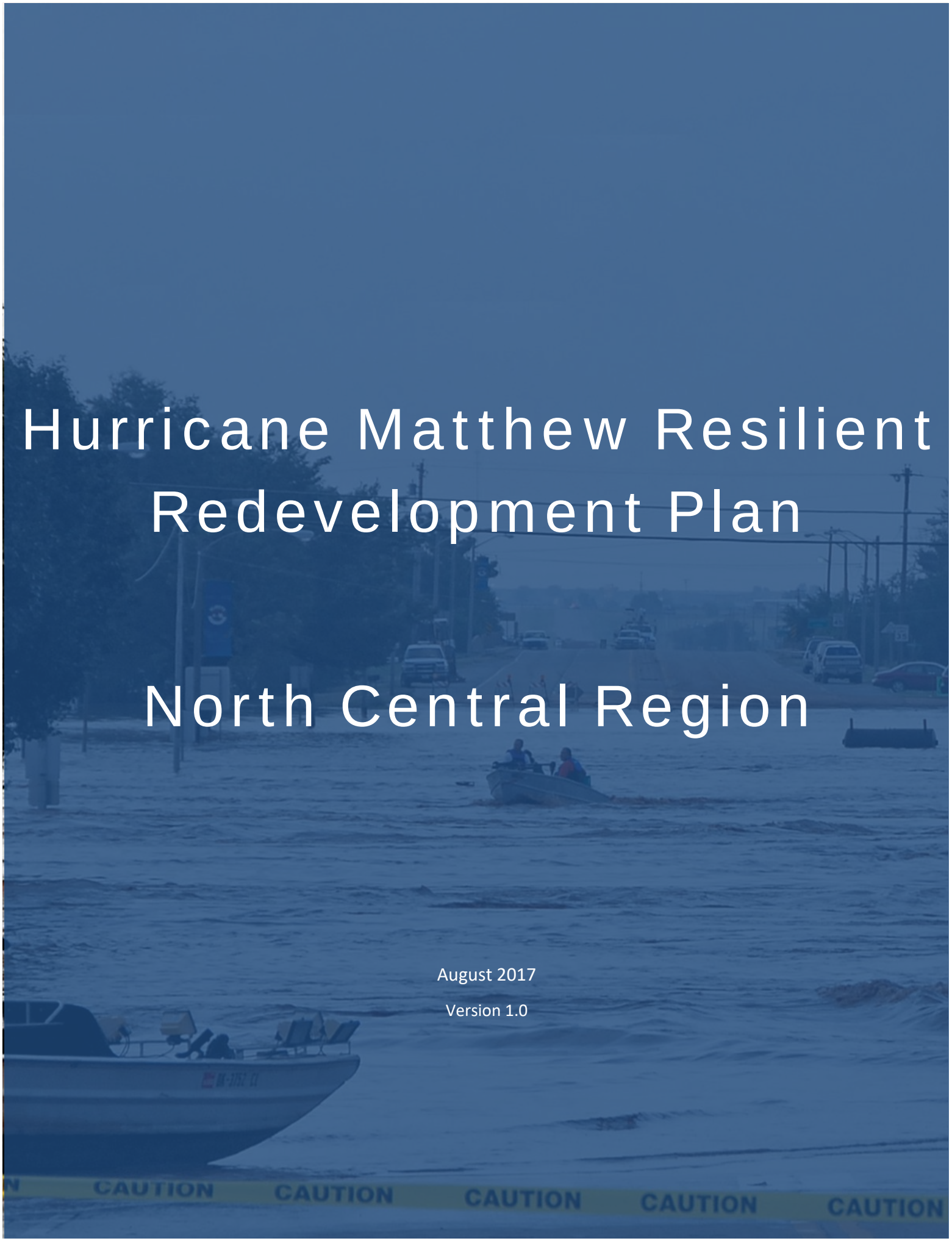


Hurricane Matthew Resilient Redevelopment Plan

North Central Region

August 2017

Version 1.0

Contents

Change Log

Version	Date	Summary of Changes

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 and
- Sandhills Region

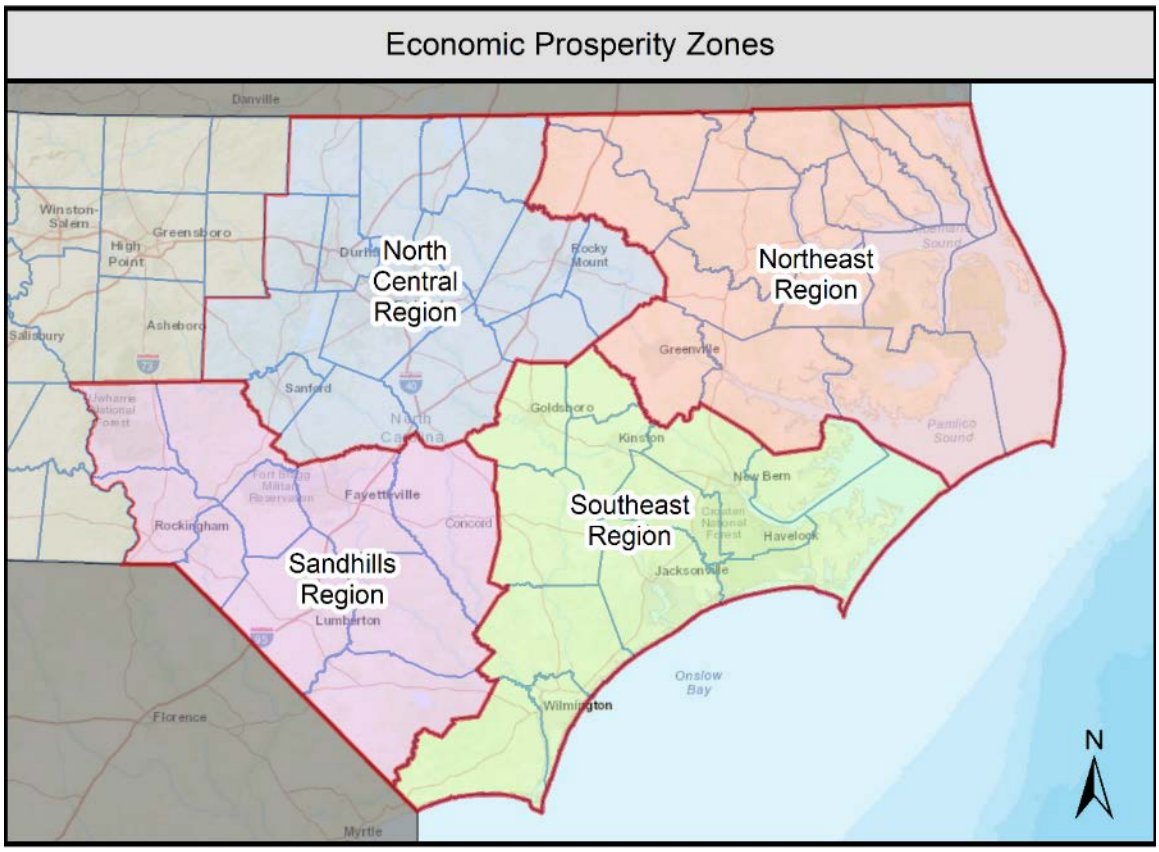


Figure 2. North Carolina Prosperity Zones

This document has been developed to provide summary information for the counties located in the North Central 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 prioritizes 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.

