

May 2017

# Hurricane Matthew Resilient Redevelopment Plan

## Bladen County



May 2017

Version 1.2

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# Change Log

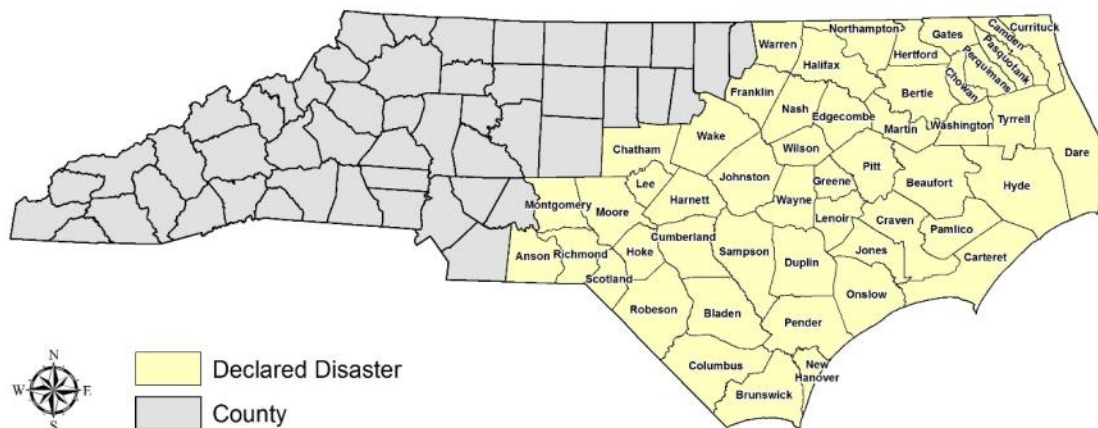
Version	Date	Summary of Changes
1.1	6/15/17	Minor Revisions
1.2	8/25/17	Labor and unemployment data updated

## 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<sup>1</sup>. 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**

This document is a snapshot of the current needs of the County regarding holistic recovery and redevelopment. The plan will evolve as the county analyzes the risk to its assets, identifies needs and opportunities, determines 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.

<sup>1</sup> 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>.

After multiple public meetings, Bladen County has identified 15 projects in four pillars: Housing, Infrastructure, Economic Development, and Environmental. Details of these projects can be found in Section IV of this plan.

Pillar	Project/Action Count
Housing	2
Economic Development	4
Infrastructure	6
Environment	3
<b>Grand Total</b>	<b>15</b>

**Table 1. Bladen County Summary of Projects by Pillar**





# 1. Background

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## 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. 2.<sup>2</sup>

## 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.

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<sup>2</sup> *Governors 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) recommendations 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 of the Plan

This document is a snapshot of the County’s current needs for achieving holistic recovery and redevelopment. The plan will evolve as the County analyzes the risk to its assets, identifies needs and opportunities, determines the potential costs and benefits of projects, and prioritizes 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. Three robust rounds of discovery, analysis, collaboration, and interaction were held with each affected county. Each meeting had two components: an in-depth working session with county officials, subject matter experts, and planners from the affected 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.

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 five 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. A map depicting Bladen County and surrounding counties is shown below.

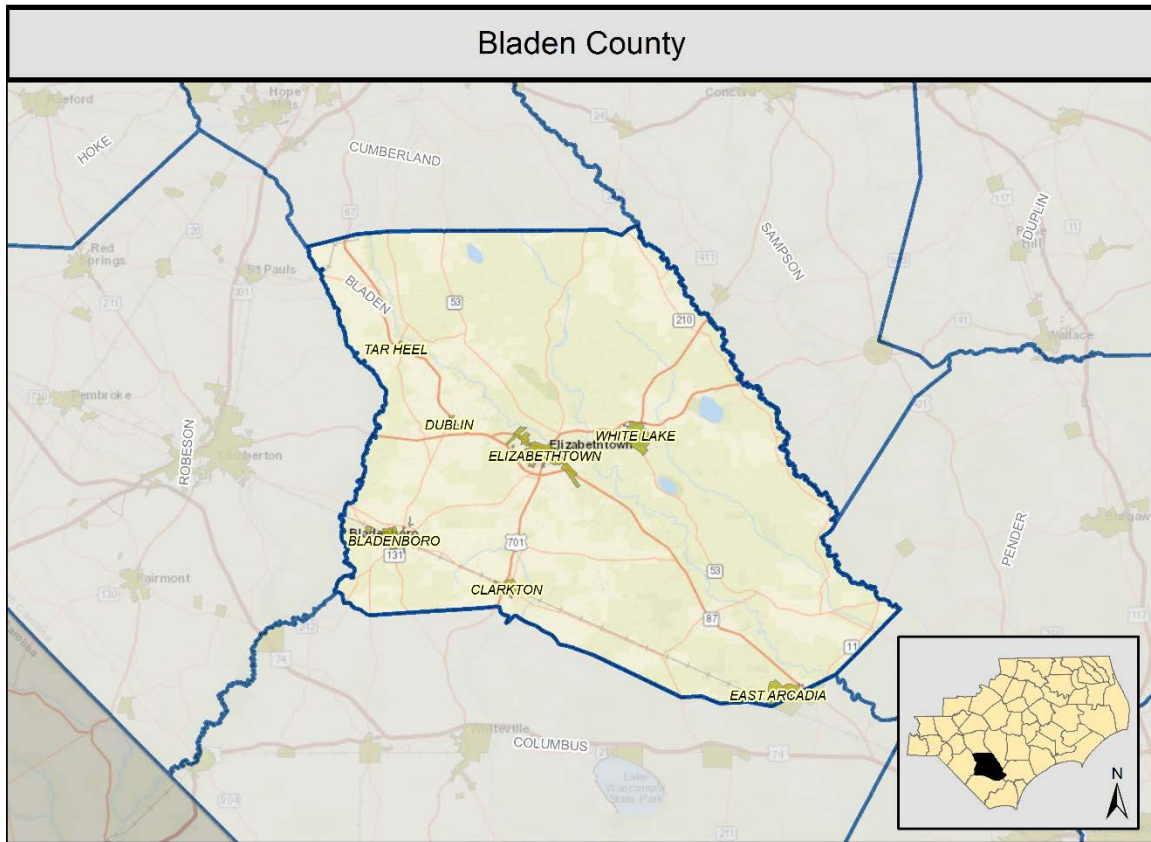


Figure 2. Bladen County and Neighboring Counties

### Data, 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 project or action 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.



An aerial photograph showing a residential neighborhood severely affected by flooding. The houses, which are mostly two-story structures with grey roofs, are surrounded by deep, brown floodwater. The water has inundated the yards and streets, leaving only the roofs and some upper floors of the buildings visible. In the background, a large body of water, possibly a lake or a wide river, is also flooded, with trees and vegetation partially submerged. The foreground is dominated by a dense forest of green trees, which appear to be on higher ground. The overall scene depicts a significant natural disaster impact on a community.

## 2. County Profile

## 2. County Profile

Bladen County is located in eastern North Carolina between Fayetteville and Wilmington. It is comprised of seven incorporated municipalities and three Census-Designated Places (CDP): Town of Bladenboro, Butters CDP, Town of Clarkton, Town of East Arcadia, Kelly CDP, Town of Dublin, Town of Elizabethtown, Town of Tar Heel, Town of White Lake, and White Oak CDP. Its current population is 34,720. This section provides a profile of housing, economics, infrastructure, environment, and administration within Bladen County.

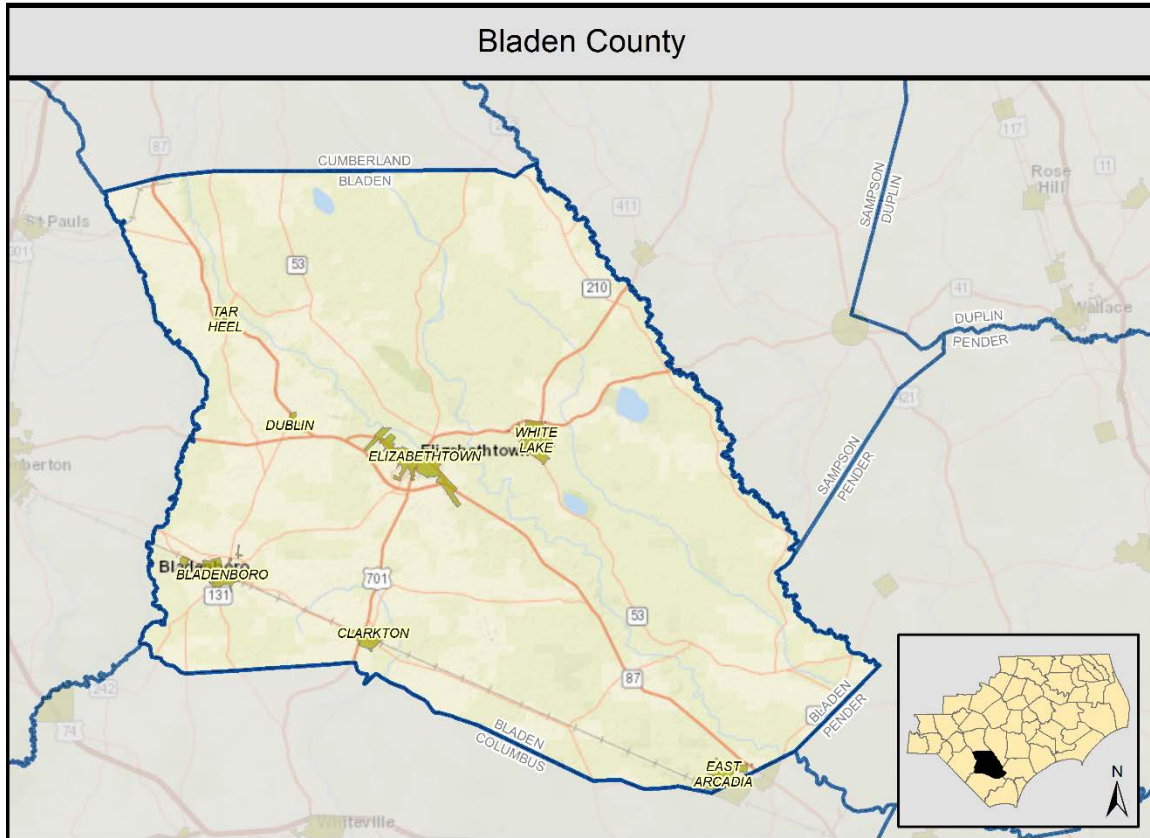


Figure 3. Bladen Base Map

### Demographic Profile

Demographics for Bladen County and its incorporated municipalities and Census-Designated Places are summarized and compared to statewide averages in this profile. The demographic data is from the 2000 Census, 2010 Census, and 2011-2015 American Community Survey five-year estimates.

### Population

Bladen County has a population of 34,720. Elizabethtown is the most populous community within Bladen County with a population of 3,610 and Tar Heel is the least populous community with a population of 173.<sup>3</sup>

<sup>3</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B01001, "Sex by Age."



## Population Change (2000 to 2010)

The Bladen County population grew moderately between the 2000 and 2010 Census. In 2000 the population was 32,278 and in 2010 it was 35,190. The population increased by 2,912 people, or around 9 percent. In comparison, North Carolina grew by 19 percent from 8,049,313 people in 2000 to 9,535,483 in 2010.<sup>4</sup>

## Age

The median age in Bladen County is 43, which is close to the same as North Carolina at 42. Within Bladen County, the Butters CDP has the oldest median age, 55, and Dublin has the youngest median age, 41.<sup>5</sup>

## Race and Ethnicity

Bladen County is mostly White (58 percent) and African American (35 percent) with other races constituting the remaining 7 percent. In comparison, North Carolina is 70 percent White, 22 percent African American, 1 percent American Indian and Alaska Native, 3 percent Asian, less than 1 percent Native Hawaiian/Pacific Islander, 3 percent Some Other Race, and 2 percent Two or More Races.<sup>6</sup> Refer to the table below.

Within Bladen County, all of the communities are predominantly White with the exception of East Arcadia and White Oak CDP which are majority African American. In East Arcadia, 8 percent of the population identifies as Two or More Races.

The Latino population in Bladen County is 7 percent compared to 9 percent for North Carolina. Dublin has the largest Latino population (21 percent) while Butters CDP, East Arcadia, and Kelly CDP do not have Latino populations according to the Census data. Bladenboro also has a notable Latino population of 13 percent.

Geography	White	Black or African American	American Indian and Alaska Native Alone	Asian	Native Hawaiian/ Pacific Islander	Some Other Race	Two or More Races	Total Non-White
Bladenboro town	63.5%	30.0%	0.4%	0.0%	0.0%	1.3%	4.9%	36.5%
Butters CDP	80.1%	19.9%	0.0%	0.0%	0.0%	0.0%	0.0%	19.9%
Clarkton town	64.1%	33.5%	0.6%	0.0%	0.0%	0.0%	1.8%	35.9%
East Arcadia town	1.8%	88.4%	1.1%	0.9%	0.0%	0.0%	7.7%	98.2%
Kelly CDP	72.4%	27.6%	0.0%	0.0%	0.0%	0.0%	0.0%	27.6%
Dublin town	61.3%	29.0%	0.0%	0.0%	0.0%	5.1%	4.6%	38.7%
Elizabethtown town	43.9%	49.4%	1.7%	0.0%	0.0%	2.5%	2.5%	56.1%
Tar Heel town	76.9%	23.1%	0.0%	0.0%	0.0%	0.0%	0.0%	23.1%
White Lake town	88.9%	5.4%	0.0%	0.0%	0.0%	3.1%	2.6%	11.1%
White Oak CDP	18.4%	79.3%	0.0%	0.0%	0.0%	2.3%	0.0%	81.6%
North Carolina	69.5%	21.5%	1.2%	2.5%	0.1%	3.0%	2.4%	30.5%

**Table 2. Bladen County Race and Ethnicity**

<sup>4</sup> Source: 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

<sup>5</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B01001, "Sex by Age."

<sup>6</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B02001, "Race"

## Limited English Proficiency

Limited English Proficiency (LEP) is defined as populations 18 years or older that speak English less than very well. In Bladen County, most of individuals identified as LEP speak Spanish while very few people speak primarily other languages. Similarly, the primary language group for LEP individuals in North Carolina is Spanish. Within Bladen County, Elizabethtown has the largest LEP population and the primary language group for LEP populations is Spanish. Most of the communities in the county do not have significant LEP populations according to Census data.<sup>7</sup>

## Poverty

In Bladen County, 27 percent of the population is below the poverty level compared to 17 percent of the North Carolina population. In White Oak CDP, 50 percent of the population is below the poverty level. Several other communities also have more than 25 percent of residents living below the poverty level including Bladenboro, Clarkton, East Arcadia, Dublin, Elizabethtown, and Tar Heel.<sup>8</sup>

## Low and Moderate Income Individuals

In Bladen County, 47 percent of the population is classified as low and moderate income (LMI) individuals based on the US Department of Housing and Urban Development's definition. In comparison, 39 percent of the North Carolina population is classified as LMI.<sup>9</sup>

## Median Household Income

The median household income of the population 25 to 64 years old is \$34,422 in Bladen County while it is \$53,097 in North Carolina. Median household income statistics were not available in most communities, though White Lake's median income for this age group is \$50,811.<sup>10</sup>

## Zero Car Households

In Bladen County, 9 percent of households do not have a vehicle available compared to 7 percent of North Carolina households. Within Bladen County, Bladenboro has the highest percentage of households without access to a vehicle at 21 percent, while White Oak CDP has the lowest percentage: 0 percent.<sup>11</sup>

<sup>7</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B16004, "Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over."

<sup>8</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table C17002, "Ratio of Income to Poverty Level in the Past 12 Months."

<sup>9</sup> Source: US Department of Housing and Urban Development, Estimate of Low and Moderate Income Individuals, <https://www.hudexchange.info/programs/acs-low-mod-summary-data/acs-low-mod-summary-data-block-groups-places>

<sup>10</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B19094, "Median Household Income in the Past 12 Months."

<sup>11</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B25044, "Tenure by Vehicles Available."

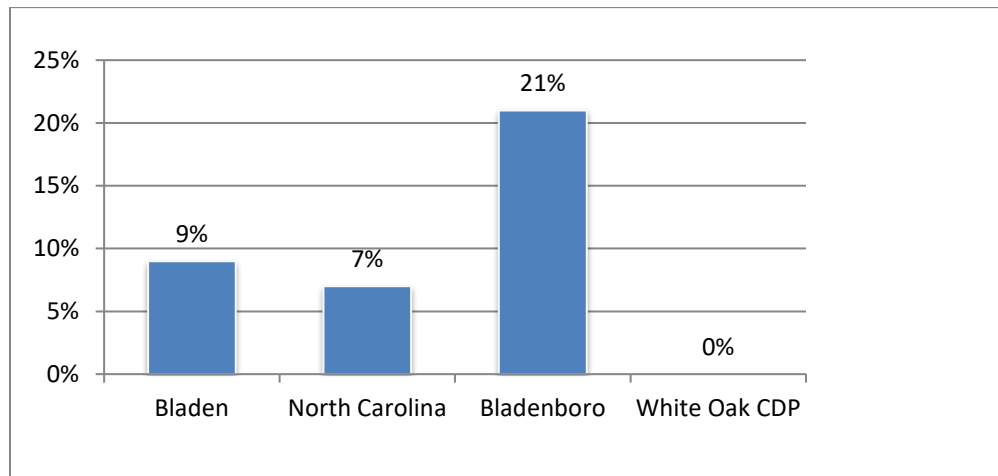


Figure 4. Zero Car Households by Percentage

### Commuting: Travel Time to Work, Means of Transportation

The majority of Bladen County residents commute alone to work by vehicle, 84 percent, which is similar to North Carolina average of 81 percent. Within Bladen County, Clarkton has the largest percentage of commuters commuting alone, 97 percent, and White Oak CDP has the least: 54 percent.

Almost no one in Bladen County uses public transportation to commute. In comparison, 1 percent of North Carolina commuters use public transportation. A greater percentage of Butters CDP and Kelly CDP residents commute by walking, bike, or motorcycle than the North Carolina average of 2 percent.

