ranking: 4

Project Timeframe: 2-3 yrs

Location: Columbus County

Project Summary: Conduct streambed cleanup, rehabilitation, and restoration by removing debris and restoring channels to their proper depth and path.
Lumber River, Livingston Creek, Molly Branch (Whiteville), Juniper Creek , other locations as defined by Columbus County NRCS

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	As a result of Hurricane Matthew many trees and other debris litter waterways across the County. During heavy rains this debris will continue to dam up water and alter flows. These unnatural changes in the water flow puts more properties at risk to future flooding. In many cases the stream's natural channel has been degraded and is in need of restoration.	N/A
Consistent with existing plans (describe points of intersection/departure)	No known inconsistencies with existing plans.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This action may provide a short term boost in employment if local workers are hired to perform this work.	N/A
For how long will this solution be effective?	Less than 10 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	Depending on the level of work required there may be short term impacts to streams and water quality due to heavy equipment operation.	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Between 26 and 50%	N/A
Who will administer this project?	County	N/A

Cumberland County Stream Restoration

County: Cumberland

Priority Grouping: Medium Priority

Priority Ranking: 8

Project Timeframe: 12-24 months

Location: See maps. Eastover; Rockfish Creek; Beaver Creek; Hybarts Branch; Heritage Park; Greys Creek; Beaver Creek leading to Hope Mill Dam

Project Summary: Hurricane Matthew knocked down many trees and resulting debris ended up in stream beds causing water backup and potential flooding. Conduct streambed cleanup and rehabilitation by removing debris and restoring channels to their proper depth and path. For dams built by beavers - explore removal/relocation strategies with NC DNR. Require annual inspection to ensure that restoration work continues to functions properly. Consider use of the Citizen Corps in stream restoration and maintenance. Require annual inspection and maintenance to ensure that restoration work remains effective.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane Matthew caused many impacts include a number of downed tree and debris that ended up in streams as well as exacerbating stormwater drainage issues. Due to the amount of vegetative debris in streambed the chance of another massive potential flooding situation looms. Restoration of the capacity of the streams to convey water is needed including debris removal. Approximately 90% of the residential flooding damage occurred outside of the designated floodplain.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with Cumberland - Hoke Regional Mitigation Plan Action Cumberland Action #9 Use natural systems more open spaces and green surfaces to manage stormwater in a more resilient fashion. This strategy is also repeated in the Cumberland County Resiliency Plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	A key discovery of the Cumberland NC Resiliency meetings was a realization of the interconnectedness of all the environmental initiatives and the City and County growth planning. The City and County are much more aware of the economic impact of not managing the environment as a natural resource.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A

What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	Stream restoration will help prevent downstream washout that can destroy wildlife habitats. It will also remove debris that is currently reducing the quality of natural aquatic habitats.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	$501K - $1M	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	County	N/A

Hoke County: Stormwater System Upgrades

County: Hoke

Priority Grouping: High Priority

Priority Ranking: 2

Project Timeframe: 24-36 months

Location: Five various locations in county; six different locations in town of Raeford. See attached maps for locations.

Project Summary: Conduct a comprehensive assessment of the stormwater systems and develop an immediate implementation plan for correcting deficiencies in the existing network at the locations shown in the attached maps.
• Include inspection of retention basins, channels, culverts and other relevant infrastructure.
• Conduct stormwater upgrades at specific sites including culvert/channel upgrade and addition of retention areas. Exact measures to be determine in engineering design stage of project.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The excess rainfall from Hurricane Matthew overwhelmed stormwater systems and highlighted major vulnerabilities in these systems. Due to the fact that some of the damage in Hoke County occurred outside the 100-year flood zone means that inadequate stormwater drainage played a part in contributing to flooding.	N/A
Consistent with existing plans (describe points of intersection/departure)	Projects are the most obvious solutions to immediate problems and extensive study that considers future storm flows would be needed to 'masterplan' the optimal storm drainage network. This project is consistent with actions from the Cumberland-Hoke HMP including Conduct a countywide infrastructure vulnerability assessment to identify priority	
needs for updating ill-designed or outdated critical structures(1) and Use natural systems more open space and green surfaces to manage stormwater(7)	N/A	
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Roads flooded due to overtopping of undersized stormwater facilities interrupts business and industry operations. Improving the network can improve access to these areas. Flooding of residential areas impacts employee ability to work and if severe causing destruction of housing permanent dispersal of workforce from the area. Businesses and residents that do not return impact property tax revenue for the county.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	<50 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A