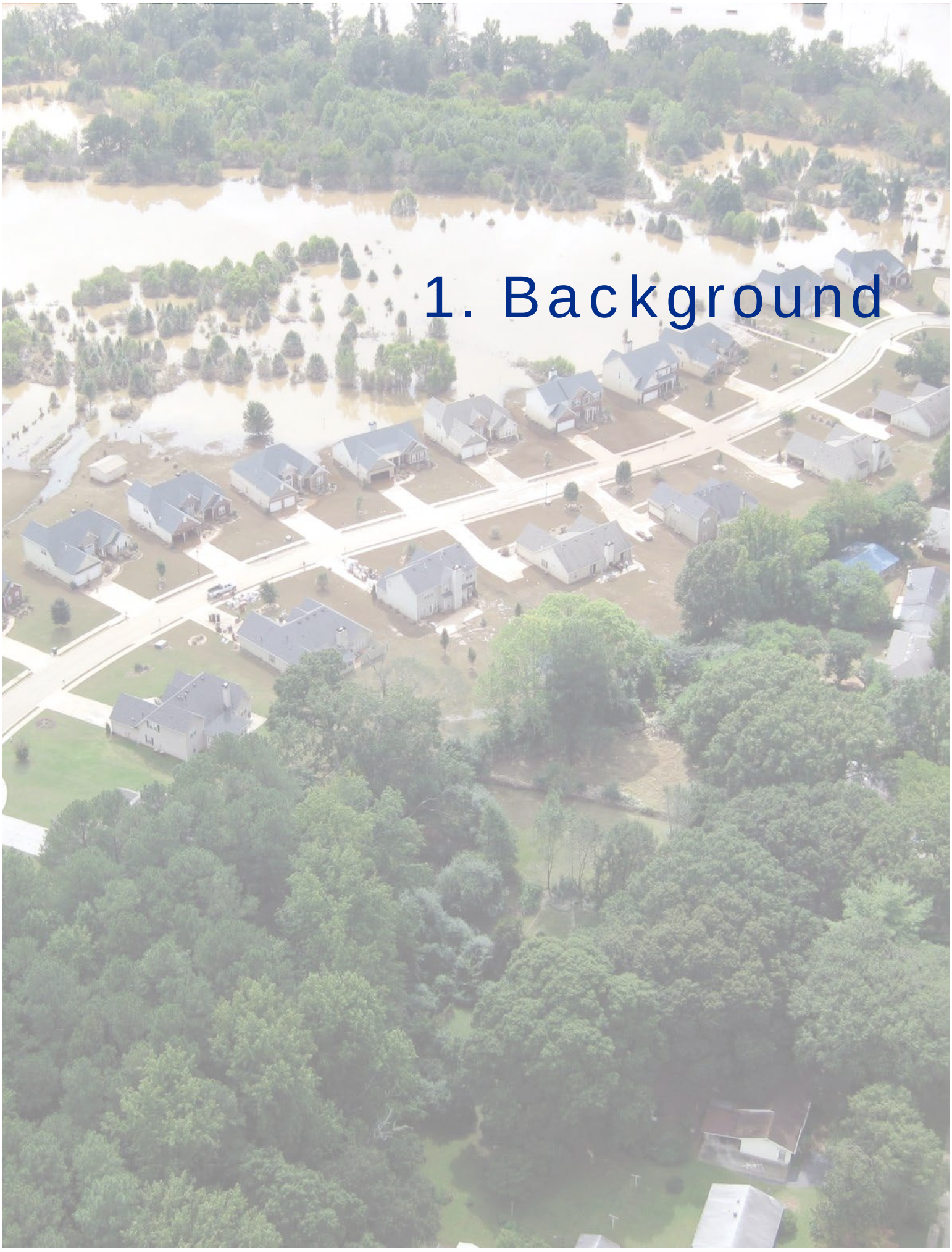
This regional RRP was developed for the following counties:

- Chatham
- Edgecombe
- Franklin
- Harnett
- Johnston
- Lee
- Nash
- Wake
- Warren
- Wilson

After multiple public meetings, the counties in this region identified 121 projects in four pillars: Housing, Infrastructure, Economic Development, and Environmental. Details of these projects can be found in Section 4 of this plan.

County	Housing Pillar	Economic Development Pillar	Infrastructure Pillar	Environment Pillar	Project/Action Count
Chatham	1	0	12	3	16
Edgecombe	8	8	7	7	30
Franklin	0	0	5	0	5
Harnett	2	3	3	2	10
Johnston	2	3	6	2	12
Lee	1	1	5	2	9
Nash	1	3	7	2	13
Wake	1	0	10	2	13
Warren	0	0	4	0	4
Wilson	2	3	3	1	9
TOTAL	**18**	**21**	**62**	**21**	**121**

Table 1. Regional Summary of Projects by Pillar



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 North Central 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 taking into account 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 and Low Prioritization; and approve inclusion of the actions in the final plan.