The mean commute time to work for Bladen County residents is 25.1 minutes. In comparison, the North Carolina mean commute time is 24.7 minutes. Within Bladen County, Elizabethtown has the shortest mean commute time at 17.6 minutes while White Oak CDP has the longest at 61.7 minutes.<sup>12</sup>

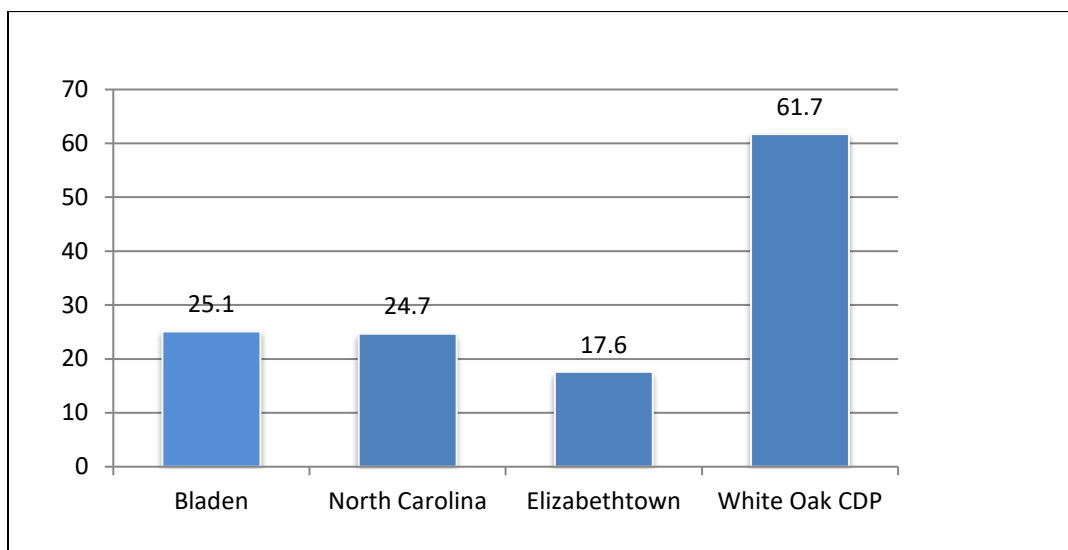


Figure 5. Mean Commute Time to Work in Minutes

<sup>12</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B08301, "Means of Transportation to Work" and Table GCT0801, "Mean Travel Time to Work of Workers 16 Years and Over Who Did Not Work at Home (Minutes)."

## Housing Profile

Bladen County has over 17,000 housing units, 57 percent of which are single-family homes, 7 percent multi-family units, and 36 percent manufactured housing.

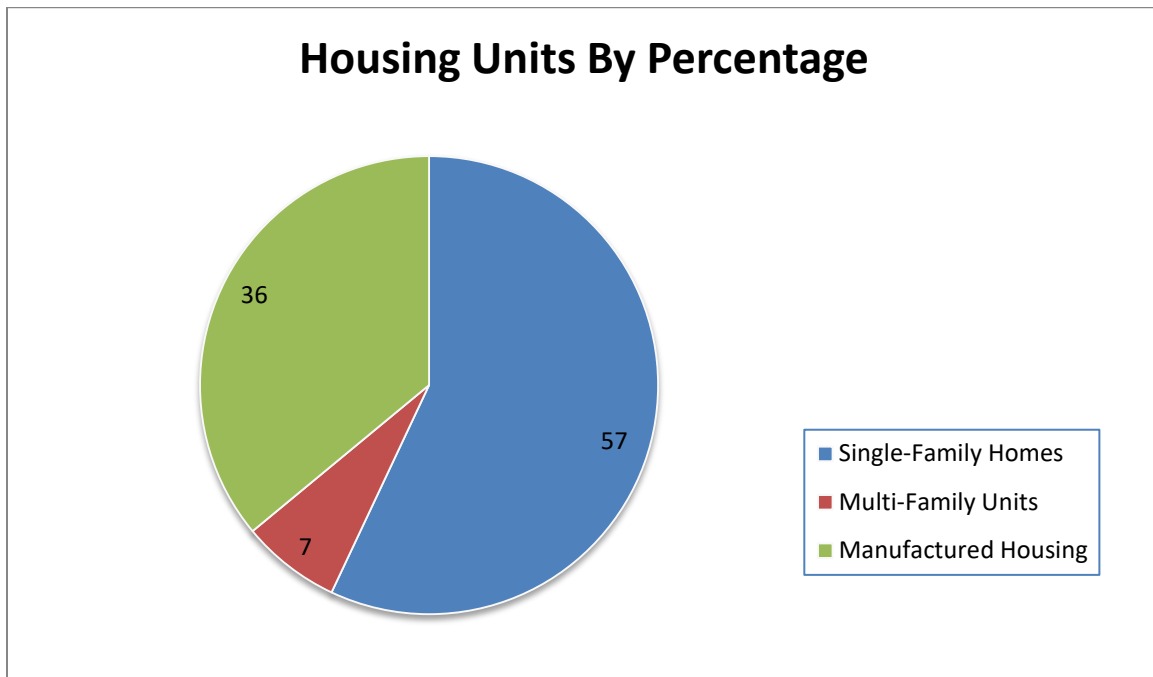


Figure 6. Housing Units By Percentage

In Bladen County 18 percent of housing units are vacant, which is slightly more than that of North Carolina. Within Bladen County, White Lake has the largest percentage of vacant housing units, 61 percent, though it should be noted that this is due to its location as a tourist destination. Butters CDP and White Oak CDP have the least: 0 percent.

Of the occupied housing units, 67 percent are owner-occupied compared to 65 percent in North Carolina; 33 percent are renter-occupied compared to 35 percent in North Carolina.

The median housing value in Bladen County \$85,000. In comparison, the median housing value in North Carolina is \$140,000. Within Bladen County, White Lake has the highest median housing value: \$145,500. East Arcadia has the lowest median housing value: \$38,500.

According to the National Housing Preservation Database, Bladen County has 867 affordable housing units. Most of the affordable housing is located within Elizabethtown and Bladenboro. There are also a few units located in Clarkton.<sup>13</sup>

<sup>13</sup> Sources: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B25002, "Occupancy Status"; Table B25003, "Tenure"; Table B25024 "Units in Structure"; Table B25077, "Median Value (Dollars)." National Housing Preservation Database

## Economic / Business Profile

Bladen County is a growing economy with a strong emphasis on manufacturing and agricultural jobs. According to the US Census Bureau's Longitudinal-Employer Household Dynamics Program, the largest concentrations of jobs within Bladen County are in Elizabethtown and in Tar Heel.<sup>14</sup>

## Labor Force

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 civilian labor force population of Bladen County is 14,722.<sup>15</sup> Within Bladen County, Dublin has the largest percentage of residents in the labor force, 60 percent, while Butters CDP has the smallest: 31 percent. Error! Bookmark not defined.

The civilian unemployment rate in Bladen County is 6.9 percent. In comparison, the North Carolina civilian unemployment rate is 5.1 percent.<sup>15</sup> Within Bladen County, Kelly CDP has the smallest civilian unemployment rate at 0 percent while White Oak CDP has the largest: 55 percent.<sup>16</sup>

## Major Employers

Employment in Bladen County is mainly concentrated in manufacturing and assembly, education/health/social services, retail trade, and agriculture/forestry/fishing.

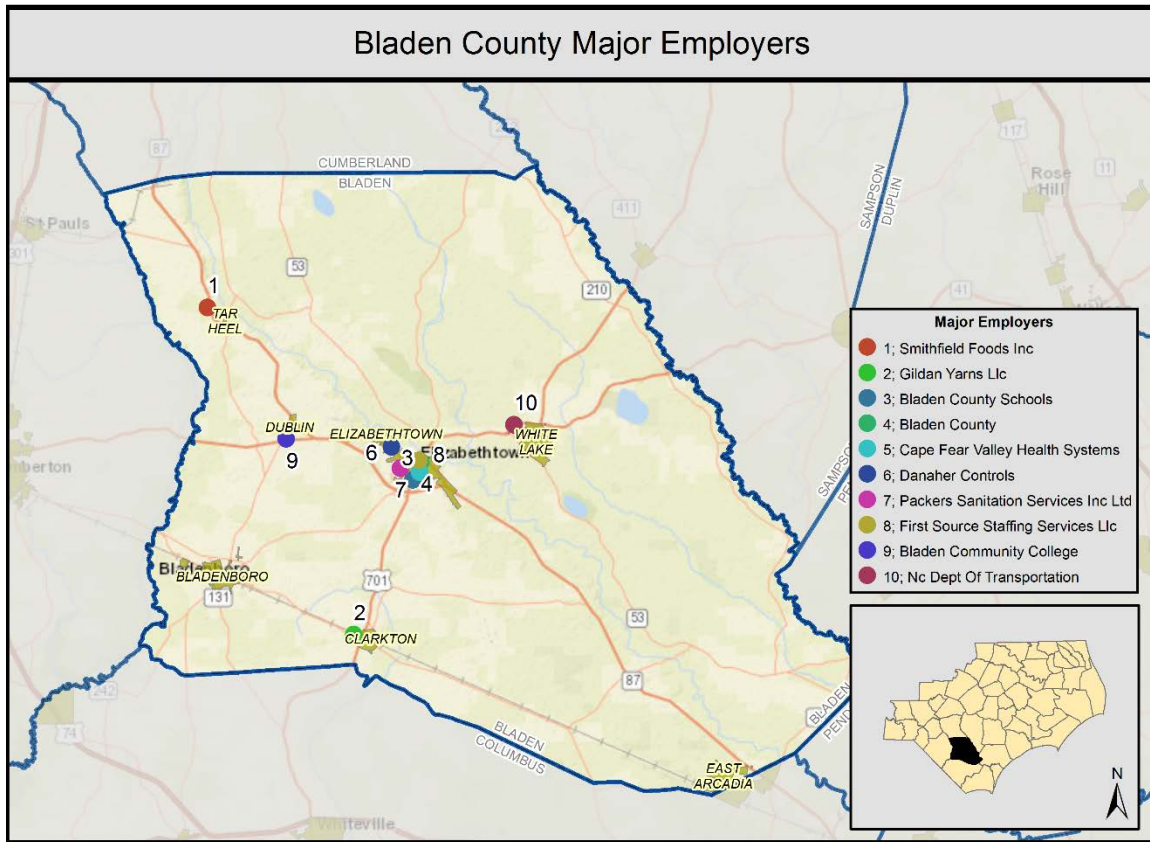
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<sup>14</sup> Source: US Census Bureau Longitudinal-Employer Household Dynamics Program

<sup>15</sup> Source: Civilian Population and Unemployment Rate - Labor and Economic Division (LEAD) of North Carolina Department of Commerce – Local Area Unemployment Statistics <http://d4.nccommerce.com/LausSelection.aspx>

<sup>16</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B23025, "Employment Status For The Population 16 Years And Over."





**Figure 7. Major Employers by Number of Employees**

In particular, the county is well-known for its emphasis on hog production as it is home to one of the largest facilities in state, which draws employees from several surrounding counties. This facility, Smithfield Foods, is a major job supporter in the Town of Tar Heel as it employs more than 5,000 workers.

The major employers in the county, other than Smithfield Foods Inc, are Gildan Yarns LLC (500-999 employees) and Bladen County Schools (500-999 employees).

Additionally, the following companies employ between 250-499 people:

- Bladen County Government
- Cape Fear Valley Bladen County Hospital
- Danaher Controls
- Packers Sanitation Services Inc., LTD.

According to a recent local news article from February of 2017, Bladen County is one of the biggest producers of blueberries in the state. Half of the commercial acreage in NC is in Bladen County, with the rest mostly in the surrounding counties.<sup>17</sup>

## Economic Development

The county is also focused on becoming a leader in the advanced manufacturing sector and there are many groups working to advance this aim, including the Bladen's Bloomin' Agri-Industrial business development non-

<sup>17</sup> Sources: NC Department of Commerce

profit. Additionally, local steps that could further improve industry have been identified such as expanding natural gas service to the Elizabethtown Industrial Park.

Bladen Community College has campuses located in Dublin, East Arcadia, and other locations throughout the county. It is dedicated to the educational and cultural enrichment of the local and global communities it serves.

However, it should also be noted that Bladen County is among the State of North Carolina’s ten counties that experience persistent poverty. As such, there are a number of state and local incentive and grant-based programs available that are intended to attract new jobs and businesses to the county. The county is focused on being open to business and is actively in pursuit of bringing in new businesses.<sup>18</sup>

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<sup>18</sup> Sources: *Bladen County Economic Development and Bladen Community College*

## Infrastructure Profile

Transportation, health, education, water, and power infrastructure are summarized for Bladen County in the sections that follow.

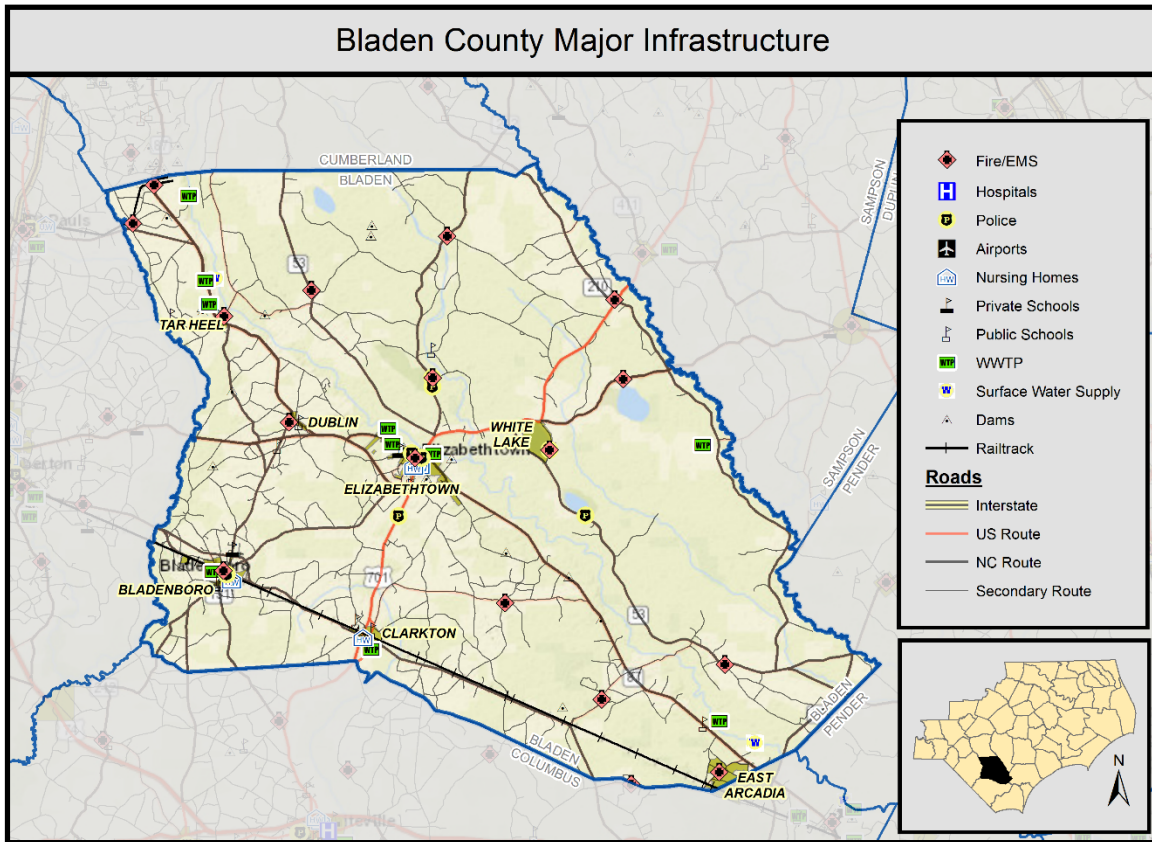


Figure 8. Bladen County Major Infrastructure

## Transportation

Bladen County is home to a significant transportation network that acts as a thoroughway to the state's coast for many travelers. The major routes that run through the county include U.S. Highway 701 and N.C. Highway 87. In addition, the county is accessible by plane via the Curtis L. Brown Jr. Field which the county is currently evaluating for additional development and land acquisition to improve the taxiway. Finally, the CSX Railway runs through the county as well.

## Health

There are a number of important health facilities located throughout the county, including several care providers. Cape Fear Valley Bladen County Hospital located in Elizabethtown is a major provider with an emergency department, Medical-Surgical Unit, Intensive Care Unit, and up-to-date Birthing Center.

## Education

In terms of schools, there are seven elementary, four middle, and two high schools within the Bladen County Public School System. As mentioned above, Bladen County Community College is also present in several locations throughout the county.<sup>19</sup>

## Water

Water and wastewater systems are also critical to the county as these systems not only provide water to citizens, but also to major industries. For example, in 2012, a new facility was placed online by the Lower Cape Fear Water and Sewer Authority, primarily to provide a surface water alternative to Smithfield Foods, thereby protecting groundwater supplies.

According to provisional data from the North Carolina Division of Water Resources, there are eight active water systems in Bladen County. These are listed below:

- Bladen Bluffs
- Bladen County Water District (East)
- Bladen County Water District (West)
- Bladen County Water District (Tar Heel)
- Bladenboro
- Dublin
- Elizabethtown
- White Lake

Another element of water-related infrastructure that is important at the regional level are the dams located along the Cape Fear River that make the river navigable from Fayetteville to Wilmington. There are three dams in particular in Bladen County that make this possible and which are critical to the region as a whole.<sup>20</sup>

## Power

There are several solar farms located within Bladen County with at least one in both Bladenboro and Clarkton. These sources have a net summer capacity of 5 megawatts each. There is also a conventional steam coal power plant just outside of Elizabethtown with a net summer capacity of 32 megawatts.<sup>21</sup>

## Environmental Profile

Water resources, natural areas, managed areas, biodiversity, wildlife habitat, and recreation are summarized for Bladen County in the sections that follow.

## Water Resources

In terms of watersheds, the Environmental Protection Agency (EPA) states that Bladen County crosses four of them: Lower Cape Fear, Black, Lumber, and Waccamaw. The county is home to a number of significant water bodies, namely the three major rivers that are located within the county's boundaries: Cape Fear, Black, and

<sup>19</sup> Sources: Bladen County Public Schools and Bladen Community College

<sup>20</sup> Sources: NC Division of Water Resources, Local Water Supply Plans

<sup>21</sup> Source: US Department of Energy, US Energy Mapping System

South. The Cape Fear is the largest of the three rivers and also bisects the county from northwest to southeast. As mentioned above, several locations along these rivers have been dammed to make navigation possible and thus there is some human control over these features. Additionally, White Lake is a popular resort destination which attracts tourists from many parts of the state.