To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	The stormwater capacity improvements will help prevent downstream washout that can destroy wildlife habitats. Improved stormwater system can also help improve water quality by reducing the amount of sedimentation and contaminants that get into local water bodies. The stormwater study should also be integrated with the proposed dam assessment. Critical habitat for T/E species need to be examined to see if projects will impact or improve. Also wetlands enhancement and riparian buffers.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	$501K - $1M	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A

Hoke County: Stream Gauges and Flood Warning System

County: Hoke

Priority Grouping: Low Priority

Priority Ranking: 13

Project Timeframe: 24-36 months

Location: Six locations identified on water bodies throughout the County - see attached maps for detailed locations

Project Summary: Installation of gauges for monitoring of water levels and water flow from high rainfall events or dam release. Build out an early-warning system to assist with management of flow from interconnected and interdependent series of dams and water courses throughout the county.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	There is an insufficient quantity of stream gauge data to build quality inter-related flood information. During Hurricane Matthew dam breaches produced intense water flows resulting in a cascade effect of dam breaches and flooding downstream. There is currently one stream gauge in Hoke County. Adding additional gauges will allow for early detection of rising waters and lead time to adjust dam water levels and/or direct evacuation of residents.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with State efforts to build out stream gauge network and support the FIMAN system	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Advanced warning will allow for reduction of flood impacts and relocation of goods. Numerous roads were closed due to flooding from Hurricane Matthew - this interrupted business and industry operations. Early detection allows for the safe evacuation of humans and farm animals.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	100-200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	N/A
What impacts to the environment of the county will result from this project?	Stream flow and rainfall monitoring will help aid in protecting natural areas needed by wildlife. Provides non-storm event data important to determine overall environmental health of the streams.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	$101K - $250K	N/A

What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

Moore County: Stream Gauges, Early Warning Network, and Dam Modification

County: Moore

Priority Grouping: High Priority

Priority Ranking: 1

Project Timeframe: 1 -3 years

Location: Map ID: IN2, see Project Summary for locations

Project Summary: Locations: Stream Gauges: Along Little River- At or south of Crystal Lake, Above Whispering Pines, and Above Wood Lake on US-1 Corridor; Along Deep River- Near convergence with Bear Creek and Near Glendon-Carthage Road; On McClendon's Creek- Near convergence with Persimmon Glade Branch
Dams: Woodlake, Lake Auman, Seven Lakes, Thagards Lake, Crystal Lake, Pine Lake, Pine Valley Pond and Lake Diamond

Problem: Need for integrated gauges/monitoring/dam release: Information on upstream volumes and flows is often unknown. There are also a number of high hazard dams in Moore County and no way of monitoring the opening/closing of gates. Private dam owners don't always communicate or are not responsive during high rain events.

Strategy: Install gauges and build out an early-warning system to assist with management of flow from interconnected and interdependent series of dams throughout the county. For example, Crystal Lake Dam and Woodlake Dam introduce a significant amount of risk for downstream structures and safety. There are currently no stream gauges located within the county. Several are needed along the Little River and Deep River. The program should consist of the following:
• Confirmation of identified gauge locations by hydrologist and installation of gauges for monitoring of water levels and water flow from high rainfall events or dam release.
• Analysis of warning/communication systems available to provide integrated approach for water management
• Introduction of telemetry communications systems at dams
Modify and upgrade several dams that are aging and may be prone to failure. These dams are older and many are privately owned and may cause downstream flooding if they fail so dam modification or upgrades are needed. There are 61 high hazard dams in the county and officials are concerned about structural integrity of all of them. Selected dams that were of greatest concern are highlighted below with some specifications of the dams:
Dam Name Height Storage Spillway
Woodlake Dam 23 ft 10,000 acre-feet No
Lake Auman Dam 93 ft 28,014 acre-feet No
Lake Diamond Dam 23 ft 258 acre-feet No
Seven Lakes Dam #1 (Echo Lake Dam) 56 ft 1,115 acre-feet No
Seven Lakes Dam #2 (Lake Sequoia Dam) 54 ft 3,412 acre-feet No
Seven Lakes Dam #3 (Big Juniper Dam) 44 ft 422 acre-feet No
Seven Lakes Dam #4 (Longleaf Lake Dam) 44 ft 317 acre-feet No
Seven Lakes Dam #5 (Little Juniper Dam) 33 ft 105 acre-feet No
Seven Lakes Dam #7 (Ramapo Dam) 17 ft 54 acre-feet No
Crystal Lake Dam 16 ft 385 acre-feet No
Pine Lake Dam 35 ft 3,080 acre-feet No
Thagards Lake Dam 21 ft 2,505 acre-feet No
Pine Valley Pond Dam <15 ft 20 acre-feet No