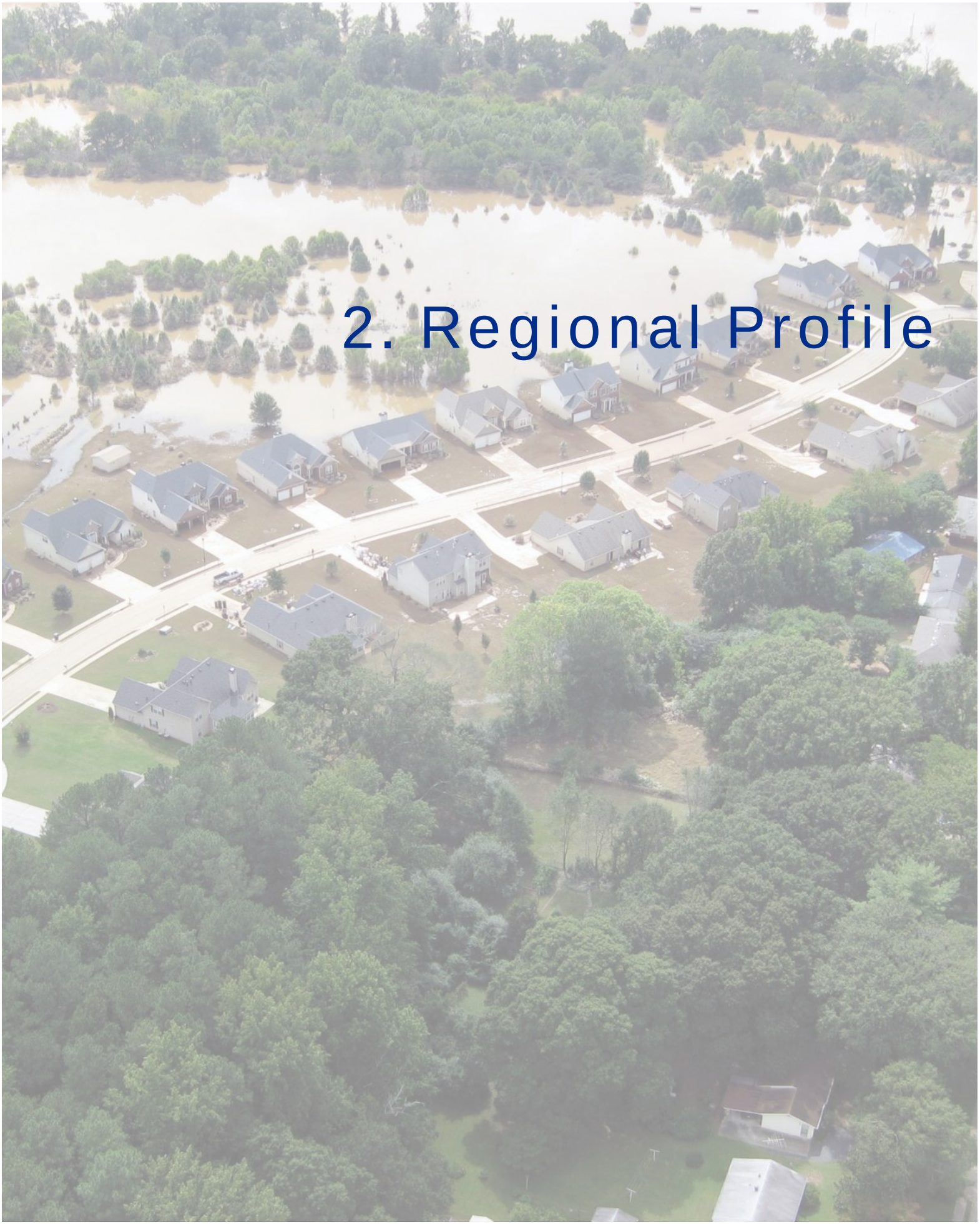
Each of the 50 counties that were declared a major disaster by the President of the United States as a result of Hurricane Matthew under the Stafford Act (P.L. 93-288) participated in the resilience redevelopment planning process. Each municipality in those counties, as well as the four economic development 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 North Central Economic Prosperity Zone is comprised the counties of Chatham, Durham, Edgecombe, Franklin, Granville, Harnett, Johnston, Lee, Nash, Orange, Person, Vance, Wake, Warren and Wilson Counties. Of these 15 counties, 10 of them (Chatham, Edgecombe, Franklin, Harnett, Johnston, Lee, Nash, Wake, Warren and Wilson 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 contain more detailed information.

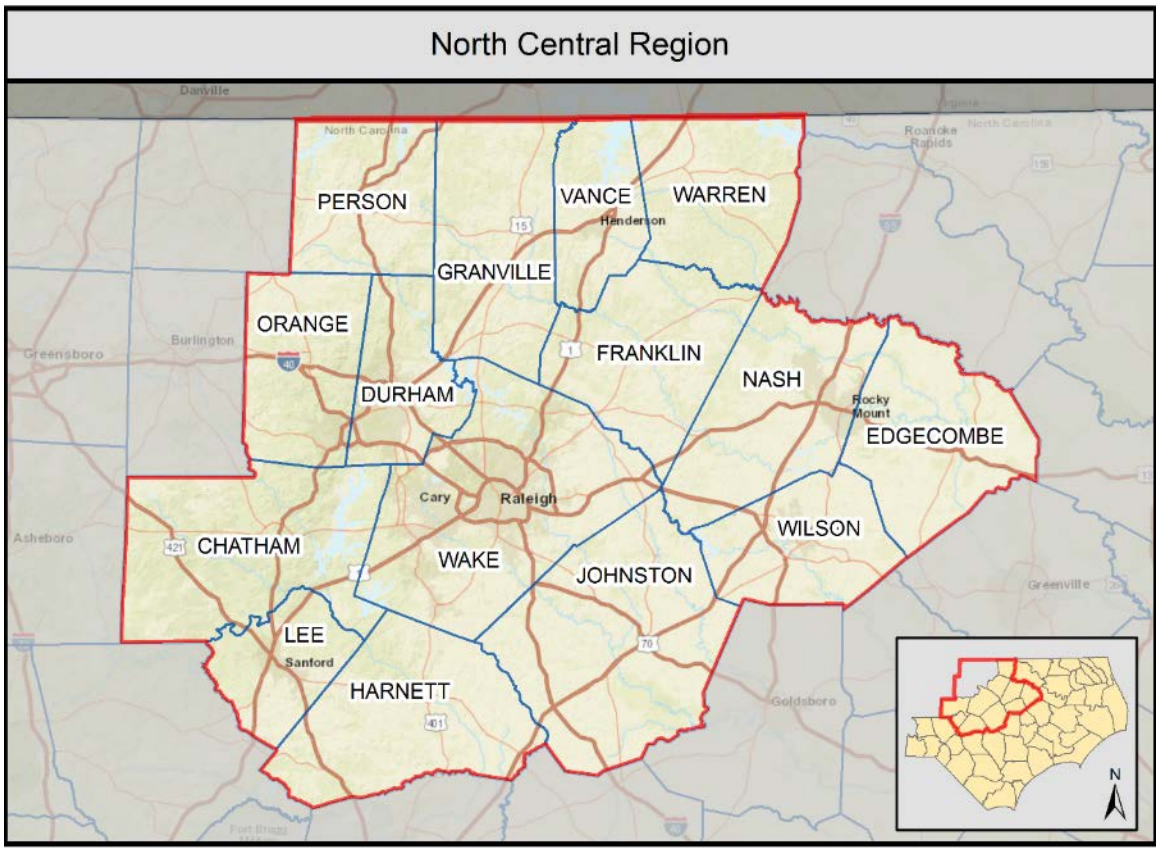


Figure 3. North Central Prosperity Zone

Demographic, Income and Housing

Demographics, 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 and 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)
Chatham	63,505	29%	46	38%	506	5%
Edgecombe	56,552	2%	40	50%	1,744	12%
Franklin	60,619	29%	40	54%	596	6.5%
Harnett	114,678	25.9%	33.6	39.9%	1,387	5%
Johnston	168,878	38.5%	37.4	48.8%	2,733	5%
Lee	57,866	18%	37.5	41.6%	1,587	7%
Nash	95,840	9.6%	41	34.9%	1,493	8.2%
Wake	900,993	43%	35	36%	12,438	4.4%
Warren	20,972	5%	46	47%	795	10%
Wilson	81,234	10%	40	40%	2,408	10%
Region	**1,621,137**	**21%**	**39**	**43%**	**25,687**	**7%**
North Carolina	**9,535,483**	**18.5%**	**42**	**55%**	**156,964**	**8.2%**

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 higher rate (21%) than the State (18.5%). All of the counties in the region experienced population growth between 2000 and 2010 with Wake (43%), Johnston (38.5%) and Harnett (25.9%) Counties having the highest growth rate. Median age of the region (39) is younger than the State's (42).