Wetlands are present throughout the county, especially along the Cape Fear River and its tributaries.<sup>22</sup>

### Natural and Managed Areas

In terms of environmental assets, Bladen Lakes State Forest stands out as the most prominent environmental feature in the county, stretching across roughly 33,000 acres of land, with more than 5,000 acres set aside as rare ecosystems. The vast majority of the forest is designated in the Game Lands Program by the North Carolina Wildlife Resources Commission which allows for public hunting, trapping, and fishing on the land, though there are several safety zones where this activity is prohibited.

Although the State Forest is the most visible environmental asset, there are a number of other notable assets located throughout the county that are important components of the overall environment. For example, as recently as 2008, around 3,500 acres of wetland forest was preserved in the county.

According to the NC Natural Heritage Program, there are several natural areas of high, very high, or exceptional value in Bladen County. Areas identified as having exceptional importance (highest) include:

- Horseshoe Lake and Marshy Bay
- Charlie Long Millpond/Big Colly Bay
- Jones Lake/Salters Lake
- Singletary Lake State Park
- The Upper Black River Bottomlands and Black River Cypress Swamp

Besides Bladen Lakes State Forest, there are several managed areas under state ownership within Bladen County. Managed areas are properties and easements where natural resource conservation is one of the current primary management goals, or are of conservation interest. These areas in Bladen County include: Suggs Mill Pond Game Land, White Lake State Park, Bay Tree Lake State Park, Black River Preserve, Whitehall Plantation Game Land, and Turnbull Creek Preserve.<sup>23</sup>

### Biodiversity and Wildlife Habitat

The NC Natural Heritage Program produces a biodiversity and wildlife habitat assessment for the state. According to this assessment, areas with the highest rating for biodiversity and wildlife habitat are concentrated in the area north of the Cape Fear River. Many of these areas rank between a 9 and 10 on the biodiversity and wildlife habitat scale, with 10 being the highest possible score. Other areas of the county along major rivers rank in the 7 to 8 range. Much of the county that is south of the Cape Fear River is unrated or has a much lower rating than areas north of the river.<sup>24</sup>

<sup>22</sup> Source: Environmental Protection Agency, NC Natural Heritage Program

<sup>23</sup> Source: NC Natural Heritage Program, Southeastern Economic Development Commission

<sup>24</sup> Source: NC Natural Heritage Program



## Parks and Recreation

Finally, the county has a considerable number of municipal-level recreational and park facilities such as Bladen County Park in Elizabethtown. These and all of the aforementioned environmental assets are especially critical to Bladen County as they drive many of the recreational activities of the residents and enhance the local economy via eco-tourism.<sup>25</sup>

## Administrative Profile

The administrative capabilities of Bladen County and the municipalities within the County are discussed in great detail within Section 4 of the Bladen-Columbus Regional Hazard Mitigation Plan (2015). The assessment evaluates the capabilities of the County and municipalities to implement mitigation actions across the areas of planning and regulatory capabilities, administrative and technical capabilities, fiscal capabilities, and political capabilities. Many more details about the capabilities of Robeson County and the municipalities can be found in that document.

In terms of administrative capabilities, the County has many of the staff and the necessary plans, policies and procedures in place that are found in communities with “moderate” capabilities. Bladen County has Emergency Management and Planning departments with the capacities to assist in implementing the resilience strategies proposed in this plan. Some of the other indicators of capability for the County include the following: Comprehensive Land Use Plan, Zoning Ordinance, Subdivision Regulations, and Floodplain Management Ordinance. These plans, policies and procedures help ensure that new development in the County will be managed in a responsible manner and will take place in non-hazardous areas.

The Towns of Bladenboro, Clarkton, Dublin, East Arcadia, Elizabethtown, Tar Heel, and White Lake have limited to moderate capabilities and may need assistance from other agencies in order to implement the strategies in this plan as a result of somewhat limited administrative resources. It should be noted that Elizabethtown has a planning department that would be able to assist.<sup>26</sup>

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<sup>25</sup> Sources: North Carolina Forest Service, Bladen County Parks and Recreation Department, County website

<sup>26</sup> Sources: Bladen County, Town of Elizabethtown

An aerial photograph showing a residential neighborhood severely impacted by flooding. The houses, which are mostly two-story structures with grey roofs, are surrounded by deep, brown floodwater. The water has inundated the yards and streets, leaving only the roofs and some upper floors of the houses visible. In the background, a large body of water, possibly a lake or a wide river, is also flooded, with trees and vegetation partially submerged. The foreground is dominated by a dense forest of green trees, providing a stark contrast to the flooded area. The overall scene depicts the significant damage and displacement caused by a storm.

### 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 three to eight inches in the central regions of North Carolina and eight to more than fifteen 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 already received above normal rainfall in the month of September leading to wet antecedent conditions prior to Hurricane Matthew. Total rainfall depth for Bladen County is highlighted graphically in the figure below.

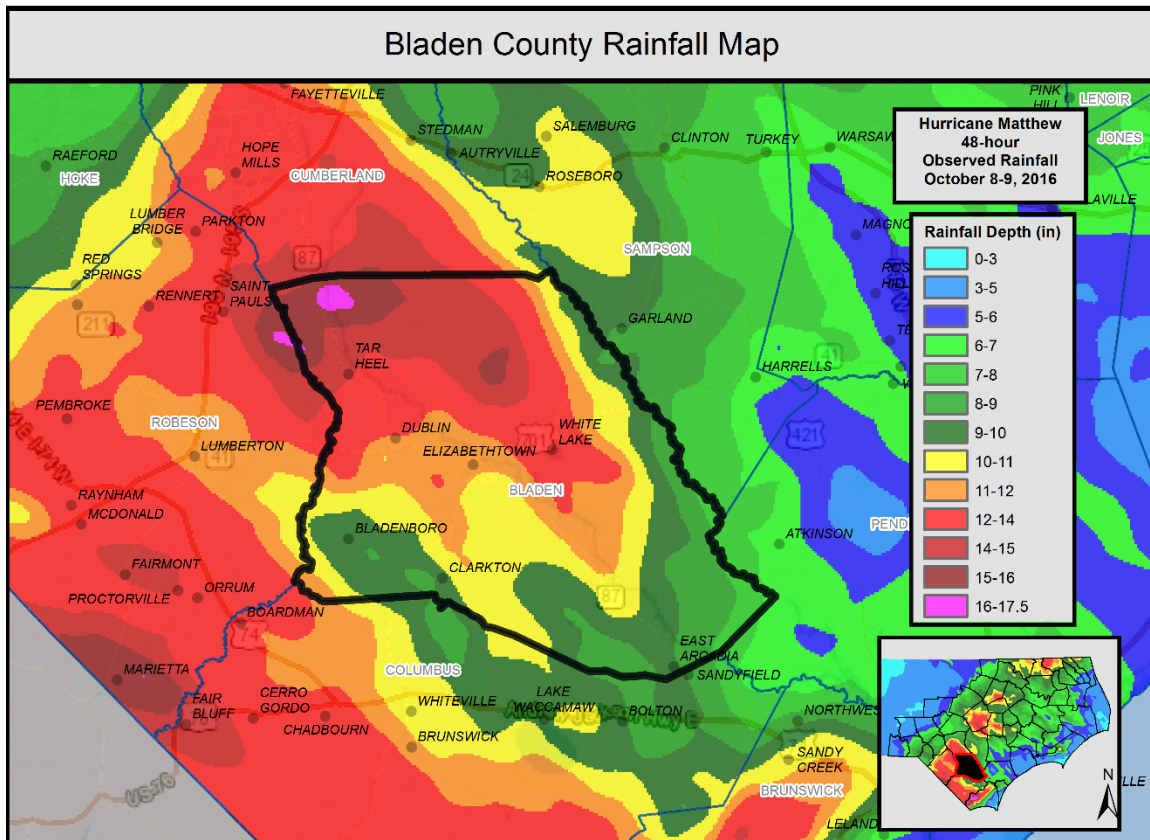


Figure 9. 48-hour Observed Rainfall Depth (October 8-9, 2016)

#### Riverine Flooding Summary

Hurricane Matthew had a number of significant impacts on Bladen County, especially to individual homeowners in the eastern part of the county where the South River is located. Flooding during Hurricane Matthew in this area was reminiscent of the flooding that occurred during Hurricane Floyd in 1999, which makes this a particular hot spot zone for flooding. At the U.S. Geological Survey (USGS) rain gauge at Cape Fear River at William O. Huske Lock near Tar Heel in Bladen County, North Carolina (USGS station 02105500), a total of 16.87 inches of rain was recorded from October 7 to October 9.

The USGS documented stream gauge data in the report *“Preliminary Peak Stage and Streamflow Data at Selected Streamgaging Stations in North Carolina and South Carolina for Flooding Following Hurricane Matthew, October 2016.”* Stream gauge data from the USGS report for the one gauge located in Bladen County is summarized below (it should be noted that county officials identified that there are two other gauges in the county as well, but data could not be located on these);

USGS Gauge	County	River Name and Location	Drainage Area (sq mi)	Peak Matthew Elevation (ft)	Previous Record (ft)
02105500	Bladen	Cape Fear River at Wil O Huske Lock NR at Tarheel, NC	4,852.0	36.37	26.75

**Table 3. Bladen County USGS Stream Gage Data**

Bladen County was located close to the heart of counties that experienced major impacts from Hurricane Matthew and which were under the federal disaster declaration that resulted from the storm. The county includes parts of several major rivers that flooded during the storm, including the Cape Fear River and the South River.

It should also be noted that citizens across the county lost their homes and personal belongings due to the storm and local infrastructure was heavily damaged in many areas as well. One of the glaring impacts from Hurricane Mathew in Bladen County was that many homes, businesses, and facilities lost power for long periods as a result of the storm. These power outages shut down critical facilities for days at a time and some residents were without power for weeks. Power outages caused some of the most severe issues in the county as potable water, food, and medical supplies were in short supply for many citizens due to a lack of power.

As one of the more heavily impacted counties in the state, Bladen County experienced a wide array of impacts from Hurricane Matthew, which are detailed below.

### **Housing Impacts**

According to Individual Assistance claims filed as of March 17, 2017, there were 2,817 registrations for Individual Assistance in Bladen County as a result of Hurricane Matthew. It should be noted that additional claims from Hurricane Matthew may still be pending, so this number may not reflect the final claims data from the event. This also does not take into account other historic impacts to the county or other areas of concern for flooding that may not have occurred during this storm. With that in mind, the planning team attempted to take a comprehensive look at both Hurricane Matthew impacts and any historic impacts that local officials felt would validate areas that should be considered at high risk to future flooding.

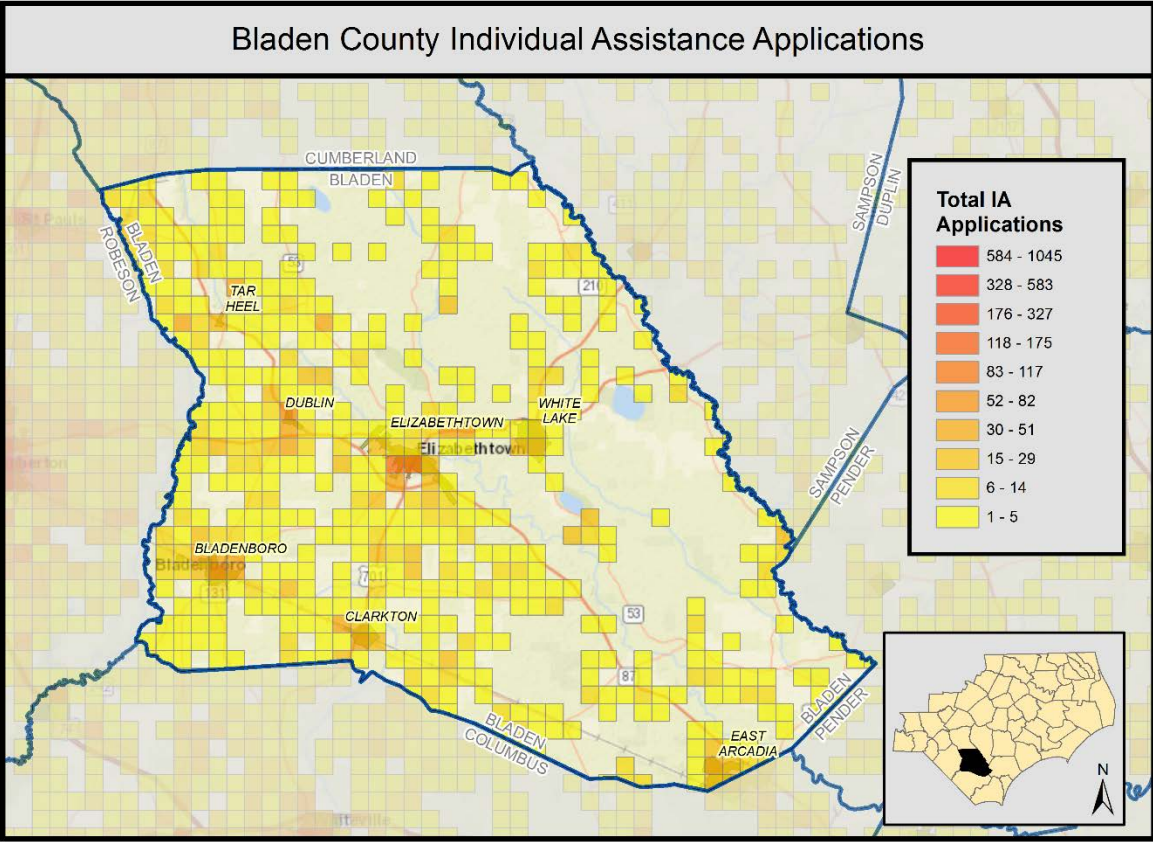


Figure 10. Bladen County IA Applications by Area

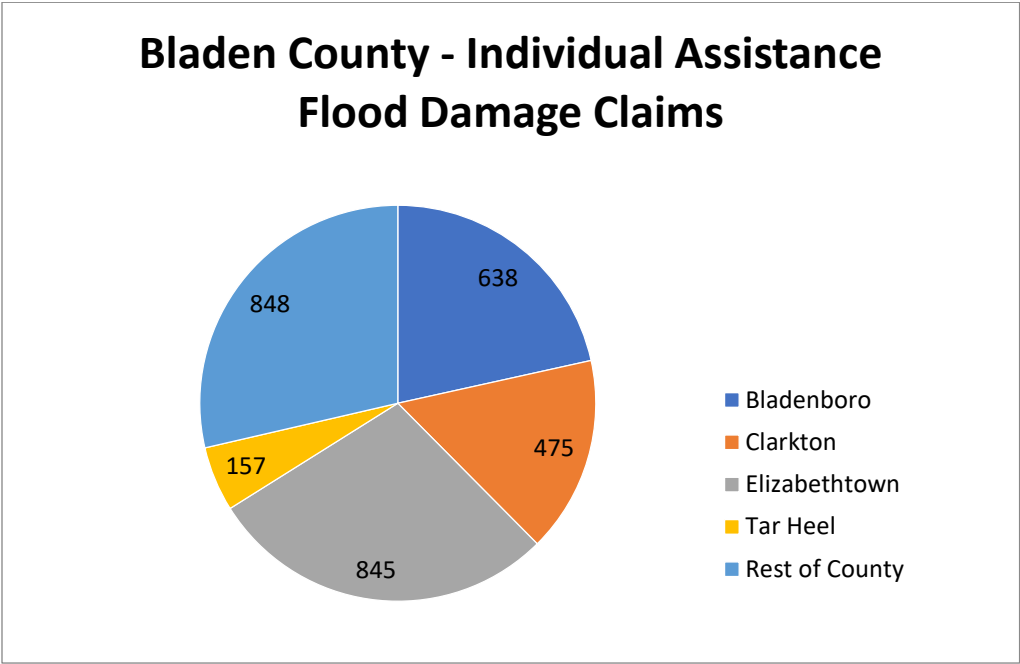


Figure 11: Number of IA Flood Damage Claims by Area



Housing was impacted in Bladen County as a result of Hurricane Matthew as there were around 150 homes with major damage according to local officials, many along the eastern border of the county. Some of the major impacts to housing that were identified by local officials from the event include:

- **Homes Flooded from Hurricane Matthew:** Significant residential loss occurred on and around N.C. Highway 210, running from the northeast area of the county to the southeast. Many of these residences experienced similar loss during Hurricane Floyd in 1999, making this a notable area of damage, especially since this area includes some repetitive loss properties that will continue to be at-risk during future flooding events.

Since the county is generally rural in terms of its development, it is difficult to pinpoint particular locations where a significant number of homes within the same geographic area were damaged. That is to say, damaged homes are scattered throughout the county. This is important to note, as home damage basically occurred across the entire county, making this a countywide problem rather than a small, area-specific issue.

- **Lack of Affordable Housing Stock:** The rural areas in Bladen County have relatively little affordable housing available, which exacerbates the impact on low- to moderate- income families who have been displaced by storm events because they do not have affordable options for temporary or permanent relocation.

### Economics / Businesses / Jobs Impacts

Bladen County experienced some significant impacts to the economy from Hurricane Matthew. Some of the impacts to the economy/businesses/jobs that were identified by local officials from the event include:

- **Multiple Businesses Impacted:** The Town of Bladenboro experienced business loss as a result of the flooding from Hurricane Matthew. After the event, several businesses in the town shut down and many did not re-open. In addition to Bladenboro business loss, the corridor along N.C. Highway 210 saw flooding and damage to two to three country stores, as well.

Smithfield Foods, which employs more than 5,000 people, lost power to its primary facility during the storm. This introduced a significant economic challenge during and after Hurricane Matthew as many hourly employees did not have work while the plant was shut down and significant revenue was lost by the company itself as large amounts of meat were unable to be properly refrigerated.

- **Economic Driver Impacted:** The Town of White Lake's economy is highly dependent upon the water quality of White Lake and its appeal as a lake that can be used for swimming, boating, and fishing. Recently, the town has experienced issues related to discoloration of the lake water. Although present just prior to Hurricane Matthew, the discoloration was intensified by the event and there is concern about the quality of the water. Any water quality issue for this lake threatens the economic livelihood of the town, as the lake is the major driver of tourism for the town.

The table below describes the impacts to the top ten employers (in terms of number of employees) in the county. These impacts were mainly the result of power outages and road closures as described throughout this document.