The dam modification program should consist of the following:
• Dam risk analysis and potential inundation impacts
• Dam improvements to include upgraded water release mechanisms (operational gates)

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Need for integrated gauges/monitoring/dam release: Information on upstream volumes and flows is often unknown. There are also a number of high hazard dams in Moore County and no way of monitoring the opening/closing of gates. Private dam owners don't always communicate or are not responsive during high rain events.	N/AConsistent with existing plans (describe points of intersection/departure)
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree

Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Additional analysis should provide the county with a higher level of detail for those areas with downstream concerns and help reduce existing frequent and nuisance.	
Upon completion of the analysis the county will be able assess and consider projects i.e. drainage upgrades storm water management planning and residential/commercial elevation/reconstruction/acquisition. Coordinated efforts for water release and management will provide a higher level of security and risk reduction.	Agree	
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	4-6	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	Reduction of dam failure and better water management can positively impact the environment.	N/A
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	$251K - $500K	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	State	Agree

Bladen County: Stream Gauges, Early Warning System, and Communications Network for Operators

County: Bladen

Priority Grouping: High Priority

Priority Ranking: 6

Project Timeframe: 1-3 years

Location: Several locations along the Cape Fear and South River: Existing gauges on Cape Fear near Tar Heel and East Arcadia. New gauges needed on the north end of the South River at the county line and in Elizabethtown on the Elizabethtown Bridge (Map ID: IN5)

Project Summary: Problem: Flooding in extreme weather events compounded by dam breaks can result in rapidly rising water levels over relatively short periods of time. Residents can go to sleep only to be awakened by flood waters entering their house when evacuation and rescue is much more problematic. There are currently only three stream gauges in the county (USGS).

Strategy: Install additional stream gauges along South River and Cape Fear River to assist with more accurate prediction of water levels, especially during a high rainfall event. Build an early warning system to notify residents and businesses of impending flood threats. Update existing gauges to ensure integration into the FIMAN networks to facilitate modeling/forecasting, ensure locks and dams are updated, and model between gauges to help anticipate what will happen to downstream areas.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	As mentioned during Hurricane Matthew communities in Bladen County did not know when or how much water was coming downstream from upstream locations and so could not provide much warning to citizens to evacuate. In addition the highly uncoordinated releases from some privately owned dams and the failure of others led to large flows downstream that might have been prevented with a more stable dam system and coordination effort among operators.	N/A
Consistent with existing plans (describe points of intersection/departure)	Better stream monitoring and dam protection are key components of EAPs and other planning efforts to warn citizens in advance of potential flood events.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Coordinated efforts for monitoring water release and management will provide a higher level of security and risk reduction for downstream communities.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	100-200 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	4-6	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?		Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	No Impact	Agree

What impacts to the environment of the county will result from this project?	In general a better understanding of water bodies will be gained and releases can be better coordinated to ensure less intense impacts to aquatic and riparian ecosystems.	N/A
What is the capability of the local government to administer this project?	Low	Agree
What is the financial range of this project?	$251K - $500K	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	State	Agree

Montgomery County: Stream Gauges, Early Warning Network, and Dam Modification

County: Montgomery

Priority Grouping: High Priority

Priority Ranking: 1

Project Timeframe: 1-3 years

Location: Stream Gauges: On the Uwharrie River near Low Water Bridge Road, On the Little River just north of NC 24/27, Series of privately-owned dams: Old Cochran Dam, Eury Dam, Capelsie Dam

Project Summary: Problem: Information on upstream volumes and flows is often unknown. There are also a number of private dams in Montgomery County with limited access for the county and no way of monitoring the structural stability of the dams.