The American Community Survey 5-year 2006-2010 Low and Moderate Income Summary Data from the Housing and Urban Development Exchange (HUD Exchange) shows that the region has a lower Low, Moderate and Medium Income (LMMI) population proportion (43%) than the State (55%).

According to the National Housing Preservation Database, Wake County has the highest number of affordable housing units in the region (12.438). Census data on zero-car households shows that Edgecombe (12%), Warren

(10%) and Wilson (10%) 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 North Central region has a higher average annual unemployment rate (6%) than the State's (5.1%), with Edgecombe, Wilson, and Warren 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	Civilian Unemployment Rate	Top Employer	Top Employer's Industry
Chatham	34,224	4.2	Chatham County Schools	Education and Health Services
Edgecombe	22,849	8.6	QVC Rocky Mount	Trade, Transportation & Utilities
Franklin	29,641	5.1	Franklin County Schools	Education and Health Services
Harnett	51,533	5.7	Harnett County Schools	Education and Health Services
Johnston	91,112	4.6	Johnston County Schools	Education and Health Services
Lee	26,239	5.9	Lee County Schools	Education and Health Services
Nash	44,072	6.6	Hospira Inc	Manufacturing
Wake	558,950	4.2	Wake County Public School System	Education and Health Services
Warren	7,240	7.3	Warren County Schools	Education and Health Services
Wilson	36,717	8.1	BB&T	Financial Activities
Region	**902,577**	**6**		
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, trade, transportation and utilities, manufacturing and financial activities are the major industries in the region. The source of employer data is the Labor and Economic Analysis Division of the North Carolina Department of Commerce.

Infrastructure and Environment

Major transportation infrastructure includes I-40, which bisects the region from west to east, I-95, which runs north-south along the eastern portion of the region, I-85 which north-south through Warren County. Important US highway routes can be found in each County. Some of the US highways that traverse through multiple counties in the region are Highway 64 (Chatham, Wake, Nash, and Edgecombe Counties) Highway 70 (Wake, Johnston, Wayne Counties) Highway 421 (Chatham, Lee, and Harnett Counties). Raleigh-Durham International airport is the major airport in the region, and smaller commuter airports are located throughout 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. The 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 Meredith College, North Carolina State University, Peace University, Shaw University, Campbell University and Wake Technical Community College.

Hospitals are located throughout the region such as Rex Hospital, WakeMed and Duke Raleigh Hospital (in Wake County), Chatham Hospital (in Chatham County), Novant Health Franklin General and Vascular Surgery and Franklin County Cancer Center (in Franklin County) Vidant Edgecombe Hospital (in Edgecombe County) Nash General Hospital (in Nash County), Wilson Medical Center (in Wilson County), two Johnston Health facilities (in Johnston County), Central Carolina Hospital (located in Lee County) and Central Harnett Hospital and Betsy Johnson Hospital (in Harnett County).