Rank	Year	Period	Company Name	Industry	Employment Range	Impacts from Hurricane Matthew?
1	2016	2	Smithfield Foods Inc	Manufacturing	1000+	Power outages and road closures affected daily activities (Smithfield Foods has an average of around 144 live hog trucks into the facility daily)

Rank	Year	Period	Company Name	Industry	Employment Range	Impacts from Hurricane Matthew?
2	2016	2	Gildan Yarns LLC	Manufacturing	500-999	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.
3	2016	2	Bladen County Schools	Education & Health Services	500-999	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.
4	2016	2	Bladen County	Public Administration	250-499	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.
5	2016	2	Cape Fear Valley Health Systems	Education & Health Services	250-499	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.
6	2016	2	Danaher Controls	Manufacturing	250-499	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.
7	2016	2	Packers Sanitation Services Inc Ltd	Professional & Business Services	250-499	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.
8	2016	2	First Source Staffing Services LLC	Professional & Business Services	100-249	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.
9	2016	2	Bladen Community College	Education & Health Services	100-249	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.
10	2016	2	NC Dept Of Transportation	Public Administration	100-249	Power outages and road closures affected daily activities causing temporary closure and reduction in revenue.

Table 4. Impacts to Top 10 Employers

### Infrastructure Impacts

According to Public Assistance claims, which are often tied to infrastructure, as of March 17, 2017, there was \$68,170 obligated federally in Bladen County as a result of Hurricane Matthew. It should be noted that additional claims from Hurricane Matthew may still be pending, so this number may not reflect the final claims data from the event.

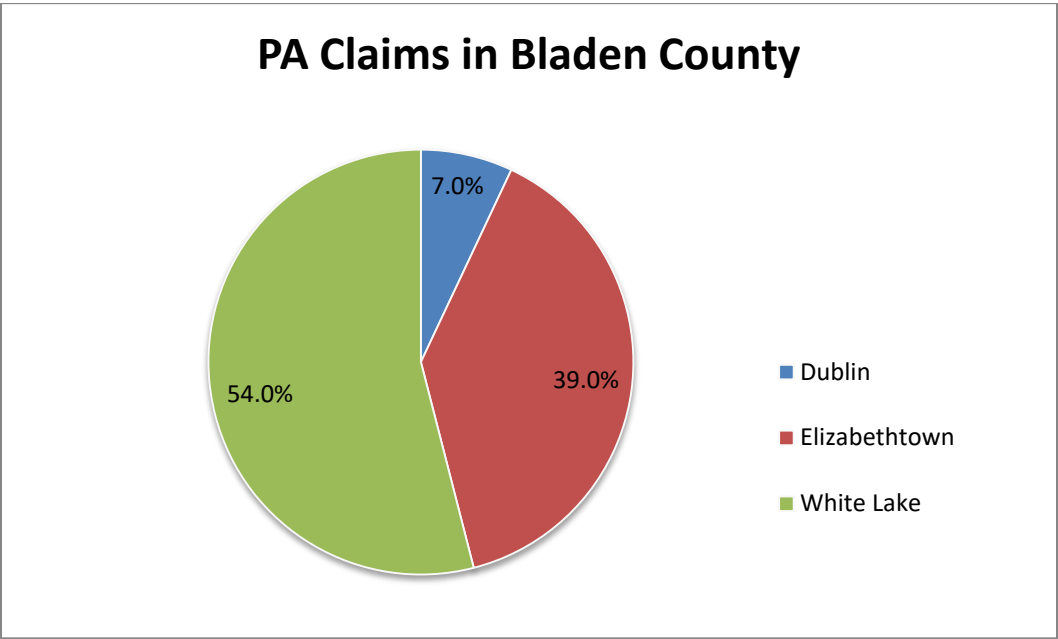


Figure 12. Bladen County PA Claims by Area and Percentage

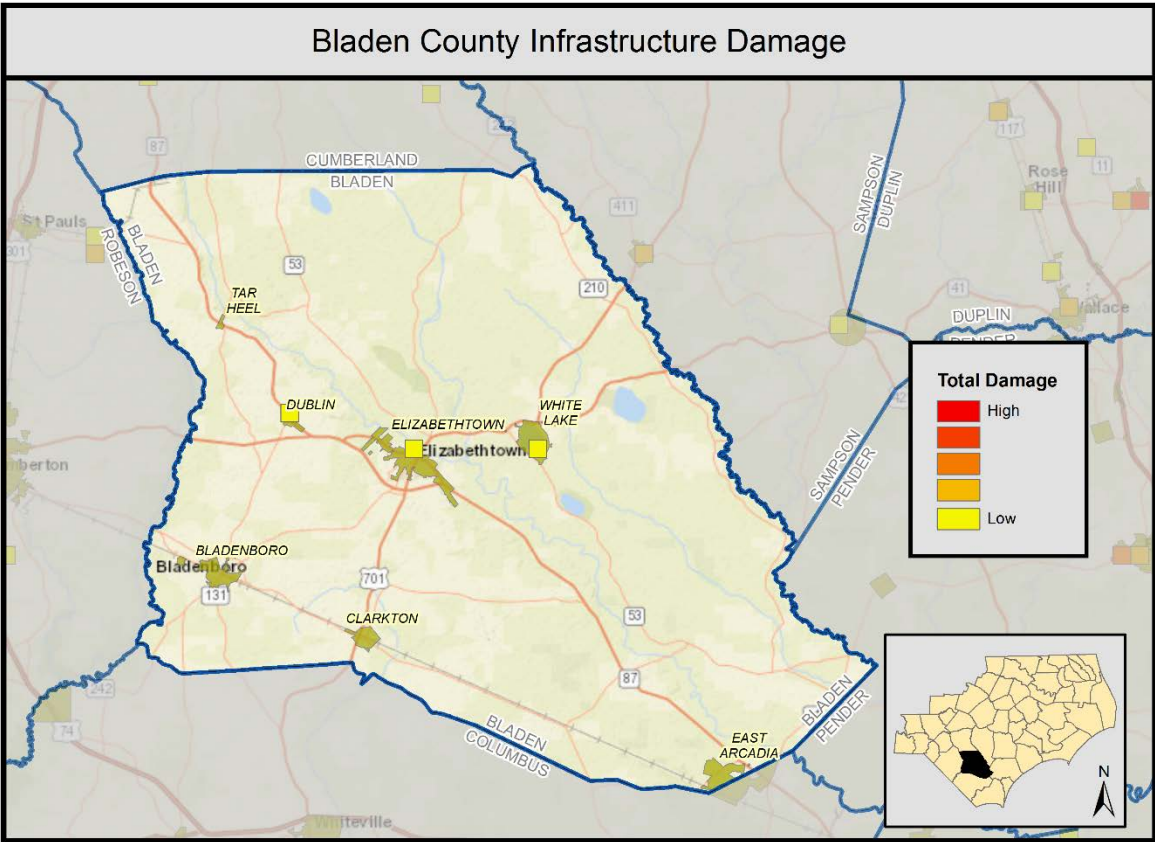


Figure 13. Bladen County Infrastructure Damage

County 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. Some of the major impacts to infrastructure that were identified by local officials as a result of the event include:

- **Dam Issues:** Although problems at dams within Bladen County itself were relatively minimal, the county was impacted by problems that occurred at dams upstream in neighboring counties. The uncoordinated releases and dam failures/breaches upstream likely caused many of the flooding issues in Bladen County. Additionally, there was noteworthy damage to a dam located in the northwest area of the county as a breach in this dam caused the washout of a huge section of roadway along N.C. Highway 53.
- **Road/Bridge Flooding:** Road and bridge overtopping impacted a number of different locations in Bladen County during Hurricane Matthew. Some of these locations have been historical hotspots in the county and are affected even during rainfall events that are not as extreme as hurricanes/tropical storms. For example:
  - In Elizabethtown, Hurricane Matthew caused Martin Luther King Jr. Drive to flood and washout, exposing 125 feet of pipe under the road. Bladen County is currently awaiting response from FEMA regarding whether this damage will be eligible for funding. If ineligible, county officials have stated this would be a significant challenge to clean up without outside funding to support community reconstruction efforts.
  - The Elizabethtown downtown area, right off Main Street, had a parking lot flooded and washed out during the storm event. There was also overtopping of several primary roads including Martin Luther King Jr. Drive, N.C. Highway 242/U.S. Highway 701, and E. Broad Street.
  - As mentioned above, a dam breach resulted in the washout of a huge section of roadway along N.C. Highway 53.
  - Several roads flood frequently along N.C. Highway 131 in the area of the Black Swamp.
  - Bladenboro has experienced flooding of several primary roads in the downtown area (see below for additional information on stormwater management problems).
  - There was bridge and road flooding in the area near White Oak around the intersection of N.C. Highway 53 and River Road.
  - Flooding of N.C. Highway 242 posed a threat to the Bladen Lakes School shelter that is on Johnstontown Road; as a result, the shelter had to be evacuated during the storm.
  - Flooding occurred along Longview Road between N.C. Highway 11 and Hunts Bluff Road.
  - Flooding occurred along N.C. Highway 11 between N.C. Highway 210 and heading south to Columbus County line.
  - Road/bridge flooding occurred along Braxton Edge Road, just south of Old Fayetteville Road.
  - Road/bridge flooding occurred along N.C. Highway 242, just south of Old Fayetteville Road.
  - Culvert issues caused flooding of N.C. Highway 41 just east of White Lake.
  - Bridge flooding of Highway 210 occurred just north of the intersection with N.C. Highway 41
  - Road flooding occurred along Rosindale Road just south of Lisbon Road.



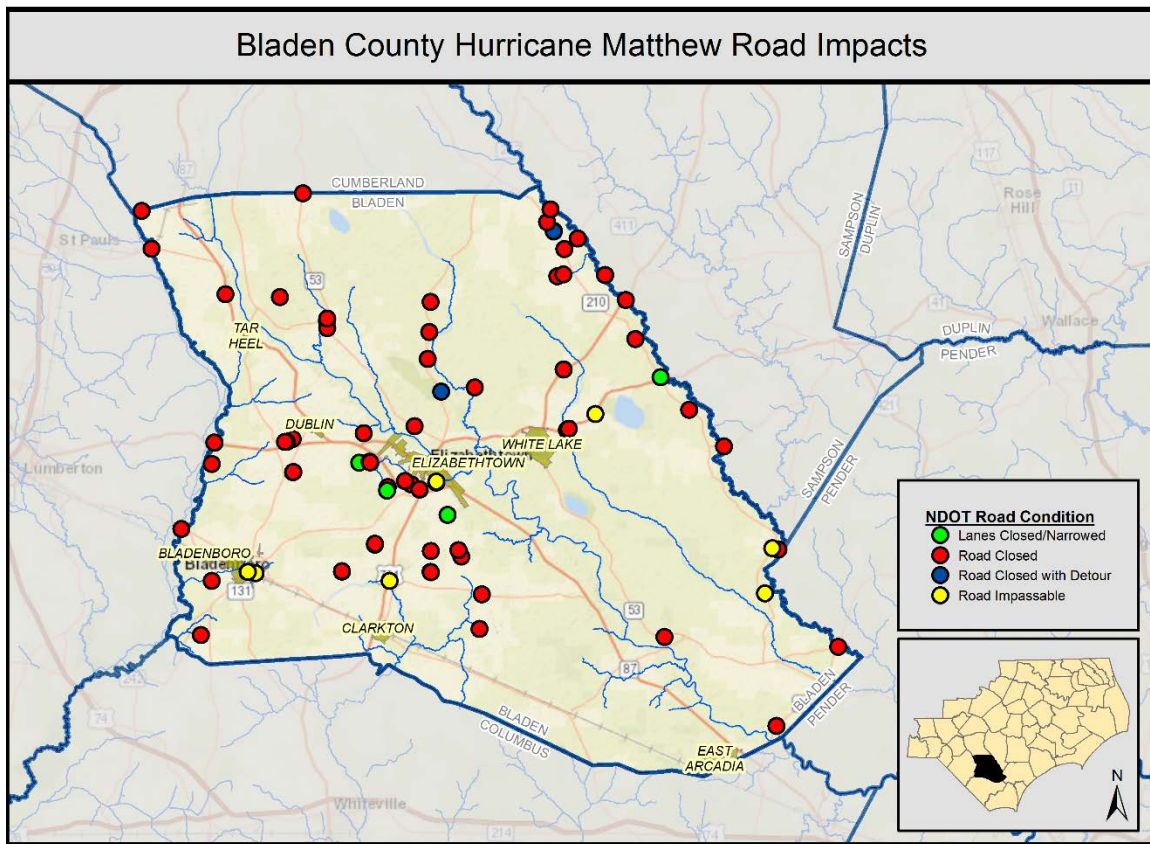


Figure 14. Impacted NCDOT Structures in Bladen County

- Stormwater Management Problems:** The Towns of White Lake and Bladenboro are both experiencing frequent flooding issues resulting from having no stormwater management systems. Both towns are very flat topographically, so there is little drainage relief. The only two subdivisions in White Lake experienced flooding during Hurricane Matthew and are historically known to flood frequently during any heavy rain event. White Lake tried to get funding for a stormwater management system after Hurricane Floyd flooded the area, but the town was unsuccessful.
- Critical Facilities:** These facilities are critical to maintaining health and well-being of the public in the wake of a storm event. Often, facilities for water and wastewater are threatened due to the necessity of placing these facilities near water bodies, which naturally causes a risk of flooding.

Maintaining or restoring power as quickly as possible to these critical facilities is also a high priority during a heavy storm event. For many structures or facilities operating on water wells, no power generally results in no water availability. Part of the reason for these power problems at critical facilities is that the need far outweighs the availability of generators in Bladen County. Indeed, there are 15 water well facilities in the county and most are without backup power. Only one of these well facilities has a stationary generator and then there are two mobile generators for the remaining 14 facilities.

In addition, a number of critical facilities were impacted directly in Bladen County by Hurricane Matthew.

- Bladenboro Industrial Park currently operates on two water wells. There is a third water well but it does not provide the necessary system capacity. Without proper sewer and water capacity, this industrial park is at-risk of shutting down on a regular basis. It is especially prone to shut down during large storm

events similar to Hurricane Matthew since there are currently no existing generators at these water well locations to ensure ongoing power/water supply to the park.

- The power was out at the industrial park in Elizabethtown for three days and only a portion of the three-phase power came back online during restoration.
- In White Lake, all medical facilities other than the main hospital were without power for a week following Hurricane Matthew and unable to operate. This was a major health and safety concern since many prescriptions are handled directly through these offices. Loss of operation at these facilities drastically reduced the amount of medical service available to the local population, as there are very few medical facilities in the area.
- The Elizabethtown Emergency Medical Services (EMS) building flooded as a result of Hurricane Matthew, hindering emergency response services. According to historical flooding information provided by county officials, it has flooded three to four times in the last five- to six-year period.
- Most emergency shelters are operating without generators or any form of back-up power supply. The only shelter that has a generator was flooded and was inaccessible after Hurricane Matthew. Shelters without generators often cannot remain open during and after an event, and therefore, introduce a secondary risk to members of the public who seek safe haven at the shelter but then are forced to leave the shelter as well.
- Due to lack of power, many cell phone towers were inoperable following the storm. These facilities are considered critical infrastructure because many people in the county are solely reliant on mobile phones for communication. During and after Hurricane Matthew, many citizens and local officials were unable to communicate for several days until service was restored. Residents had to resort to radios for communication. It should be noted that many towers are privately owned.
- **Stream Gauges:** Due to a lack of stream gauges in Bladen County (only three in the county currently), the county was unable to accurately predict water levels before Hurricane Matthew or understand the volumes that were being released from upstream and within the county itself. Since local officials did not know how much water was coming their way, they were unable to provide as much early warning to citizens as they would have been able to with more gauge data. This put citizens at risk who might have been able to evacuate further in advance of floodwaters.

### Ecosystems / Environment Impacts

Overall, environmental impacts in Bladen County as a result of Hurricane Matthew were relatively minimal. However, there were some noteworthy incidents that may not have explicitly impacted the environment and ecosystems, but which brought to light some underlying issues related to maintenance of environmental features that the county faces recurrently.

- **Water Quality Issues:** In the Town of White Lake, stormwater runoff currently drains into White Lake, constantly exposing the lake to elements capable of diminishing water quality. This problem already existed prior to Hurricane Matthew, but due to the large quantity of water that was dumped on the area during the storm, the problem was exacerbated in Hurricane Matthew's wake.
- **Natural Debris Buildup Causing Flooding:** Several bridges across the county experienced a significant amount of debris buildup in streams. This debris is frequently in the form of downed trees and other buildup

of natural remains. Indeed, one of the major causes of debris buildup is from beaver dams that are constructed and then washed out during heavy rainfall/flooding events. This debris is then caught underneath bridges and in culverts, causing a jam that backs up water upstream and results in flooding.





## 4. Strategies for Resilient Redevelopment



## 4. Strategies for Resilient Redevelopment

This section provides details about the resilience and revitalization strategies and actions identified in Bladen County. These actions were identified and refined during three 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.

Meeting 1 was designed to introduce the community and County points of contact to the Resilient Redevelopment Planning process and goals. This meeting allowed the planning team to capture areas within the county that were damaged during Hurricane Matthew and to hear what potential mitigation actions had already been considered. Draft resilience actions were then presented at Meeting 2 of the planning process. This was done to garner general buy-in on the draft actions from the County-level planning teams and residents. More details on the actions were collected between Meetings 2 and 3 through research and follow-up phone calls and emails with the primary points of contact. Meeting 3 provided the opportunity to collect and finalize details for the draft actions. Meeting 4, scheduled in early May 2017, allowed the county points of contact to rank the identified actions, group them into High, Medium, and Low Priorities, and to approve their inclusion in the plan.

Pillar	Project/Action Count
Housing	2
Economic Development	4
Infrastructure	6
Environment	3
<b>Grand Total</b>	<b>15</b>

**Table 5. Bladen County Summary of Projects by Pillar**

The following table is ordered by the rankings and priorities provided by Bladen County during Meeting 4:

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	IN2- Backup Power/Generators/Microgrids	High	1
Environment	EN2- Stream Restoration	High	2
Economic Development	ED2- Downtown Redevelopment and Revitalization	High	3
Infrastructure	IN5- Stream Gauges, Early-Warning System, and Communication Network for Operators	High	
Infrastructure	IN4- Stormwater Management Analysis and System Upgrades	High	
Infrastructure	IN3- Roadway/Bridge/Culvert Improvements	High	
Housing	H1- Increase Affordable Housing	Medium	
Housing	H2- Voluntary Acquisition/Elevation/Reconstruction of Homes	Medium	

Pillar	Action Name	Priority	Overall Ranking
Economic Development	ED4- Upgrade Existing Water, Sewer, Gas Facilities	Medium	
Infrastructure	IN1- Critical Facility Protection/Hardening/Relocation	Medium	
Environment	EN3- Floodplain Mapping Studies	Medium	
Economic Development	ED1- Backup Power/Generators/Microgrids at Key Private Sector Enterprises	Low	
Infrastructure	IN6- Dam Analysis and Modification	Low	
Economic Development	ED3- Water Quality Improvement	Low	
Environment	EN1- Recreational/Open Space Additions and Enhancements	Low	

**Table 6. Projects by Rank**

On the following pages, we have organized the projects and actions by pillar. Within each pillar, the projects are grouped by county priority. Please note that maps are provided for all projects that have a specific location within the county. Projects without maps are county-wide projects that will benefit citizens throughout the county.