Strategy: Install gauges and build out an early-warning system to assist with notification high water levels along major water sources in the county. There are currently no stream gauges located within the county to provide notification from upstream or downstream (backflow) increase of flow. Several are needed along the Uwharrie River and Little River. The program should consist of the following:
• Identification of gauge locations and installation of gauges for monitoring of water levels and water flow from high rainfall events or dam release.
• Analysis of warning/communication systems available to provide integrated approach for water management.

Modify and upgrade several dams that are aging and may be prone to failure. These dams are older, privately owned and may cause downstream flooding if they fail. Selected specifications of the dams are highlighted below:
Dam Name Height Storage Spillway
Old Cochran Dam (Bruton Millpond) 40 ft 216 acre-feet No
Eury Dam 48 ft 620 acre-feet Yes (W=253 ft)
Capelsie Lake Dam 15 ft 144 acre-feet No

The dam modification program should consist of the following:
• Dam risk analysis and potential inundation impacts
• Dam improvements to include upgraded water release mechanisms (operational gates)

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The lack of understanding of what is happening upstream from many locations in the county during storm events is causing an uncoordinated release of water that flows downstream and causes flooding. Addition of stream gauges a coordination network and dam modification can all help reduce this uncertainty.	N/A
Consistent with existing plans (describe points of intersection/departure)	The county is very focused on ensuring adequate warning and flood information to the public and in becoming part of a greater effort regionally to monitor and release flows appropriately on the rivers that flow through the county. So this strategy is very consistent with these efforts.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Additional analysis should provide the county with a higher level of detail for those areas with downstream concerns and help reduce existing frequent and nuisance flooding.	
Coordinated efforts for water release and management will provide a higher level of security and risk reduction for downstream communities. All of these undertakings have a consistent positive impact and risk reduction to the community – facilitating resilience.		
	Agree	

For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	>200 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	4-6	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	No Impact	Agree
What impacts to the environment of the county will result from this project?	In general impacts to the environment will be minimal since this is not a project to construct additional dams. In general this project will likely improve environmental systems as a more secure dam network will result in less breaches that could cause overflow and flooding of ecosystems.	N/A
What is the capability of the local government to administer this project?	Low	Agree
What is the financial range of this project?	$251K - $500K	Agree
What is the level of public support for this project?	High	Agree

Anson County Stream Gauge / Early Warning Network

County: Anson

Priority Grouping: Medium Priority

Priority Ranking: 6

Project Timeframe: 12-24 months

Location: Stream gauge locations to be determined - looking to install two. Existing gauge on Pee Deer River at US 74 crossing (next to Richmond County)

Project Summary: Installation of gauges for monitoring of water levels and water flow from high rainfall events. Build out an early-warning system to assist with providing warnings. Looking for two locations - will consult with state and NWS.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	There is an insufficient quantity of stream gauge data to build quality inter-related flood information. During Hurricane Matthew in several areas heavy flooding also resulted in dam breaches. There is currently one stream gauge in Anson County. Adding additional gauges will allow for early detection of rising waters and lead time for people to take appropriate safety measures including evacuation.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with State efforts to build out stream gauge network and support the FIMAN system	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Advanced warning will allow for reduction of flood impacts and relocation of goods. In many counties numerous roads were closed due to flooding from Hurricane Matthew - this interrupted business and industry operations.	Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	Stream flow and rainfall monitoring will help aid in protecting natural areas needed by wildlife.	N/A
What is the capability of the local government to administer this project?	Minimum	Agree
What is the financial range of this project?	$51K - $100K	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	State	Agree

Robeson County: Perform Detailed Studies of Unmapped Flood Sources

County: Robeson

Priority Grouping: Low Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Robeson County, North Carolina