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

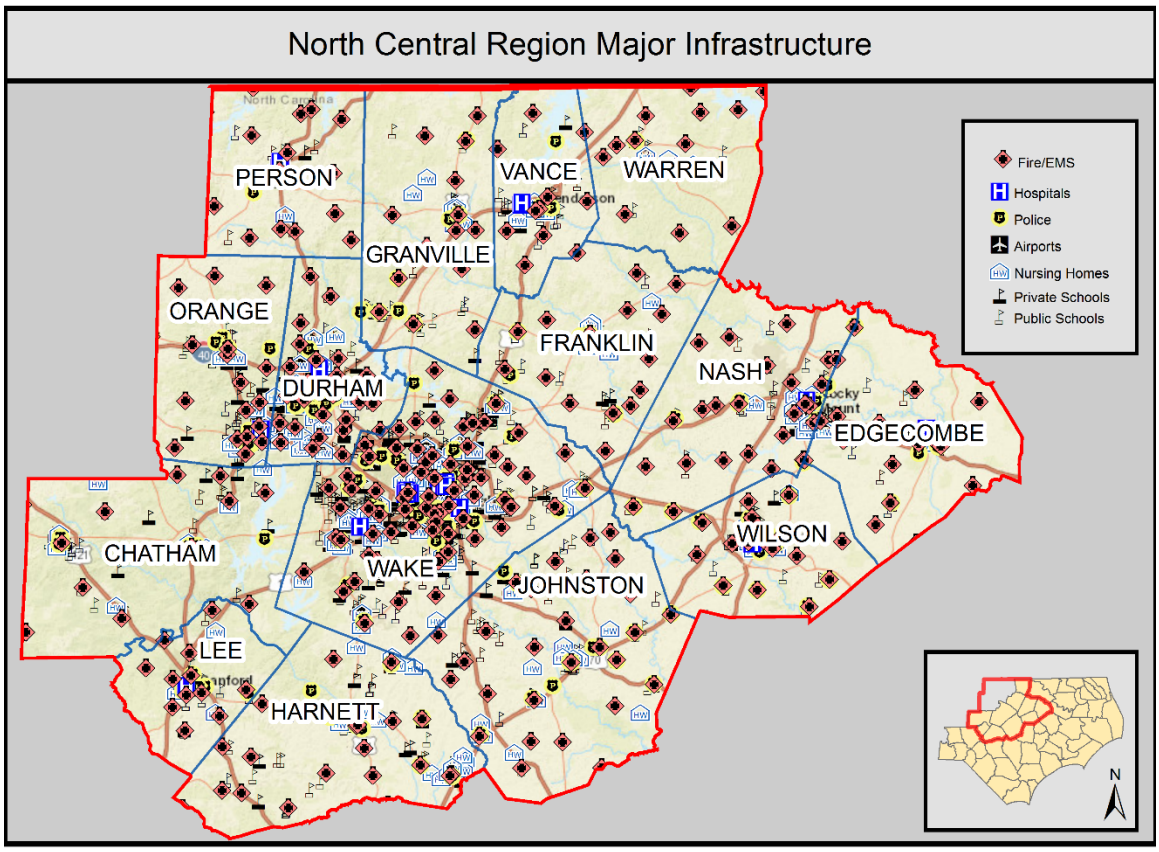


Figure 4. Major Infrastructure in the North Central region – 1 of 2 maps

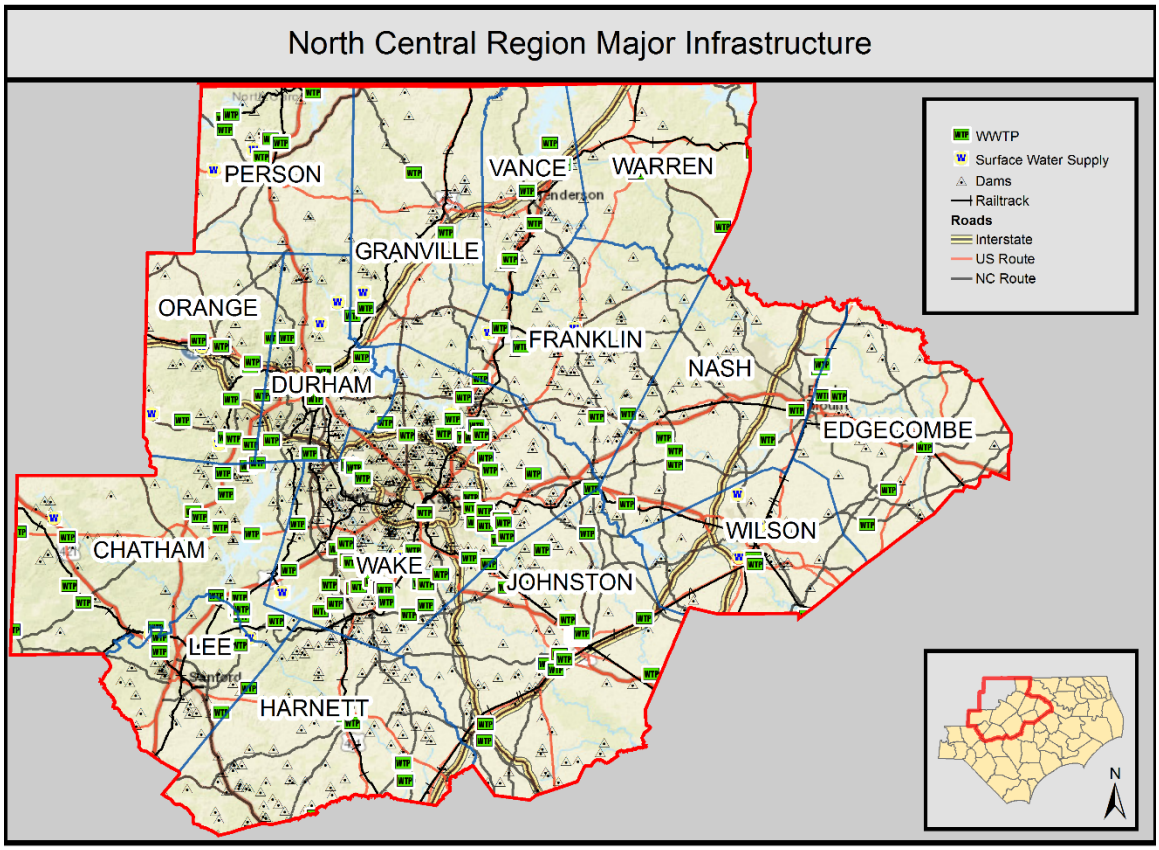
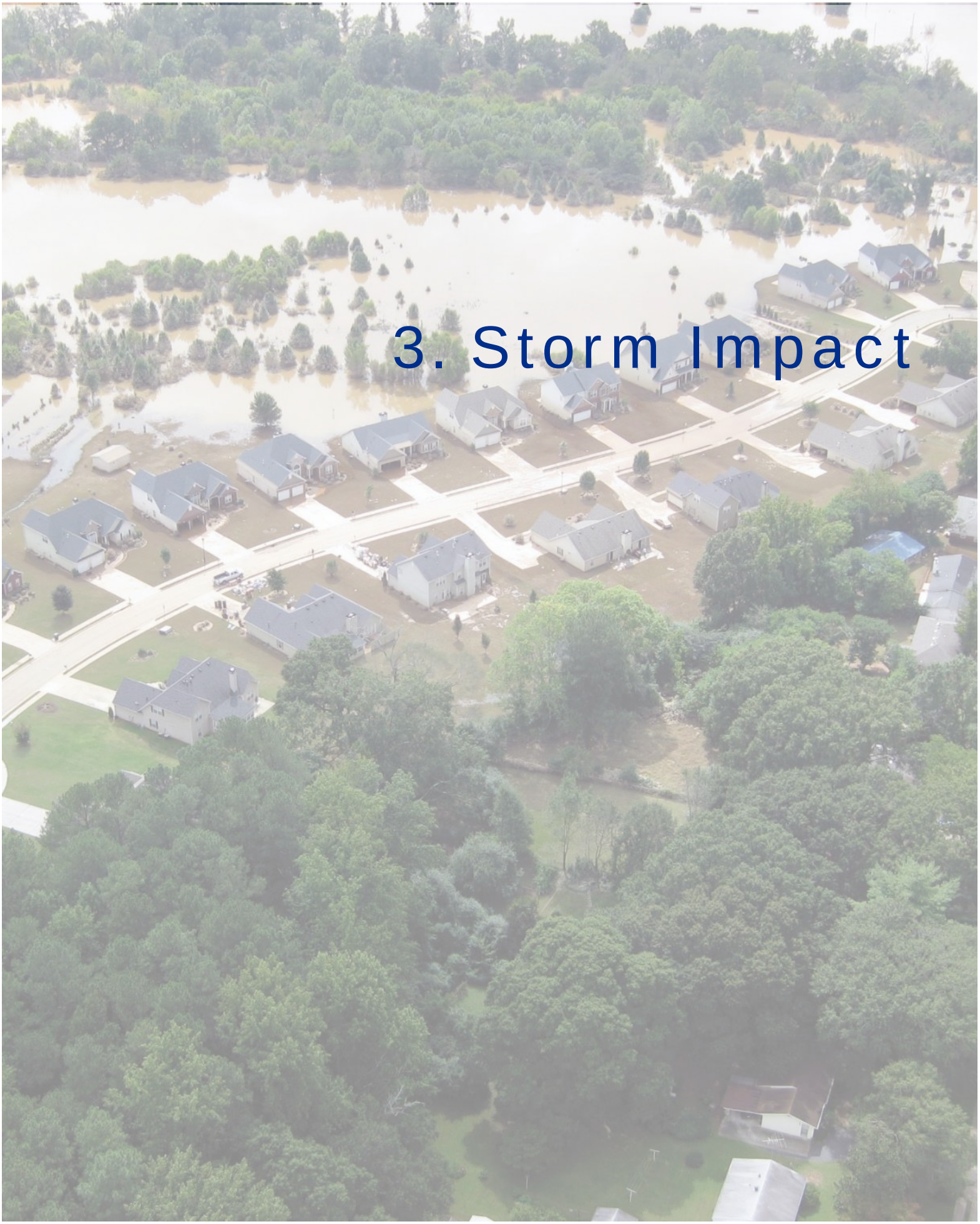


Figure 5. Major Infrastructure in the North Central Region - 2 of 2 maps

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:

- Rocky River (Chatham County)
- Deep River (Chatham County, Lee County)
- Haw River (Chatham County)
- Tar River (Franklin County, Nash County, Edgecombe County)
- Sandy Creek (Franklin County)
- Reedy Creek (Warren County)
- Fishing Creek (Nash County, Warren County, Edgecombe County)
- Jordan Lake (Chatham County)
- Sharon Harris Reservoir (Chatham and Wake Counties)
- Falls Lake (Wake County)
- Lake Royale (Franklin County)
- Turkey Creek Natural Area (Nash County)
- Swift Creek (Nash County, Edgecombe County)
- Neuse River (Wilson County, Johnston County, Wake County)
- Cape Fear River (Harnett County, Lee County)
- Raven Rock State Park (Harnett County)
- Little River (Johnston County)
- Buckhorn Reservoir (Johnston County)
- Holts Lake (Johnston County)
- Lake Johnson (Wake County)
- Lake Wheeler (Wake County)
- Lake Crabtree (Wake 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 the North Central Region is highlighted graphically in the figure below.

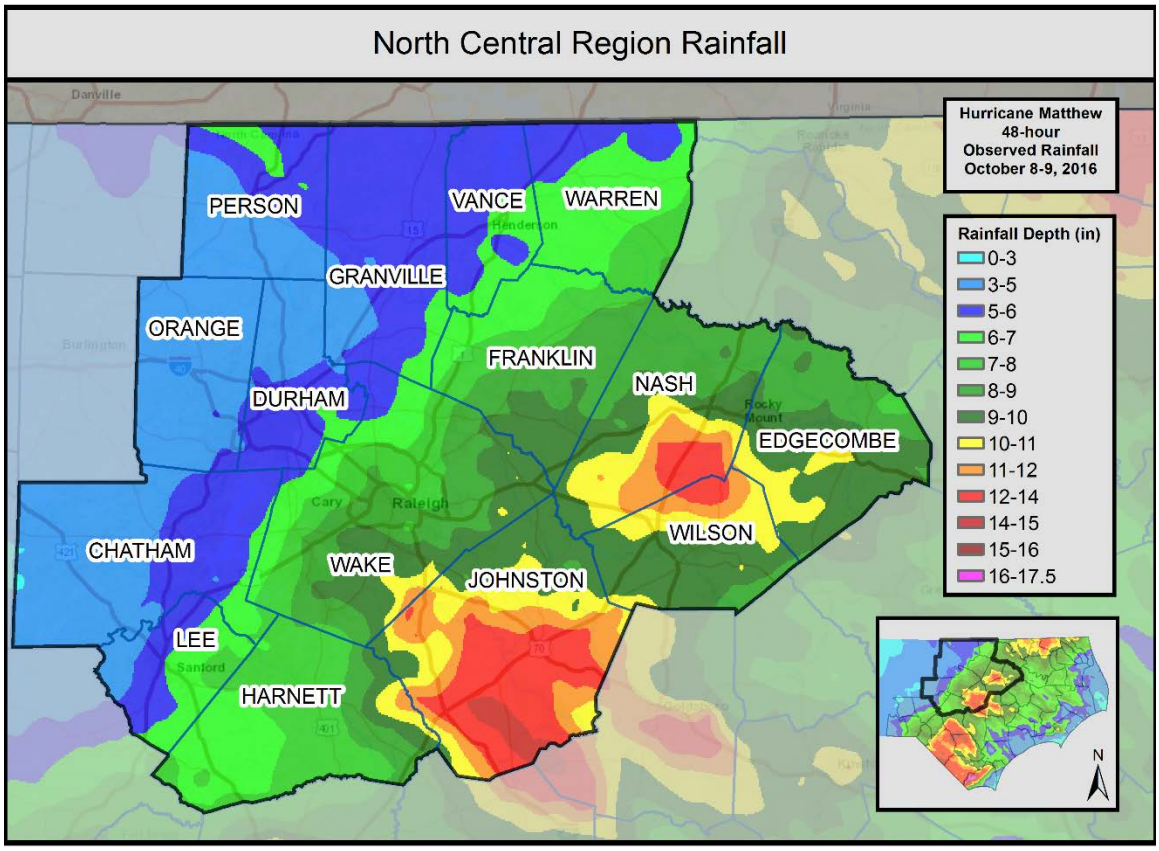


Figure 6. 48-hour Observed Rainfall Depth (October 8-9, 2016)

Housing and Infrastructure Impacts

According to Individual Assistance (IA) claims information as of July 2017, there were 9,673 impacted houses in the North Central 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 178 submitted projects and $23,306,218 of federal share obligated in the North Central 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
Chatham	29	$14,092	8	$138,274
Edgecombe	3,147	$9,718,251	76	$4,513,501
Franklin	0	$0	0	$0
Harnett	1,806	$1,417,933	10	$1,497,565
Johnston	1,856	$2,328,681	19	$488,375
Lee	222	$173,017	13	$1,845,296
Nash	954	$766,076	21	$293,510
Wake	934	$579,894	22	$13,297,338
Warren	0	$0	0	$0
Wilson	725	$925,300	9	$1,232,359
Region	**9,673**	**$15,923,244**	**178**	**$23,306,218**
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 Edgecombe County with 3,147 claims. The highest number of PA submitted projects is for Edgecombe County with 76 projects; however, the largest federal share obligated is for Wake County with $13,297,338.

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.