## Housing Strategies

### High Priority Housing Strategies

No high priority Housing strategies were identified for Bladen County.

### Medium Priority Housing Strategies

Pillar	Action Name	Priority	Overall Ranking
Housing	H1- Increase Affordable Housing	Medium	
Housing	H2- Voluntary Acquisition/Elevation/Reconstruction of Homes	Medium	

**Table 7. Bladen Medium Priority Housing Summary**

These projects represent the housing strategies that Bladen County indicated are of medium priority to address. Additional detail can be found below:

- H1 - Increase Affordable Housing:** Assess the current affordable housing stock available and add affordable housing units by encouraging and supporting development through incentives, subsidies, and utility extensions in identified urban and rural areas. The county has identified a need for 100+ units throughout the county – with a potential 5 to 6-acre site location in Elizabethtown near existing housing in the Swanzy Ridge and Tall Oaks Apartment Complexes (Senior Housing). Another ideal location may be Bladenboro’s Habitat for Humanity Development site on Hickory Street.

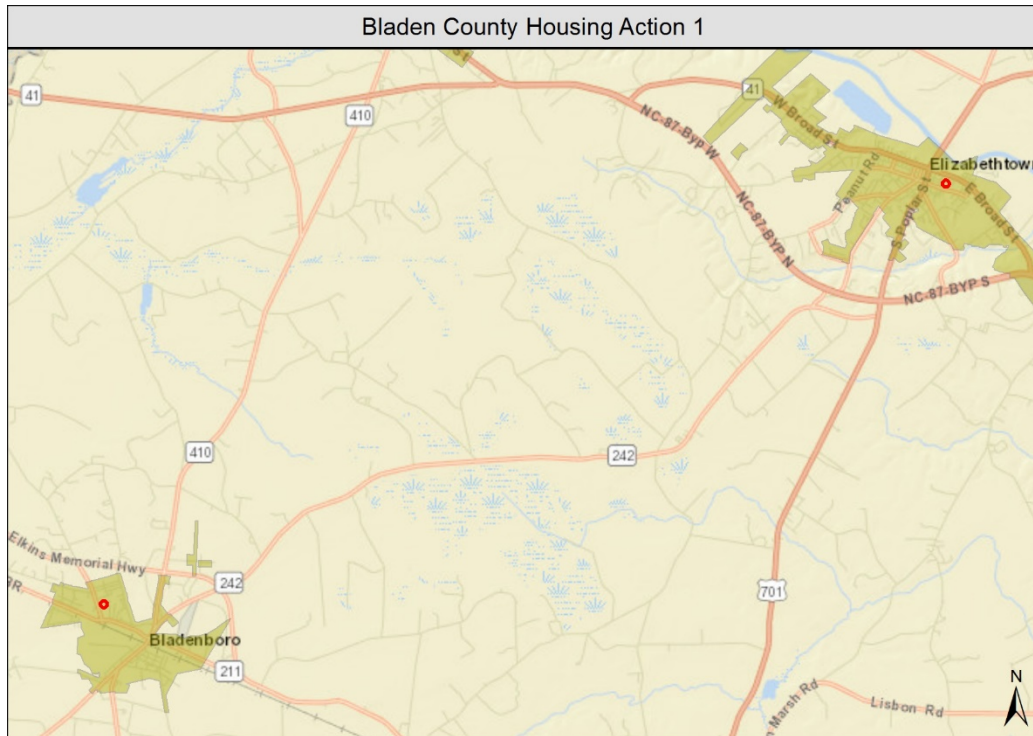


Figure 15. Increase Affordable Housing

## H1 - Increase Affordable Housing

County: Bladen

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

**Location:** On 5-6 acre open lot on E. Swanzy Street across from Swanzy Ridge Apartments and Bladenboro's Habitat for Humanity Development on Hickory St.

**Project Summary:** Problem: There is a lack of availability of affordable housing throughout the county, especially in the more rural areas. County officials explained that there is currently a long waiting list for public housing as Hurricane Matthew displaced residents and many have found it very difficult to locate affordable short-term housing options. In the long-term there is a need for both public and private affordable housing stock.

Strategy: Construct at least 100 units of affordable housing at several locations throughout the county. At least one potential location has been identified on E. Swanzy Street that may be able to support roughly half the units, but the county will need to complete an assessment of feasible alternatives for providing affordable housing at this and other locations to ensure the best locations are identified. This assessment should further clarify housing needs, assess potential locations, and collect other pertinent information to further the provision of affordable housing in Bladen County. Work to identify funding sources to assist in encouraging construction of more affordable housing through incentives or subsidies. Evaluate efficacy of extending utilities to locations identified as an incentive to developers if needed.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	There is a lack of availability of affordable housing throughout the county especially in the more rural areas. County officials explained that there is currently a long waiting list for public housing as Hurricane Matthew displaced residents and many have found it very difficult to locate affordable short-term housing options. In the long-term there is a need for both public and private affordable housing stock. Introduction of more affordable housing can help relieve this unmet need.	N/A
Consistent with existing plans (describe points of intersection/departure)	Bladen County wants to ensure that all of its residents can afford to live in a stable affordable environment and it is clear based on existing housing stock and the long waiting list that exists to be able to get into the existing affordable housing units that there is insufficient stock. This strategy to increase affordable housing is consistent with all economic development and housing plans for the county.	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.	As this program will enable the County to work toward the provision of adequate affordable housing resources the cost of carrying such an assessment/program is much lower than the future benefit for residents needing affordable housing. Availability of affordable housing will help ensure residents are able to reserve sufficient earnings from jobs to be able to participate in a meaningful way in the local economy thereby creating a more stable and sustainable economic environment overall.	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	No	N/A



to complete this project?		
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Less than 25%	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?	No Impact	N/A
What impacts to the environment of the county will result from this project?	Nothing significant.	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

- **H2 - Voluntary Acquisition/Elevation/Reconstruction of Homes:** On the eastern side of the county near Highway 210 along the South River, develop a program to address widespread repetitive flooding of homes and continual flood risk in these residential and commercial areas. The county would like to use elevation, mitigation reconstruction, and/or acquisition as a part of this strategy.

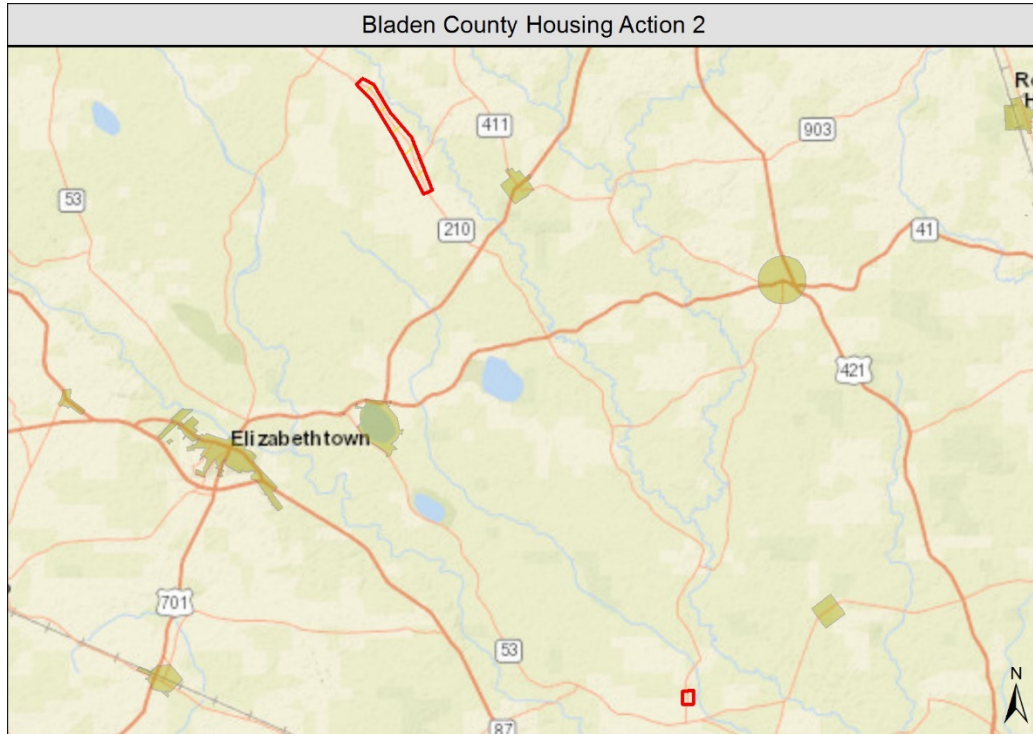


Figure 16. Voluntary Acquisition/Elevation/Reconstruction of Homes

## H2- Voluntary Acquisition/Elevation of Homes

**County:** Bladen

**Priority Grouping:** Medium Priority

**Priority Ranking:** 0

**Project Timeframe:** 3-5 years

**Location:** Eastern side of the county near Highway 210 along the South River (Map ID: H2)

**Project Summary:** Problem: Flooding from area rivers and tributaries, as well as drainage issues near culverts, caused damage to residential and commercial properties in this area. Repetitive flood losses have affected this corridor significantly reducing residential and business building stock. Area was also impacted by Hurricane Floyd and has been limited in growth.

Strategy: Use voluntary acquisition or elevation of homes as a strategy to remove or reduce flood risk to structures in high-risk areas (SFHA). Identify commercial buildings that may be appropriate for flood-proofing, elevation or relocation. Currently, the county has put in an application for 33 reconstructions, 10 acquisitions, and 12 elevation projects. However, the county's initial estimate was that there were around 70 residents in flood zones who are interested in some sort of mitigation and roughly 130 total residents both in and out of flood zones were impacted and interested in participating in a mitigation project (~60 outside flood zone). In terms of type, these homes are split roughly evenly as mobile homes and single-family frame construction.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Although there a number of homes are queued up for acquisition and elevation projects in the county through the typical HMGP program many of these damaged homes will likely not be funded through this process and will remain at risk to future flooding.	N/A
Consistent with existing plans (describe points of intersection/departure)	Acquisition/elevation is consistent with development and land use plans within the county to reduce the amount of development in high risk flood areas and better protect properties in these areas using higher standards.	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 project may help from an economic development standpoint improving commercial buildings' resiliency and mitigating risks associated with being located in at-risk areas such as the Special Flood Hazard Area	N/A
For how long will this solution be effective?	More than 50 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?	Less than 25%	N/A
What impacts to the environment of the county will result from this project?	Increasing open space can have many positive impacts on the environment including returning areas to their natural	N/A

	floodplain state and allowing for a more open space for habitats and growth of vegetation.	
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?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A



## Low Priority Housing Strategies

No low priority Housing strategies were identified for Bladen County.

## Economic Development Strategies

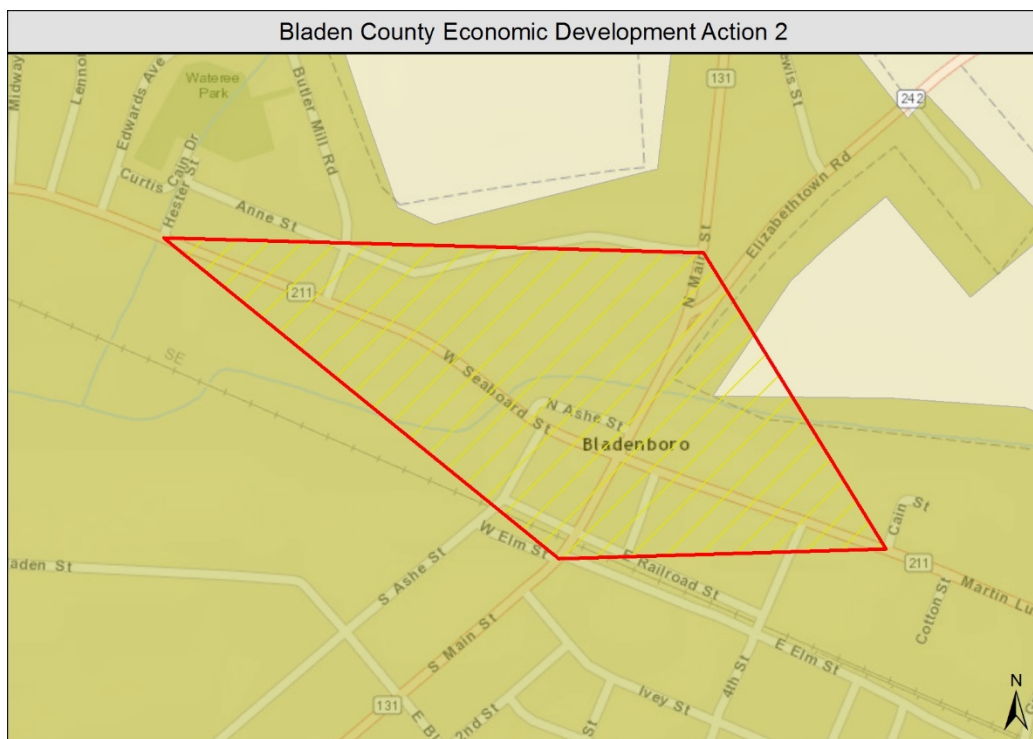
### High Priority Economic Development Strategies

Pillar	Action Name	Priority	Overall Ranking
Economic Development	ED2- Downtown Redevelopment and Revitalization	High	3

**Table 8. Bladen High Priority Economic Development Summary**

This project represents the economic development strategy that Bladen County indicated is of a high priority to address. Additional detail on the projects can be found below:

- ED2 - Downtown Redevelopment and Revitalization:** Encourage business to return to downtown Bladenboro after being displaced by Hurricane Matthew. This strategy will focus on rebuilding with risk reduction in mind for a more resilient community through use of street and walkway re-designs, infrastructure improvements, and other economic incentive programs. Downtown Bladenboro is roughly a 12-block area, the focus areas are from the intersection of Anne Street and W. Seaboard to the intersection of Cain Street and Martin Luther King Jr. Drive, and from the intersection of Anne Street and NC Highway 410 to the intersection with Elm Street.



**Figure 17. Downtown Redevelopment and Revitalization**

## ED2- Downtown Redevelopment and Revitalization

**County:** Bladen

**Priority Grouping:** High Priority

**Priority Ranking:** 1

**Project Timeframe:** 1-3 years

**Location:** Bladenboro – Downtown, which is roughly a four block area (Map ID: ED2)

**Project Summary:** Problem: Downtowns across the state, but in particular in rural areas, have suffered downturns as building stock has aged and major retailers have moved out to shopping centers. Bladenboro's water system was built in the 1970s and sewer system was built in the 1930s. Added to these issues, flooding during Hurricane Matthew forced medical providers and retailers to relocate and many have chosen not to return to their previous locations of business. Nearly the entire downtown area is in a floodplain.

Strategy: Encourage business to return to downtown Bladenboro after being displaced by Hurricane Matthew as well as focus on rebuilding with risk reduction in mind for a more resilient community through use of street and walkway re-designs, infrastructure improvements, and other economic incentive programs.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	There was significant flooding during Matthew in these critical downtown areas. Many businesses were shut down and never reopened and don't have plans to. This is a huge issue for the economic vitality of the town and there has not been any solution to help protect this area going forward. There were already issues with loss of businesses due to economic issues prior to the event.	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with all of the local development plans to try to improve not only economic development in the downtown area but also to make communities more resilient in the long-term to prevent business loss from the downtown in the future.	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.	Downtown revitalization has a synergetic effect on the entire regional economy and will certainly impact the town and county economy positively.	Agree
For how long will this solution be effective?	More than 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)?	>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?	Higher than 75%	Agree
What impacts to the environment of the county will result from this project?	Refocus on the downtown prevents urban sprawl and the whole cycle of long commutes that degrades the	N/A

	environment.	
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?	County	Agree

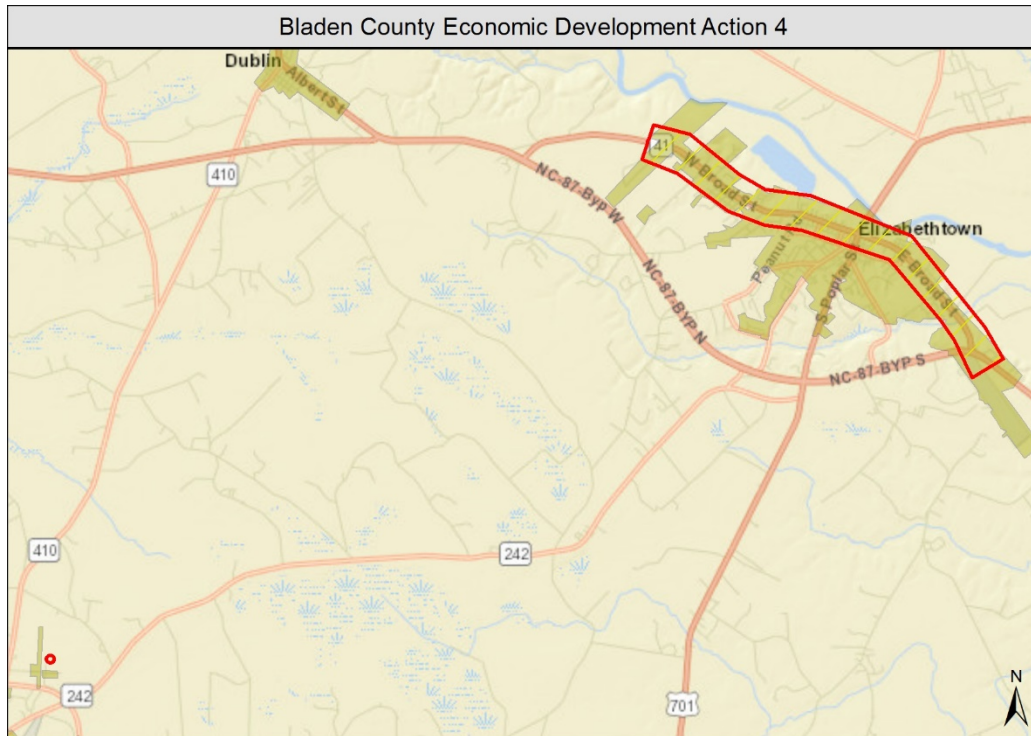
## Medium Priority Economic Development Strategies

Pillar	Action Name	Priority	Overall Ranking
Economic Development	ED4- Upgrade Existing Water, Sewer, Gas Facilities	Medium	

**Table 9. Bladen Medium Priority Infrastructure Summary**

This project represents the economic development strategy that Bladen County indicated is of medium priority to address. Additional detail can be found below:

- ED4 - Upgrade Existing Water, Sewer, Gas Facilities:** The county identified that the build out of utility infrastructure in several locations could support economic growth as this has been stalled by lack of infrastructure.
  - Elizabethtown Industrial Park- Expand natural gas supply
  - Bladenboro Industrial Park- Upgrade sewer and water utilities to increase current capacity and encourage future development



**Figure 18. Upgrade Existing Water, Sewer, Gas Facilities**

## ED4- Upgrade Existing Water, Sewer, Gas Facilities

**County:** Bladen

**Priority Grouping:** Medium Priority

**Priority Ranking:** 3

**Project Timeframe:** 3-5 years

**Location:** Elizabethtown Industrial Park, Bladenboro Industrial Park (Map ID: ED4)

**Project Summary:** Problem: Elizabethtown Industrial Park needs natural gas to encourage and handle future industrial growth. Bladenboro Industrial Park has insufficient water and sewer capacity for current and future development.