Project Summary: Actual Flood Risk Unknown or Inaccurate. There is a need for better identification of Flood Risk Areas –updated flood profiles and mapping in areas of frequent and nuisance flooding to better understand overall risk of future events.
A need for an updated analysis of flood risk has been identified by the county for specified frequent flooding areas. The instances of repeated inundation outside the current SFHA provides a basis for re-evaluation of risk, which may have changed since the most recent FIRMs were approved. Localized analysis should assist the community in better planning and mitigation of future damages.
- Hydrologic and Hydraulic Studies - Floodplain Mapping
- Limited Detailed Studies - Additional Modeling
Approximate 270 miles of stream need to be studied as identified by NCEM Risk Management.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	This project will address directly the identification of flood prone areas. It will also support flood warning efforts.	N/A
Consistent with existing plans (describe points of intersection/departure)	No known inconsistencies with existing plans.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	better floodplain mapping can be a benefit to the County's economy.	N/A
For how long will this solution be effective?	Less than 10 years	N/A
How effective is the risk reduction?	>200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Improved flood mapping could provide environmental benefits for the County in the form of larger areas protected through floodplain management regulation.	N/A
What is the capability of the local government to administer this project?	Minimum	N/A
What is the financial range of this project?	$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A

Who will administer this project?	State	N/A

Moore County: Hydrologic and Hydraulic Study

County: Moore

Priority Grouping: High Priority

Priority Ranking: 3

Project Timeframe: 1-3 years

Location: Eastern section of Little River from Crystal Lake Dam to Spring Lake Streams, Crane Creek around McGill Road and north to US-1, Deep River, eastern county near Cameron (Map ID: EN4)

Project Summary: Problem: Frequent Flooding Occurs and Cause is not Well-Understood or Mapped. Several areas where flood risk is unknown or current mapping appears to be inaccurate. Notable problem area due to hydrology concerns in east county near Cameron – soil composition makes determination of saturation and downstream risk hard to determine.
Strategy: A need for an updated analysis of flood risk has been identified by the county for specified area to better understand and more accurately determine downstream risk during high rainfall events. Localized analysis should assist the community in better planning and mitigation of future damages.
Hydrologic and Hydraulic Studies
Floodplain Mapping
Detailed Studies
Additional Modeling

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Frequent Flooding Occurs and Cause is not Well-Understood or Mapped. Several areas where flood risk is unknown or current mapping appears to be inaccurate. Notable problem area due to hydrology concerns in east county near Cameron – soil composition makes determination of saturation and downstream risk hard to determine.	N/A
Consistent with existing plans (describe points of intersection/departure)	County Regional and State agencies identify H & H studies as a high priority for risk identification and education for the communities.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Upon completion of the analysis the county will be able assess and consider projects i.e. drainage upgrades storm water management planning and residential/commercial elevation/reconstruction/acquisition. All of these undertakings have a consistent positive impact and risk reduction to the community – facilitating resilience.	
	Agree	
For how long will this solution be effective?	Less than 10 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	0	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A

What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	Additional analysis should provide the county with a higher level of detail for those areas with repetitive and nuisance flooding.	N/A
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	$501K - $1M	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree

Cumberland County: Interstate-95 Multi-County Coordinated Evacuation/Rerouting Plan

County: Cumberland

Priority Grouping: Low Priority

Priority Ranking: 18

Project Timeframe: 24 months

Location: I-95 through Cumberland County in connections with other counties in NC. One area in particular is Exit 56. No maps are attached for this project since re-routing area is to be determined.

Project Summary: Both northbound and southbound lanes of Interstate 95 were closed between Exit 13 (the U.S. 74-Interstate 95 interchange) and Exit 56 (in Cumberland County) due to flooding conditions. The evacuation route, U.S. 301, was also closed to general purpose traffic south of Fayetteville, to allow emergency vehicles and local residents at least one route out of town. Furthermore, motorists are being advised not to rely on GPS to navigate. All southbound I-95 traffic was required to exit off onto business Interstate (Exit 56) and travel toward NC 162 west. Motorist then traveled along NC 162 west toward US 401 south, to US 74 east then return to I-95 South. A better advisory and rerouting system will be prepared.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Millions of dollars were lost due to I-95 shut down and rerouting. Confusion resulted in travelers passing through and local traffic alike. Detours were not well marked and several motorists became lost. This project will mean positive benefits on the evacuation and re-routing of Cumberland County residents as well as adjacent counties during the next disaster. In the days and weeks after a future storm it will help both motorists passing through the area as well as local traffic.	N/A
Consistent with existing plans (describe points of intersection/departure)	The NCDOT information advisory system is constantly growing and evolving. This will help improve emergency communication and response so will help inform Annex A Appendix 5 Tab A (Transportation) of the NC Emergency Operations Plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Millions of dollars were lost due to I-95 shut down and rerouting. Confusion resulted in travelers passing through and local traffic alike. Detours were not well marked and several motorists became lost. A more organized response and advisory service will reduce time related losses.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	<50 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A