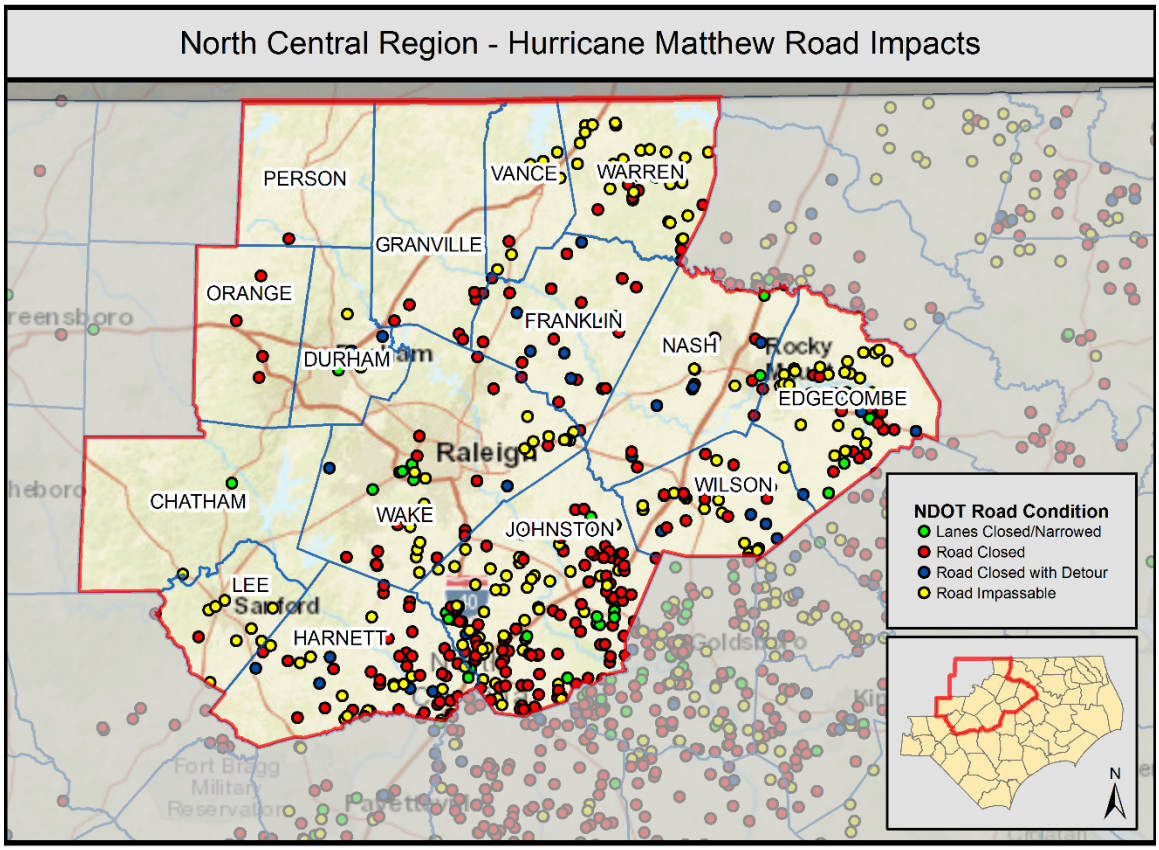
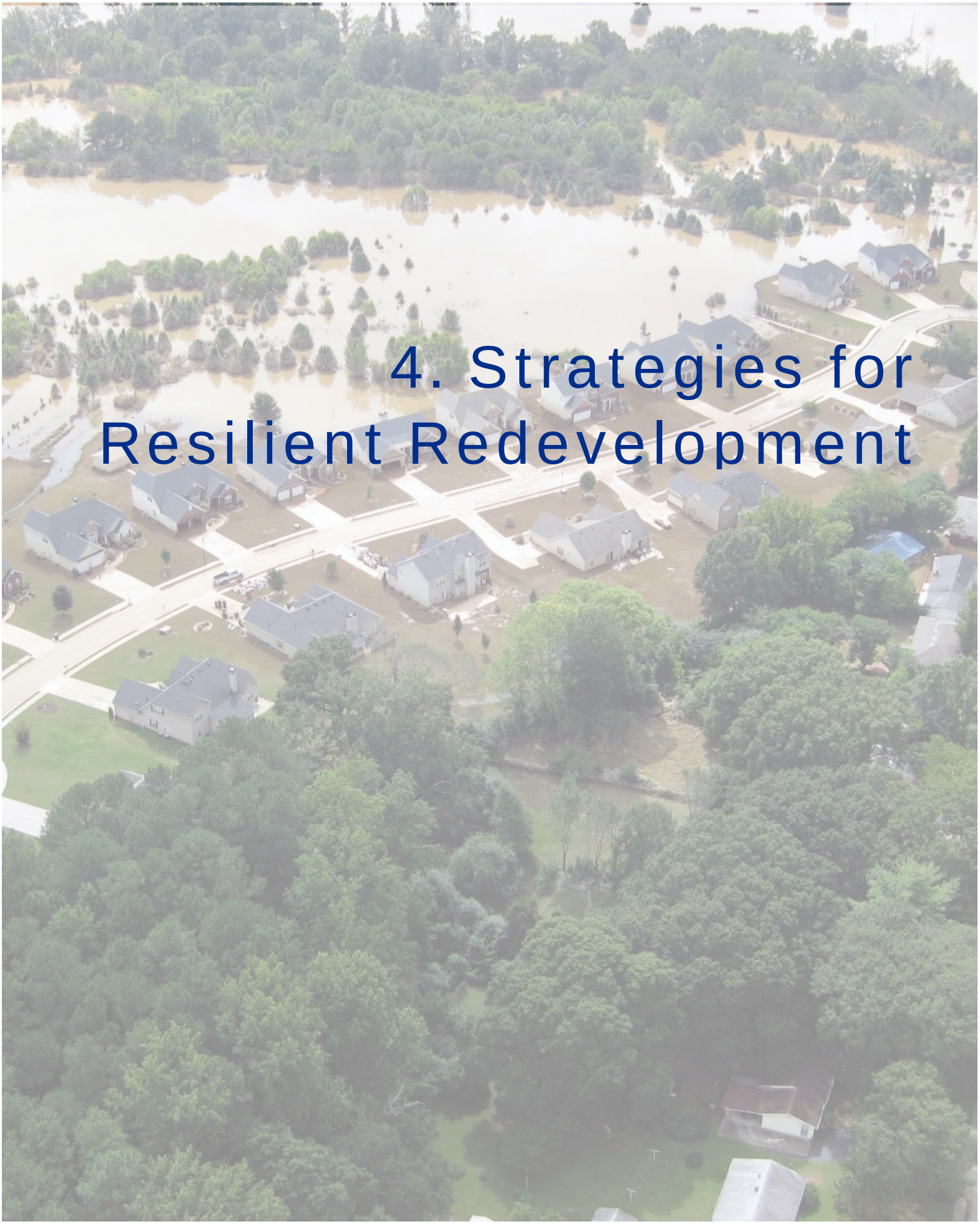


Figure 7. Regional Road Impacts

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 North Central 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 North Central Region under each pillar.

Pillar	Number of Projects in the Region	Number of Regional Projects
Housing	18	0
Economic Development	21	1
Infrastructure	62	4
Environment	21	0
Grand Total	**121**	**5**

Table 4. Summary of Regional Projects by Pillar

The following table list the regional actions for the North Central 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	4		
All other non-hazard mitigation/recovery projects	9		
Dams and Levee Repairs and Improvement	2		
Economic Development/Environment/Energy (3Es)	15	1	• Edgecombe County Economic Development Action 3: Sustainable Tourism Development and Marketing
Mitigation for Damaged Homes-Acquisition/Reloc	6		
Mitigation for Damaged Homes-Elevation/Recon	2		
Mitigation for Damaged Homes-Minor Repairs	2		
Mitigation for Public/Business Buildings	15		
Stormwater Management/Other Flood Mitigation	19	2	• Chatham County: FIMAN Gauge Installation • Wake County: Install/Improve Flood Warning System
Studies and all other recovery activities	24		
Temp/Affordable Housing Construction outside SFHA	3		
Transportation Infrastructure	10	2	• Harnett County Transportation Access Improvements

Project Type	Number of Projects in the Region	Number of Regional Projects	Regional Project Name(s)
			• Wake County Upgrade Vulnerable Roads and Bridges
Waste Water & Water System Repairs & Hardening	14		
TOTAL	**125**	**5**	