Strategy: Natural gas service needs to be extended to Elizabethtown Industrial Park in order to foster economic development in the area and provide a consistent source of gas to this important area. Currently gas service has been extended to an area northwest of Elizabethtown and needs to be extended roughly 5 miles to the southeast side of Elizabethtown where the park is located. Sewer capacity needs to be increased at the Bladenboro Industrial Park in order to foster economic development in the area and provide a consistent source of sewer to this important area. Currently the system has a 500,000 gallons per day capacity and in high rain events they are at roughly 1,000,000 gallons per day. Bladenboro Industrial Park also needs expansion of water capacity. Currently the park is serviced by 2 wells – but an additional well is needed to support current needs and future growth.

As a first step, this strategy may include a needs assessment study to identify current and future capacity needs for extending gas, sewer and water services in the county. The study should address multiple concerns to include current shortfalls in capacity as well as expected growth, developing resilience for future disasters by determining viability of bringing rural communities online to county services and provide an analysis of infrastructure support to encourage the future development of the Industrial Park.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Expansion and diversity of services will help improve resiliency to future disasters as a higher capacity and more diverse infrastructure will naturally improve the community's ability to bounce back after a disaster.	N/A
Consistent with existing plans (describe points of intersection/departure)	The county is interested in expanding public services to as many citizens as possible. This is also consistent with local economic development plans which identify the locations above as key businesses and areas for job growth.	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.	Extending utilities will help promote economic growth and job growth in key areas	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?	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	None	N/A



result from this project?		
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?	Regional	Agree

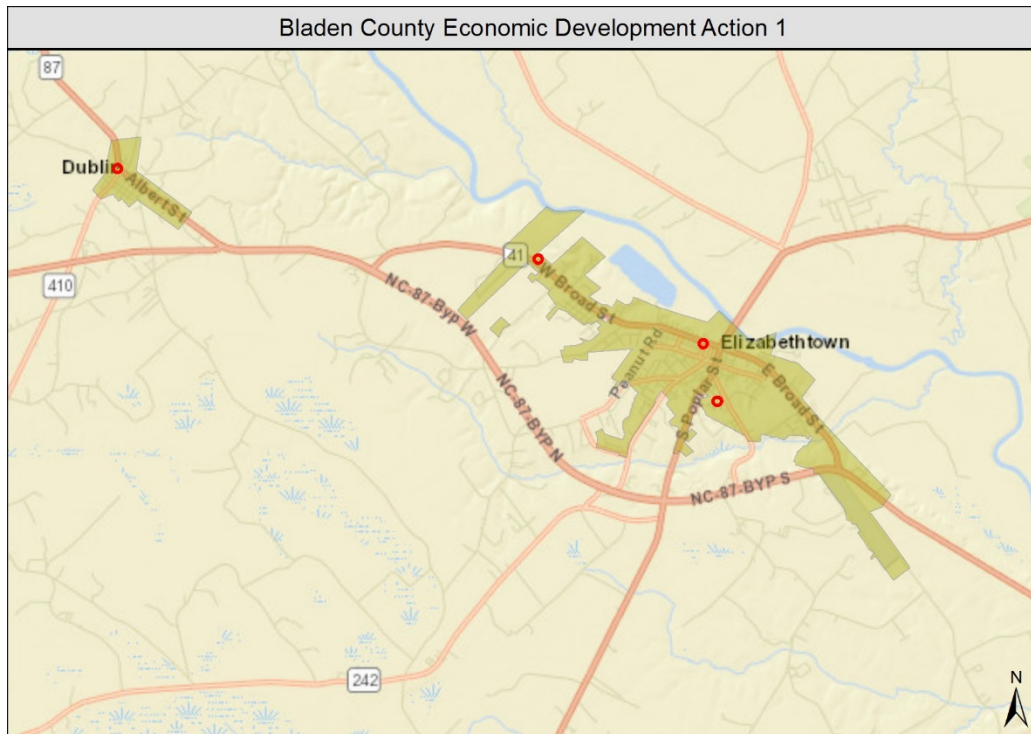
## Low Priority Economic Development Strategies

Pillar	Action Name	Priority	Overall Ranking
Economic Development	ED1- Backup Power/Generators/Microgrids at Key Private Sector Enterprises	Low	
Economic Development	ED3- Water Quality Improvement	Low	

**Table 10. Bladen Low Priority Infrastructure Summary**

These projects represent the infrastructure strategies that Bladen County indicated are of lower priority to address. Additional detail can be found below:

- ED1 - Backup Power/Generators/Microgrids at Key Private Sector Enterprises:** Provide alternative power sources for nine Medical Clinics located in Clarkton (2), Bladenboro, White Lake, Tar Heel, Dublin and Elizabethtown (3) and Cell Towers (~40) located across the county to make them more resilient and able to come back online quicker to service the community. Options can vary from generators, ATS, adapters or microgrid solutions.



**Figure 19. Backup Power/Generators/Microgrids at Key Private Sector Enterprises**

## ED1 - Install Backup Power, Generators, or Microgrids at Key Private Sector Enterprises

**County:** Bladen

**Priority Grouping:** Low Priority

**Priority Ranking:** 4

**Project Timeframe:** 1-3 years

**Location:** Medical Clinics in Clarkton (2), Bladenboro, Dublin, White Lake, Tar Heel, and Elizabethtown (3), and roughly 40 Cell Towers

**Project Summary:** Problem: Loss of power caused by flooding and downed trees from saturated soil and high wind. Services temporarily cut off to community during power outage.

Strategy: Overall, back-up, supplemental and redundant power is needed to create better energy assurance post-disaster and to make sure that critical facilities have sufficient power to maintain operations in several medical clinics (all ~3,000 sq ft), and a number of key cell towers. Within this strategy are several options:

- Provide emergency generators or ATS for portable generators for critical businesses and private sector enterprises.
- Consider establishing regulations requiring service providers in the county to install generators or ATS to maintain operations in the event of future events and power loss.
- Where there is a concentration of key enterprises, consider installation of a microgrid.
- Improve coordination where Electric Co-ops rely on regional power supply.
- Install remote switching controls where access may be an issue.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Power loss during Hurricane Matthew resulted in the need for back-up and redundant power to provide energy assurance. Loss of power was caused by flooding and downed trees from saturated soil and high wind. Services temporarily cut off to community during power outage.	N/A
Consistent with existing plans (describe points of intersection/departure)	Economic development plans recognize the need for businesses to maintain continuity of operations especially after storm events and many providers of critical services are privately owned so this is consistent with both economic and continuity 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.	Businesses are more resilient to coming back on line to service the community. Generators and/or ATS for portable generators can provide an easy and lower cost solution to provide much needed power after an event. Microgrids improve reliability and efficiency of the local power system. Microgrids reduce environmental impact integrating renewable and clean energy sources and reducing greenhouse gas emissions. Microgrids give users long-term overall cost savings	Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	>200 year event	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	No Impact	Agree

floodplain/coastal zone management?		
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?	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?	Local	Agree

- **ED3- Water Quality Improvement:** Determine the cause behind White Lake’s water clarity issue and implement a solution to bring the spring-fed lake back to its clear state. Perform a watershed analysis for the initial phase to determine possible cause for discoloration, followed by a mitigation phase to improve and maintain water clarity. Develop an information campaign to address the public’s concerns with the discoloration of the lake and perceived poor water quality.

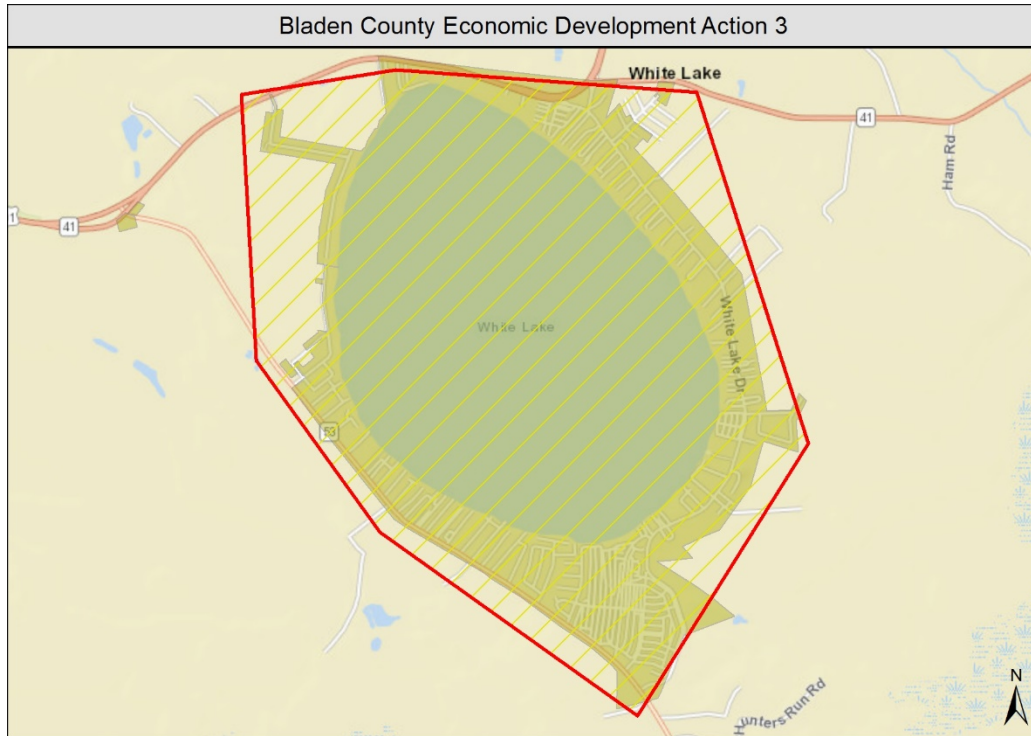


Figure 20. Water Quality Improvement



## ED3 - Water Quality Improvement

**County:** Bladen

**Priority Grouping:** Low Priority

**Priority Ranking:** 2

**Project Timeframe:** 1-3 years

**Location:** White Lake water body (Map ID: ED3)

**Project Summary:** Problem: Concerns with reduction in weekend visitors for recreational use due to perceived water quality issues. This is causing a significant economic impact with the reduction of this key monetary influx for the community.

Strategy: Determine the cause behind water clarity issue and implement solution to bring spring-fed lake back to its clear state. Perform a watershed analysis for the initial phase to determine possible cause for discoloration, followed by a mitigation phase to improve and maintain water clarity. Develop an information campaign to address the public's concerns with the discoloration of the lake and perceived poor water quality.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The discoloration of the water began prior to Hurricane Matthew in the summer of 2013 after White Lake received 14" of rainfall but was worsened after the fact. It is evident that high rainfall events are not helping this issue. Water quality has already been tested and results have shown that the water is safe. There are a number of action items as a result of a meeting last August 2016 but many have not yet been completed.	N/A
Consistent with existing plans (describe points of intersection/departure)	The White Lake water body is critical to the functioning of the town and therefore perhaps its most important asset. As a result this strategy is consistent with all local 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.	The economic benefits of improving the perception of water quality in White Lake are critical to the ongoing sustainability of the community's tourist-based economy. Therefore the cost-effectiveness is tied directly to the success of the community's primary revenue source.	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?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Higher than 75%	Agree
What impacts to the environment of the county will result from this project?	More knowledge behind reason for water discoloration can lead to improvements that are also better for the	N/A

	environment such as more effective treatment of stormwater runoff prior to entering rivers/lakes	
What is the capability of the local government to administer this project?	Medium	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?	County	Agree

## Infrastructure Strategies

### High Priority Infrastructure Strategies

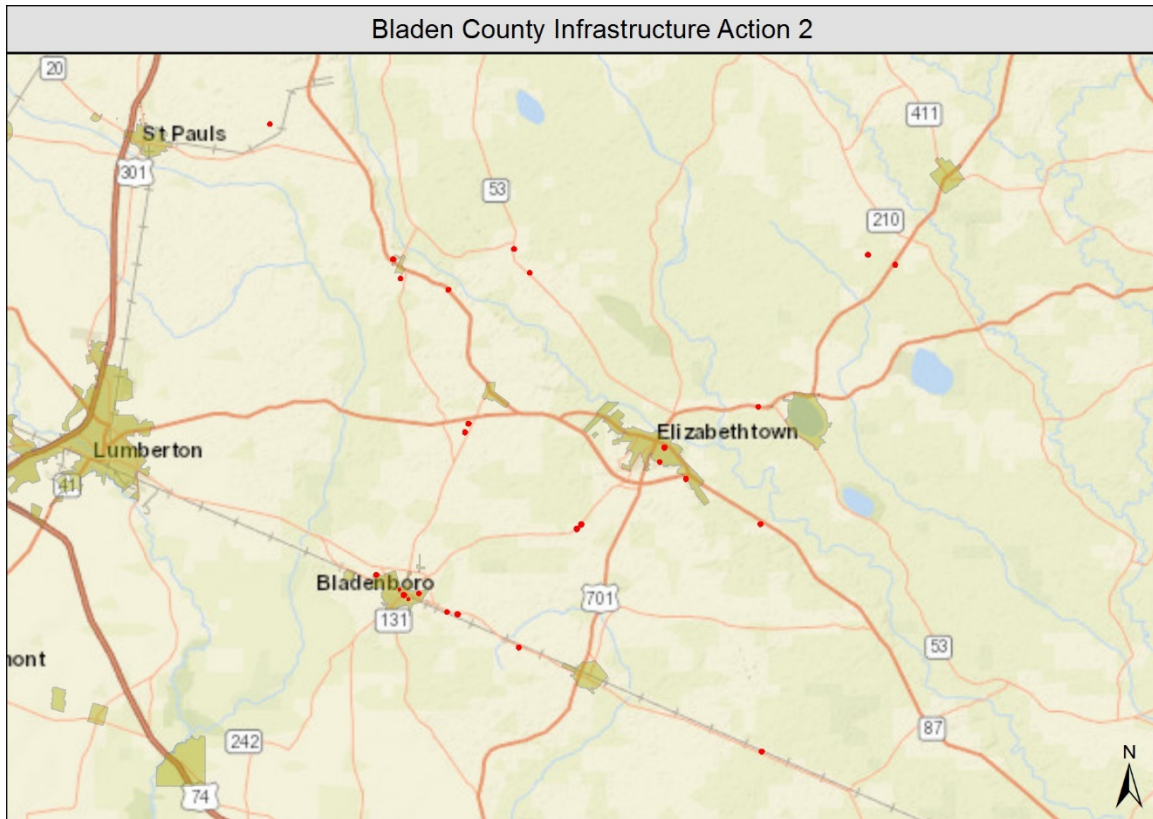
Pillar	Action Name	Priority	Overall Ranking
Infrastructure	IN2- Backup Power/Generators/Microgrids	High	1
Infrastructure	IN5- Stream Gauges, Early-Warning System, and Communication Network for Operators	High	
Infrastructure	IN4- Stormwater Management Analysis and System Upgrades	High	
Infrastructure	IN3- Roadway/Bridge/Culvert Improvements	High	

**Table 11. Bladen High Priority Infrastructure Summary**

These projects represent the infrastructure strategies that Bladen County indicated are the highest priority to address. Additional detail can be found below:

- **IN2 - Backup Power/Generators/Microgrids:** Implement a power microgrid system or generator at one or several facilities within the community to reduce power consumption and environmental impact. Alternatively, add other form of backup power or redundancy to these facilities. Several ideal locations were provided by local county officials. These locations are all in need of some form of backup power:
  - Existing/New/Relocated EMS facility in Elizabethtown
  - Main County EMS Facility located in the Industrial Park
  - East and West Bladen High Schools (priority sites)
  - Bladenboro Town Hall
  - Bladenboro Police Department
  - Bladenboro Maintenance Building
  - Well sites
    - White Oak #1
    - White Oak #2
    - Abbottsburg #4
    - White's Xrds #5
    - Lisbon #6
    - White Lake #7
    - Center Road #8
    - Tobermory #9
    - Lisbon #10
    - Rosindale #11
    - Bull Street
    - Smith Millpond Road #12
    - White's Xrds #13
    - Tar Heel #1A
    - Tar Heel #2
    - Elizabethtown #1A

- Elizabethtown #3A
- Bullard
- White
- Chestnut Street
- Lift Stations
  - Horne Street
  - NC Highway 242



**Figure 21. Backup Power/Generators/Microgrids**

## IN2- Backup Power, Generators, Microgrids

**County:** Bladen

**Priority Grouping:** High Priority

**Priority Ranking:** 1

**Project Timeframe:** 1-3 years

**Location:** Main EMS facility in Elizabethtown (7,000 sq ft) East Bladen High School (100,000 sq ft) West Bladen High School (100,000 sq ft) Bladenboro Town Hall (3,500 sq ft) Bladenboro Police Department (1,800 sq ft) Bladenboro Maintenance Building (3,800 sq ft)

**Project Summary:** Problem: Downtowns across the state, but in particular in rural areas, have suffered downturns as building stock has aged and major retailers have moved out to shopping centers. Bladenboro's water system was built in the 1970s and sewer system was built in the 1930s. Added to these issues, flooding during Hurricane Matthew forced medical providers and retailers to relocate and many have chosen not to return to their previous locations of business. Nearly the entire downtown area is in a floodplain.