What impact will this action have on the local economy/tax base?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	Some degradation occurred to roadside ditches along the reroute established by NCDOT.	N/A
What is the capability of the local government to administer this project?	Minimum	N/A
What is the financial range of this project?	$101K - $250K	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	State	N/A

Robeson County: Upgrade Vulnerable Roads and Bridges

County: Robeson

Priority Grouping: High Priority

Priority Ranking: 4

Project Timeframe: 1-7 years

Location: Robeson County, North Carolina

Project Summary: Make road system improvements that would ensure access to and evacuation of communities during an event.
Details
Bonnie Road (2400' of roadway). Pembroke
Union Chapel is (1000' of roadway) Pembroke
I-95 In (3.6 Miles) Lumberton
NCDOT flooded roads & structures (66)
Resiliency- Communities will not be cut off from support during an event

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Elevate roads to keep them open and not flooded throughout the next storm event. This will allow for access in and out of community and to better access to essential facilities.	N/A
Consistent with existing plans (describe points of intersection/departure)	No known inconsistencies with existing plans.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Enhanced roadways will keep them open through a disaster and allow commerce to resume as soon as event has past.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	>200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	High	N/A
What is the financial range of this project?	$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

Scotland County: Secure Funding to Add a Minimum of 1,500 Feet to the Existing Length and 50 Feet in Width (25 Feet on Each Side) of the Laurinburg–Maxton Airport's Longest Runway

County: Scotland

Priority Grouping:

Priority Ranking:

Project Timeframe: 5 to 10 years

Location: City of Laurinburg

Project Summary: Secure funding and begin efforts to add an additional 25 feet to each side of the runway and a minimum of 1,500 feet to the length. These modifications will enable larger aircraft to land in Scotland County.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Improving the airport's runway will provide economic benefits to the county which will make the county more resilient to disaster through an influx in capital.	N/A
Consistent with existing plans (describe points of intersection/departure)	This strategy will support economic development objectives to strengthen the local economy.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Expanding the runway will enable larger aircraft to use the facility which will contribute to economic development. Use of the airport generates income which will improve local economy.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	N/A
What impacts to the environment of the county will result from this project?	N/A	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

Columbus County: Upgrade Vulnerable Roads and Bridges

County: Columbus

Priority Grouping: High

Priority Ranking: 11

Project Timeframe: >5years

Location: Columbus County

Project Summary: Carry out structural improvements to roadways, bridges, culverts, and other infrastructure that have been damaged and upgrade to make more resilient. This may entail, among other actions, roadway/bridge elevations, culvert upsizes, etc. Roads to be considered: Highway 74 at Boardman, Highway 74 East of Whiteville, Water Tank Rd, Bella Coola Rd, Lake Waccamaw Shores Rd., River Rd, Pine Log Rd, Slippery Log Rd.
In addition, it may be necessary to leverage existing data and studies to develop an updated assessment of the Bridge and Road Inventory impacted by Hurricane Matthew as well as structures identified at risk during more frequent (1-2/year) significant rain events affecting the county – many located in the SFHA. Prioritize the most at risk structures and develop an implementation plan to address deficiencies in current infrastructure through above techniques and develop a plan for future development needs to ensure integration of resiliency design measures and best practices to facilitate a reduced need for future upgrades as the county grows as well as offsetting potential future flood risk impacts.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Many major routes were severely flooded during Hurricane Matthew. Improvement of these major routes by elevation improved storm drainage or other action can improve the overall resiliency of Columbus County.	N/A
Consistent with existing plans (describe points of intersection/departure)	No known inconsistencies with existing plans.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Improving roads bridges and culverts could limit flooding of major routes allowing businesses to reopen faster following large storm events.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Roadway projects can impact the environment however many environmental impacts require compensatory mitigation as a condition of project approval.	N/A
What is the capability of the local government to administer this project?	Minimum	N/A
What is the financial range of this project?	$1M+	N/A

What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Between 26 and 50%	N/A
Who will administer this project?	State	N/A