Table 5. Regional Projects

Edgecombe Economic Development Action 3: Sustainable Tourism Development and Marketing

County: Edgecombe

Priority Grouping: Low Priority

Priority Ranking: 27

Project Timeframe: Unknown

Location: County-wide

Project Summary: Edgecombe County tourism was impacted negatively by Hurricane Matthew. While there is a tourism plan that was developed in 2008, few projects have been implemented to their fullest extent due to lack of funding. Tourism is an industry that has potential for further development. Currently, the Edgecombe County Tourism Authority is not adequately funded to perform marketing services. This project would fund an initial staff person and marketing/advertising budget for a 5-year time frame, with the specific task of visitor attraction and fundraising for future operations. This project would also fund a targeted tourism study update to identify key projects from the existing tourism plan—or new projects—to prioritize for future funding and a marketing strategy.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Tourism to the county during and after Hurricane Matthew was restricted both by damaged infrastructure and by local visitors' reduced resources for discretionary spending.	N/A
Consistent with existing plans (describe points of intersection/departure)	There is an existing tourism plan developed in 2008 but implementation has been slowed by lack of available funds.	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.	US 64 is a major approach route for beach communities from points west and provides a market for initial capture of traffic. However future development could draw additional visitors.	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?	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?	Unknown	Agree
What impact will this action have on the local economy/tax base?	Unknown	Agree
What impacts to the environment of the county will result from this project?	N/A	Agree
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?	Unknown	Agree
Who will administer this project?	Local	Agree

Chatham County: FIMAN Gage Installations

County: Chatham

Priority Grouping: High Priority

Priority Ranking: 6

Project Timeframe: 1-year

Location: Cape Fear River @ Rte 42 & Haw River @ Chicken Bridge Road

Project Summary: Chatham County currently has 1 gage active in the FIMAN system. Installation of additional gages will better prepare the county during flood events and help protect lives by monitoring flood hazards real-time. Two locations have been identified and are part of a current mitigation project. These two locations will monitor two of the largest flooding sources within the county at the upstream and downstream county extents, providing a good understanding of timing of flooding throughout the county during an event.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.		N/A
Consistent with existing plans (describe points of intersection/departure)	Map libraries will use existing hydraulic models from NCFMP.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?		N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?		N/A
Explain any benefits or impacts to the economy of the county from this project.		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)?	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		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?	Unknown	N/A
What impacts to the environment of the county will result from this project?		N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	$0- $50K	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

Wake County: Install/Improve Flood Warning System

County: Wake

Priority Grouping: Medium Priority

Priority Ranking: 7

Project Timeframe: 2-3 years

Location: Wake County

Project Summary: Install 5 stream gages; 3 along the Neuse River, 1 on Walnut Creek, 1 on Swift Creek, 1 on Middle Creek and 1 on Crabtree Creek as part of FIMAN network. Existing USGS gage stations that are not already in FIMAN should be considered for addition to the network. Additional areas for potential gage placement include Swift Creek at Highway 401 and Middle Creek at Highway 401 south of Wake Tech.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Additional gages will enhance the coverage of the FIMAN network. FIMAN can provide early warning of future flooding to a larger population.	N/A
Consistent with existing plans (describe points of intersection/departure)	No known inconsistencies with existing plans.	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.	Better flood warning capabilities is a benefit to the County's economy.	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)?	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?	No environmental impacts will result from this project.	N/A
What is the capability of the local government to administer this project?	High	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

Harnett County Transportation Access Improvements

County: Harnett

Priority Grouping: Medium Priority

Priority Ranking: 5

Project Timeframe: 1-5 years

Location: Scattered sites in Harnett County

Project Summary: During Hurricane Matthew, transportation access issues included:
• No four-lane way into Wake County for evacuation or commuting purposes caused longer detours
• Rhodes Pond overflowed due to dam failure and closed US-301
• I-95 was closed in several places and detours were not coordinated with county/municipal officials, forcing long, high-volume traffic detours through parts of the county when power was out and signals were not functional.
To mitigate these issues, the county proposes to:
• Prioritize the widening of Highway 401 (1st priority) and Highway 55 (2nd priority) and perform construction quickly to enable westward evacuation and detour options that enable commerce during emergencies.
• Correct I-95 deficiencies at bridges/culverts to allow proper flow and decrease the need for detours and emergency rescues.
• Mitigate flooding/dam failure caused by Rhodes Pond at Hwy 301. Rhodes Pond is owned by the State and is in Cumberland County. The failure of the dam (which continues to await funding for repair/upgrade) during the storm caused flooding of US- 301 South and closed this critical detour route for I-95.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The proposed project addresses an unmet need that has been created by damage from Hurricane Matthew by increasing options for travelling north and west into Wake County as well as preventing future closures and detours due to flooding on I-95.	N/A
Consistent with existing plans (describe points of intersection/departure)	The proposed project is consistent with existing plans. County economic development plans include widening these roads as a high priority.	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 proposed project will not adversely affect the local economy. The proposed project will benefit the economy of the county by improving commuter experience and commute times and supporting local population growth.	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?	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?	Unknown	Agree

What impacts to the environment of the county will result from this project?	The proposed project will not create any adverse impacts to the environment. Improving commute times to Wake County will result in less emissions contributing to air quality.	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?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	State	Agree

Wake County: Upgrade Vulnerable Roads and Bridges

County: Wake

Priority Ranking: 3

Priority Grouping: Medium Priority

Project Timeframe: 3-5 years

Location: Rose Lane, Hwy 64/264, Old Stage and Fannie Brown at Middle Creek

Project Summary: Roadway and bridge improvements to alleviate flooding. For Rose Lane (City of Raleigh owned and maintained), elevating the bridge will ensure emergency access to residents south of Walnut Creek. Hwy 64/264 is a major artery (NCDOT owned and maintained) into and out of Raleigh that has been flooded by Buffalo Creek in past events, closing this major highway into and out of Raleigh. Old Stage and Fannie Brown at Middle Creek. Another potential area for consideration includes Swift Creek at Old Stage Rd.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Rose Lane was flooded during Hurricane Matthew and the location of a swift water rescue. This bridge is the only access to the Rosalynn Place and Maplewood Forest neighborhoods located on the south side of Walnut Creek. Elevating the bridge and roadway over Walnut Creek will ensure emergency access to the 54 homes during future flooding events. Additionally, 264/64 and Old Stage at Middle Creek flooded during Matthew and will flood again if not addressed.	N/A
Consistent with existing plans (describe points of intersection/departure)	No known inconsistencies with existing plans.	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.	Roads not flooding helps keep all businesses up and running thus a benefit to the economy.	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)?	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?	Less than 25%	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?	No impacts to the environment are expected.	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?	Medium	Agree
What is the technical feasibility of this project?	Between 51 and 75%	Agree
Who will administer this project?	State	Agree

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.