Strategy: Encourage business to return to downtown Bladenboro after being displaced by Hurricane Matthew as well as focus on rebuilding with risk reduction in mind for a more resilient community through use of street and walkway re-designs, infrastructure improvements, and other economic incentive programs.

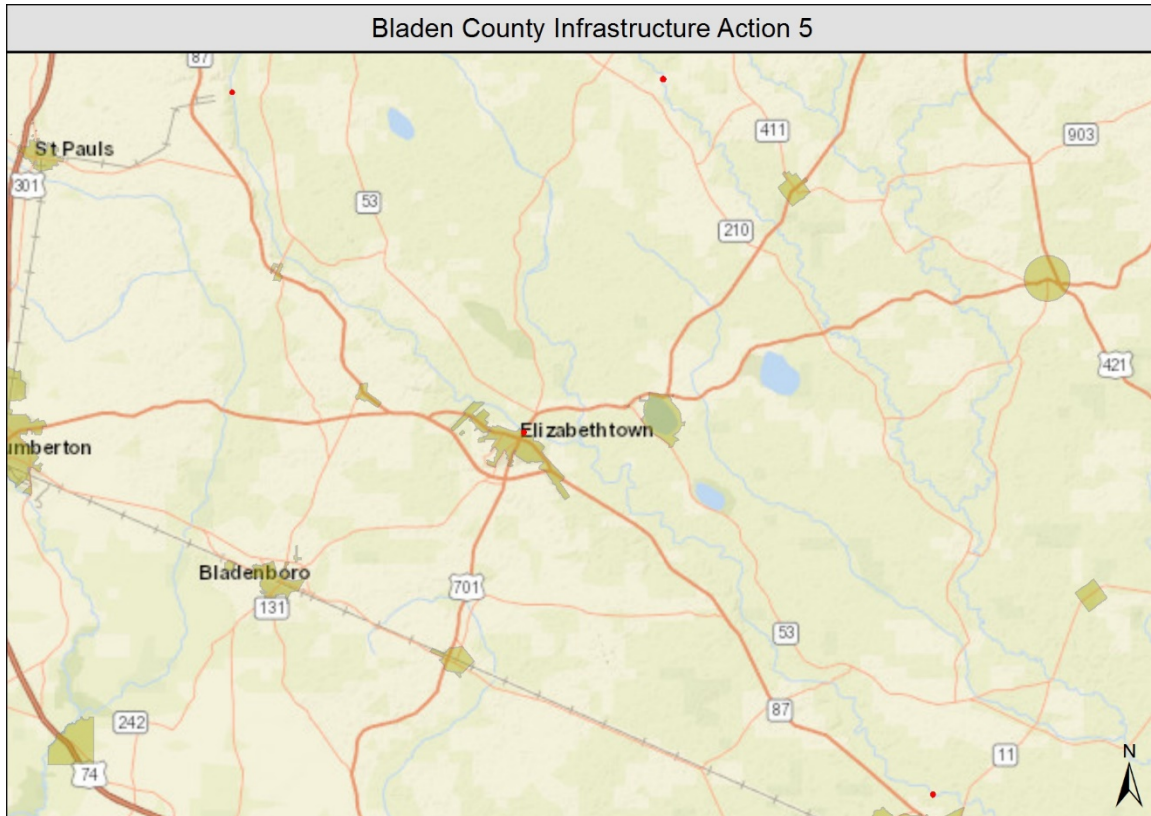
- Address physical components like infrastructure and buildings to make structures 'move-in ready' with façade and basement foundation improvements as well as modern utilities and stormwater improvements
- Floodproofing or other resilience strategies for businesses
- Campaigns, strategies, and incentives to attract needed businesses
- Public amenities - wayfinding, sidewalks, bicycle, transit stops and street furniture

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Power loss was probably the major concern in Bladen County after the storm. Many critical facilities went down along with many homes causing residents to need to evacuate to shelters. Unfortunately these facilities also lost power and so backup power is critical at the shelters. This is perhaps the primary project the community would like implemented.	N/A
Consistent with existing plans (describe points of intersection/departure)	Providing consistent power to critical facilities such as shelters is a critical goal of local government and thus is consistent with all local 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.	If Microgrids and additional substations are solution these allow for greater economic development and Downtown Revitalization by introducing an attractive alternative power source for businesses located near the facility housing the Microgrid.	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)?	>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?	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?	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

- **IN5 - Stream Gauges, Early-Warning System, and Communication Network for Operators:** Install additional stream gauges along South River and Cape Fear River (specifically at the Elizabethtown Bridge) to assist with more accurately predicting water levels, especially during a high rainfall event. The 3 existing stream gauges also need to be upgraded so they can be tied into the North Carolina Flood Inundation Mapping and Alert Network (FIMAN), a state-operated flood risk warning system.



**Figure 22. Stream Gauges, Early-Warning System, and Communication Network for Operators**

## IN5- 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)

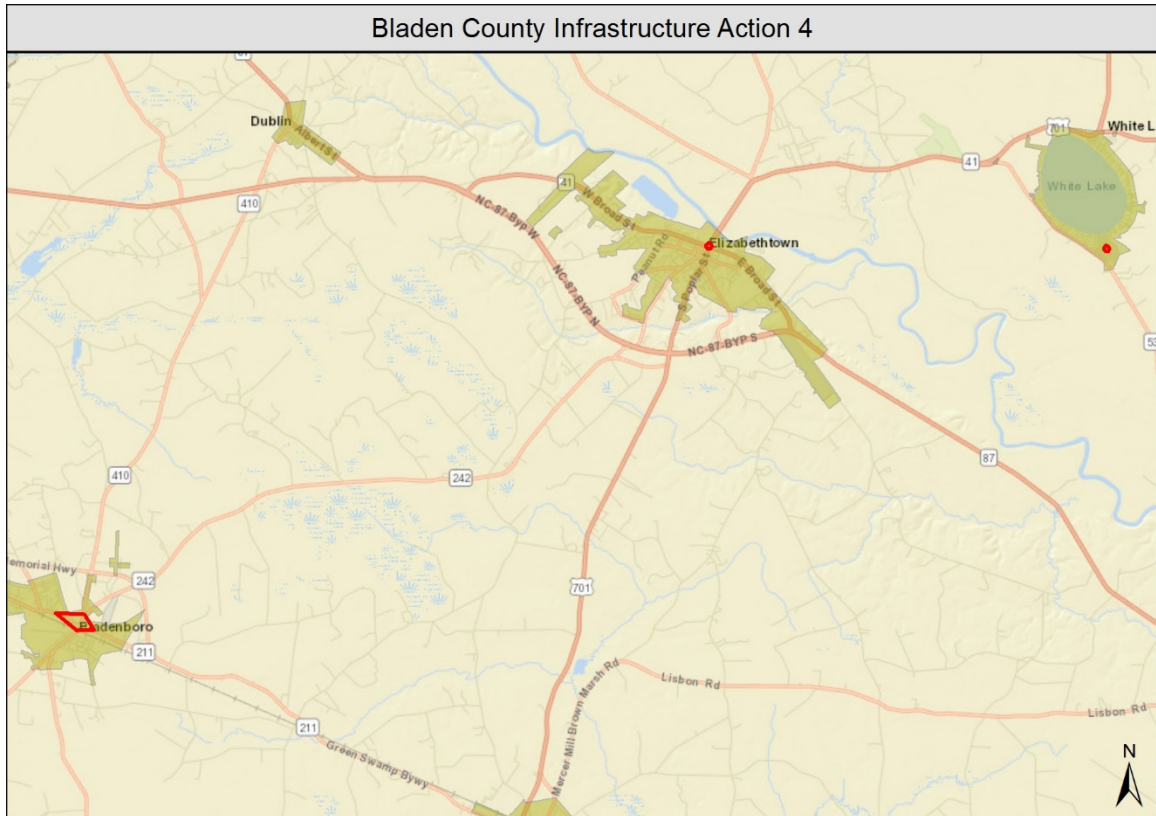
**Project Summary:** Problem: Flooding in extreme weather events compounded by dam breaks can result in rapidly rising water levels over relatively short periods of time. Residents can go to sleep only to be awakened by flood waters entering their house when evacuation and rescue is much more problematic. 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	In general a better understanding of water bodies will be	N/A

result from this project?	gained and releases can be better coordinated to ensure less intense impacts to aquatic and riparian ecosystems.	
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

- **IN4 - Stormwater Management Analysis and System Upgrades:** Perform Hydrologic and Hydraulic (H&H) study to determine capacity needed for effective stormwater drainage design in White Lake, Bladenboro and Elizabethtown. Upgrade stormwater drainage system to accommodate existing and future development. Develop a stormwater management plan for Main Street near White Lake, where parking lots and downtown areas flood during high rain events.



**Figure 23. Stormwater Management Analysis and System Upgrades**



## IN4- Stormwater Management Analysis and System Upgrades

**County:** Bladen

**Priority Grouping:** High Priority

**Priority Ranking:** 2

**Project Timeframe:** 1-3 years

**Location:** Main Street and surrounding areas in White Lake (12 block area), Main Street and surrounding areas in Bladenboro (12 block area), Main Street and surrounding areas in Elizabethtown (9-10 block area)

**Project Summary:** Problem: A large portion of damage experienced during Hurricane Matthew resulted from a failure of the stormwater system or lack thereof. The area around White Lake is very flat and currently has no stormwater management system. In Bladenboro, the drainage ditch system maintenance laterals to Bryant Swamp are also an issue. In all three communities, stormwater infrastructure is extremely old or is only a roadway drainage system. Heavy rains consistently cause roadway flooding. Strategy: Perform H&H study to determine capacity needed for effective stormwater drainage design in White Lake, Bladenboro, and Elizabethtown. Upgrade stormwater drainage system to accommodate existing and future development. Perform a flood study analysis and develop a stormwater management plan for Main Street near White Lake, where parking lots and downtown areas flood during high rain events.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Stormwater issues were a commonly identified cause of many of the flooding issues during Matthew and from other previous storm events. Addressing underlying stormwater management systems will be able to drastically reduce flood risk in these communities many of which only have street level infrastructure.	N/A
Consistent with existing plans (describe points of intersection/departure)	Stormwater systems in all communities are outdated and aging and local officials have actions in all plans to try to upgrade and improve these systems. Therefore this action is consistent with all 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.	Upon completion of the analysis the county will be able assess and consider projects i.e. drainage upgrades storm water management planning and dam upgrades/removal. 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?	50-100 year event	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?	Between 26 and 50%	Agree

What impacts to the environment of the county will result from this project?	Sedimentation and lower water quality are environmental hazards and these will be reduced through this action	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?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Local	Agree

- **IN3 - Roadway/Bridge/Culvert Improvements:** Upgrade roadway/bridge/culvert locations identified by local officials and residents:
  - Martin Luther King Jr. Drive roadway
  - Elizabethtown downtown area, off Main Street roadway
  - NC Highway 242/701 roadway
  - E. Broad Street roadway
  - NC Highway 53 roadway
  - Several roadways along NC Highway 131 in the Black Swamp area
  - Several primary roadways in Bladenboro’s downtown area
  - White Oak roadway & bridge, around the intersection of NC Highway 53 and River Road
  - NC Highway 242 roadway, just south of Old Fayetteville Road roadway & bridge
  - Longview Road roadway, between NC Highway 11 and Hunts Bluff Road
  - NC Highway 11 roadway, between NC Highway 210 and heading south to Columbus County line
  - Braxton Edge Road roadway and bridge, just south of Old Fayetteville Road
  - NC Highway 41 roadway and culvert, just east of White Lake
  - NC Highway 210 bridge, just north of intersection with NC Highway 41
  - Rosindale Road roadway, just south of Lisbon Road
  - River Road along the Cape Fear River
  - N. Main Street bridge in Bladenboro
  - Martin Luther King Jr. Drive bridge just west of Village Street in Bladenboro
  - Martin Luther King Jr. Drive bridge at intersection with Hester Street in Bladenboro
  - Martin Luther King Jr. Drive bridge just southeast of Main Street in Bladenboro
  - Martin Luther King Jr. Drive bridge at Grief Street in Bladenboro
  - Martin Luther King Jr. Drive bridge northwest of Ashe Street in Bladenboro
  - Butler Mill Road culvert south of Edwards Avenue

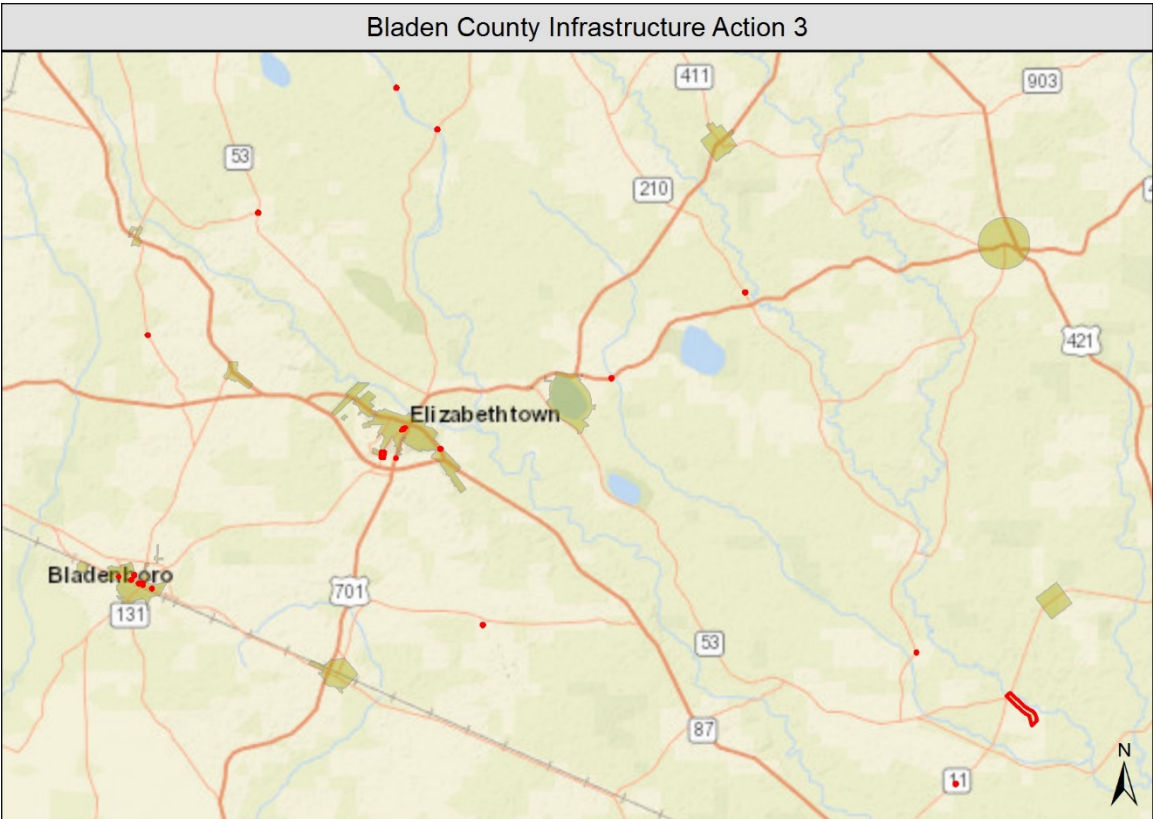


Figure 24. Roadway/Bridge/Culvert Improvements

## IN3- Roadway/Bridge/Culvert Improvements

**County:** Bladen

**Priority Grouping:** High Priority

**Priority Ranking:** 4

**Project Timeframe:** 1-3 years

**Location:** Numerous locations, see project summary below

**Project Summary:** Problem: Roadways and road crossings (bridges and culverts) were inundated with water and damage occurred to structural components impacting overall integrity of the structures. These issues occurred due to high rains during Hurricane Matthew, but these infrastructure elements are also impacted during more frequent (2-3/year) significant rain events. All of the roads identified above are two lane roads.

Strategy: 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. A list of frequently flooded structures is below. Many were impacted by Hurricane Matthew.