Potential Innovative Regional Resilience Strategies

In addition to the regional resilience projects, other innovative regional resilience strategies were developed by discussing the findings, issues, and potential solutions identified by the planners leading the development of the County-level RRPs. Regional resilience strategies could achieve economies of scale and benefit several counties dealing with issues that are cost-prohibitive for individual counties to take on. These regional strategies may also help undertake projects that need a comprehensive, long-term view e.g. stormwater management or transportation projects, and therefore help improve the overall resilience of the state in the areas of housing, economic development, infrastructure and environment. The additional potential innovative resilience strategies possible to implement at the regional level are as follows:

Potential Regional Economic Development Resilience Strategies

- **Low-impact development** – For growing urban areas, low-impact development techniques employed at the lot and subdivision level reduce stormwater runoff and downstream flooding.
- **Agricultural Alternative Power Supply** – Backup power needed for large-scale agricultural operations can be provided using animal waste to power a microgrid, or for electrical co-generation. These may be helpful in helping maintain regional economic vitality following a disaster.
- **Qualified local contractor program for reconstruction –** the State can coordinate with local governments and other local and regional stakeholder groups to identify local workforces that might be available to assist with recovery efforts. This provides multiple benefits to all involved through employment opportunities for those that might have lost their jobs as a result of Hurricane Matthew and in keeping resources local, benefitting the local economy.

Potential Regional Infrastructure Resilience Strategies

- **Comprehensive shelter occupant inventorying** - Coordination needed between DSS, Red Cross, FEMA and local EM to understand who is in which shelters and when they leave, because a lot of time was wasted by local EM officials trying to locate people who were already safe.
- **Road closure tracking and real-time rerouting** – Develop a system for real-time rerouting as many people had trouble understanding how to get around with all the road closures.
- **Creation of Comprehensive Transportation Mitigation Program** – Develop programs so that people are prepared and understand what to do when encountered with flooded roads, e.g. better dissemination of information on re-routing, shelter locations, signage, etc.
- **Wide-Area Flood Alert Sensor Network –** Install affordable flood sensors across entire watersheds for cloud-hosted data and GIS information accessible by desktop and mobile phones. The sensors are being developed by DHS Science and Technology Directorate.
- **Regional retention, detention and all-in-one basins** – Reduce stormwater runoff by creating a system of retention basins (permanent pools) and detention basins (dry areas that can collect water and have an outlet for slowly releasing the water; the areas can be used as parking lots, recreation areas, etc.). A detention basin can be an all-in-one that has a permanent pool (retention basin) with an infiltration/filtering bottom.

- **Labeling and inventory of natural and manmade water and stormwater channels –** To support regular inspection and maintenance of the channels, an inventory is essential. A regional system would be consistent and convenient to for multiple counties to use, and can aid in responding to problem sites. Communities participating in the Community Rating System can get credit for this activity.
- **Micro loans and/or grants for private dam owners –** State could help private dam owners (HOAs, community associations) pay to rebuild their dams with conditions that dam owners provide measures to ensure safety in future events (POC for State to identify as a manager, lake level gauge to help State make decisions about releases)
- **Solutions to reduce flooding of I-95 –** Identify the hot-spots on this region, major highway through the state and work with NCDOT to mitigate them using a combination of solutions like enlarging culverts, creating detention basins, etc.

Potential Regional Environmental Resilience Strategies

- **Centralized debris/silt traps** – ongoing stream maintenance to reduce clogging of streams and rivers. Debris/silt traps can serve to collect catch debris and sediment in centralized locations making maintenance easier.

At this point, the strategies listed above are to identify potential regional resilience issues and possible solutions to those issues. They currently are not specific resilience strategies identified through the County-level planning processes, but may be considered for implementation at a larger, regional or statewide scale.

Summary

Implementation has already begun for some of these actions but for those that have not already been funded, the State of North Carolina will begin a process of prioritizing the actions and seeking to match a funding stream to each action. Those that are not matched with a funding source will be added to the State's Unmet Needs Report. Funding for Unmet Needs will be sought through additional funding from Congress and from the North Carolina General Assembly. Any action that cannot be matched to a funding source should be incorporated into each County's Hazard Mitigation Plan for consideration for future funding. It is important to seek to implement as many of these actions as feasible. Doing so will significantly contribute to helping improve the resiliency of North Carolina's communities.