Road Name Roadway/Bridge/Culvert Length/Span/Size\*

Martin Luther King Jr. Drive (Elizabethtown) Roadway L=125 feet roadway washout (area 1)  
L=0.25 miles (area 2)

Main Street (Elizabethtown) Roadway Downtown Parking Lot

Highway 242/701 Roadway L=0.3 miles

E. Broad Street Roadway L=0.3 miles

Several roads along Highway 131 Roadway L=0.4 miles

Several primary roads in downtown Bladenboro Roadway L=0.2 miles

Highway 53 and River Road intersection Roadway/Bridge L=90 feet

Highway 242 south of Old Fayetteville Road Roadway/Bridge L=90 feet  
W=35 feet

Longview Road between Highway 11 and Hunts Bluff Road Roadway L=1.2 miles

Highway 11 between Highway 210 and south to Columbus County line Roadway L=5.8 miles

Braxton Edge Road just south of Old Fayetteville Road

Roadway/Bridge L=154 ft

W=30 ft

Road Name Roadway/Bridge/Culvert Length/Span/Size\*

Highway 41 east of White Lake Roadway/Culvert L=50 feet (culvert1)

W=12 feet (culvert1)

L=50 feet (culvert2)

W=34 feet (culvert 2)

Highway 210 north of intersection with Highway 41 Roadway L=0.3 miles

Rosindale Road south of Lisbon Road Roadway L=100 feet

River Road along the Cape Fear River Roadway L=5 miles

N. Main Street in Bladenboro Bridge L=150 feet

W=32 feet

Martin Luther King Jr. Drive just west of Village Street in Bladenboro Bridge L=76 feet

W=31 feet

Martin Luther King Jr. Drive at intersection with Hester Street in Bladenboro Bridge L=30 feet

W=21 feet

Martin Luther King Jr. Drive just southeast of Main Street in Bladenboro Bridge L=37 feet

W=36 feet

Martin Luther King Jr. Drive at Grief Street in Bladenboro Bridge L=37 feet

W=20 feet

Martin Luther King Jr Drive northwest of Ashe Street in Bladenboro Bridge L=55 feet

W=33 feet

Butler Mill Road south of Edwards Avenue Culvert L=30 feet

W=21 feet

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane	Many roads and bridges flooded during Matthew and the cost to repair was sometimes covered but not in all cases and	N/A



Matthew.	often only to repair back to the same standard at which these roadways were flooded. As such an unmet need that still exists is to bring those flooded roads/bridges up to a higher elevation or build them to a higher standard so that future flood risk is reduced.	
Consistent with existing plans (describe points of intersection/departure)	Roadway improvements are consistent with both state and local plans to strengthen infrastructure and ensure that transportation networks remain in place both during and after storm 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.	More resilient roadways can help reduce the likelihood of disruptions to commerce and transportation routes after a storm event and can help ensure employees and business owners are able to return to work quickly and safely after the storm. (Economic Development)	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)?	>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?	Unknown	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?	Minimal impacts to the environment would result from this strategy especially considering these roads are already in place and would have relatively small impacts on surrounding environment during reconstruction/elevation.	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?	Higher than 75%	Agree
Who will administer this project?	State	Agree

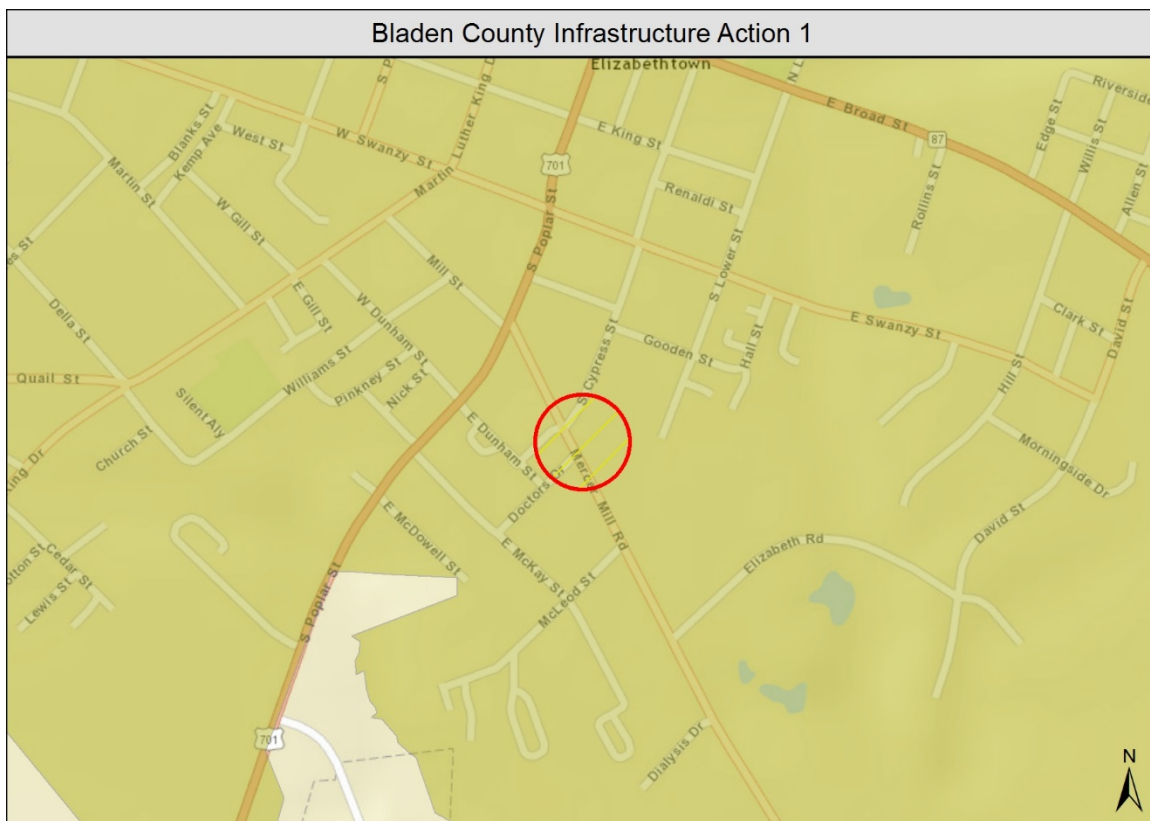
## Medium Priority Infrastructure Strategies

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	IN1- Critical Facility Protection/Hardening/Relocation	Medium	

**Table 12. Bladen Medium Priority Infrastructure Summary**

This project represents the infrastructure strategy that Bladen County indicated is of a medium priority to address. Additional detail can be found below:

- **IN1 - Critical Facility Protection/Hardening/Relocation:** Rebuild Elizabethtown Emergency Medical Services (EMS) building on current site with a higher level of protection through retrofitting or relocate structure to a safer site.



**Figure 25. Critical Facility Protection/Hardening/Relocation**

## IN1- Critical Facility Protection, Hardening, and Relocation

**County:** Bladen

**Priority Grouping:** Medium Priority

**Priority Ranking:** 3

**Project Timeframe:** 1-3 years

**Location:** EMS Building in Elizabethtown (Map ID: IN1)

**Project Summary:** Problem: Building has flooded multiple times and insurance is no longer a viable solution to repair for future events. Has been flooded 3-4 times in the last 5-6 years

Strategy: Rebuild on current site to higher level of protection, relocate structure, or flood proof existing structure. County is in negotiations with FEMA to determine the best option to proceed. This project is under consideration for Public Assistance funding but has not been approved. The building is 5,000 sq ft but could be relocated into a facility that is 2,500-3,000 sq ft. It is important that, if relocated, the new facility remain close to its current location as this will be needed to maintain the service area.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	This facility flooded during Matthew and has flooded during many other storm events and so protecting it or moving to a new location would have a large positive impact for the community and although some funding sources have been tossed around as ideas previously this project has not yet been funded.	N/A
Consistent with existing plans (describe points of intersection/departure)	All local emergency plans and mitigation plans have a focus on protecting critical facilities and since this is a key critical facility it is consistent with local 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.	By implementing this project the county will be able to provide ongoing necessary EMS services to the community during an event – as the structure will no longer be at risk and will be able to function and provide services during and after an event.	Agree
For how long will this solution be effective?	More than 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)?	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	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?	None	N/A
What is the capability of the local government to administer this project?	Medium	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

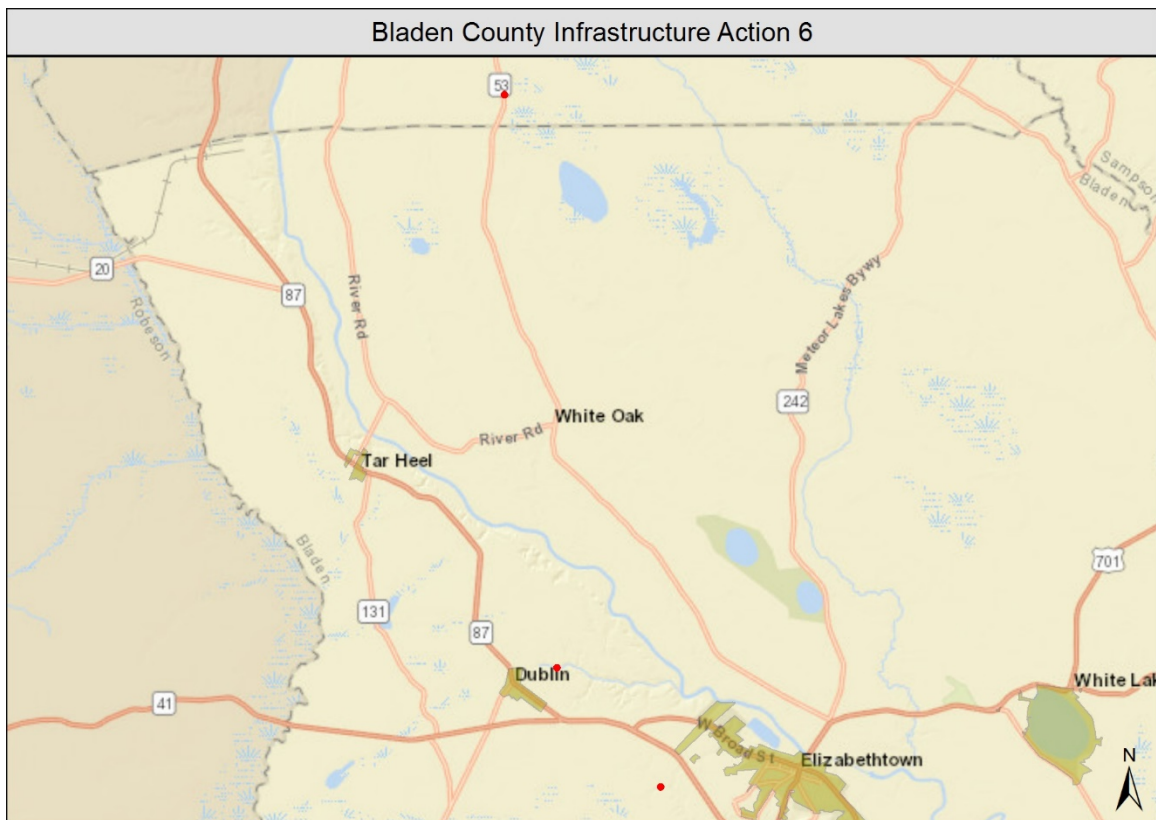
## Low Priority Infrastructure Strategies

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	IN6- Dam Analysis and Modification	Low	

**Table 13. Bladen Low Priority Infrastructure Summary**

This project represents the infrastructure strategy that Bladen County indicated is of a lower priority to address. Additional detail can be found below:

- **IN6 - Dam Analysis and Modification:** Modify and upgrade dams located near Cromartie Road, on NC Highway 53 north of county line, and near the Dublin race track. During Hurricane Matthew, these dams failed and caused downstream flooding.



**Figure 26. Dam Analysis and Modification**



## IN6- 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

## Environmental, Ecosystem and Agricultural Strategies

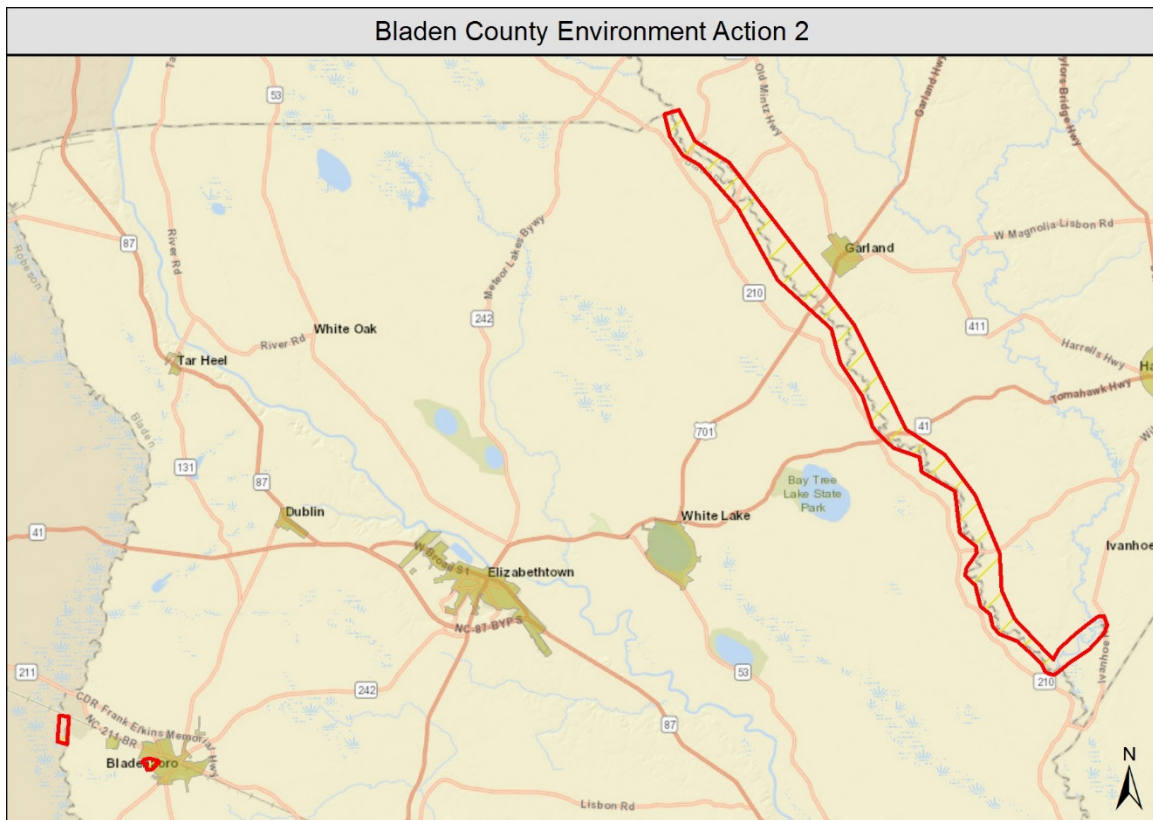
### High Priority Environmental Strategies

Pillar	Action Name	Priority	Overall Ranking
Environment	EN2- Stream Restoration	High	2

**Table 14. Bladen High Priority Environmental Summary**

This project represents the environmental strategy that Bladen County indicated is the highest priority to address. Additional detail can be found below:

- **EN2 - Stream Restoration:** Perform stream restoration activities such as debris removal, beaver dam removal, streambank stabilization, and undoing channelization to decrease backup of water and flood risk for South River, Black River, Big Swamp, Bryant Swamp Channel and areas around Bladenboro.



**Figure 27. Stream Restoration**

## EN2- 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

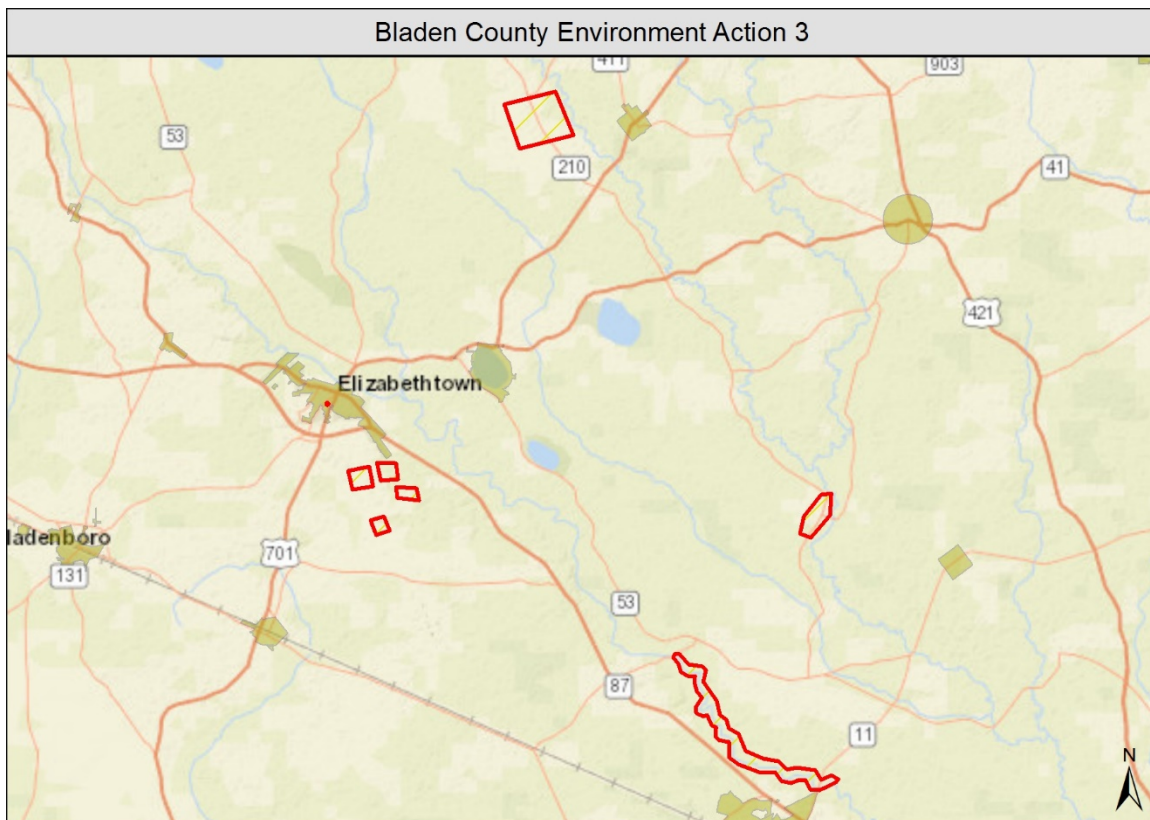
## Medium Priority Environmental Strategies

Pillar	Action Name	Priority	Overall Ranking
Environment	EN3- Floodplain Mapping Studies	Medium	

**Table 15. Bladen Medium Priority Environmental Summary**

This project represents the environmental strategy that Bladen County indicated is of a medium priority to address. Additional detail can be found below:

- EN3 - Floodplain Mapping Studies:** Revise current special flood hazard areas (completed in 2007) in specific at risk areas in the county to include: Kelly Dam, NC Highway 210, reaches south of Elizabethtown between Rosindale Road and Airport Road, and Brown’s Creek Watershed through Elizabethtown to accurately reflect the risk to structures (especially impacts from upstream dam failure). Ensure that uncertified (or privately-owned) dams are included in the risk assessment.



**Figure 28. Floodplain Mapping Studies**



## EN3- Floodplain Mapping Studies

**County:** Bladen

**Priority Grouping:** Medium Priority

**Priority Ranking:** 2

**Project Timeframe:** 1-3 years

**Location:** Highway 210 in several areas, the reaches south of Elizabethtown between Rosindale Road and Airport Road, Brown's Creek in downtown Elizabethtown, and around Kelly Dam/Dike and downstream

**Project Summary:** Problem: Current SFHAs are outdated and have not been updated since 2007. 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 (especially impacts from upstream dam failure).

Strategy: 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 FIRM were approved. Localized analysis should assist the community in better planning and mitigation of future damages.

- Hydrologic and Hydraulic Studies
- Floodplain Mapping
- Detailed Studies
- Additional Modeling

State NFIP representative indicated that work maps have been completed and preliminary DFIRMS are under development. Concerns may arise as to whether uncertified (or privately-owned) dams are included in the risk assessment.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Many of the flood problems from Matthew were in homes/businesses that were located outside of identified flood hazard areas. As such it would have been difficult to prevent this damage and local officials have noted that many of these areas have never been studied or mapped so additional mapping info would be useful for future development efforts.	N/A
Consistent with existing plans (describe points of intersection/departure)	Many local ordinances base regulations on the identified areas of floodplains and so when flood areas are not mapped properly this can cause problems with implementing these ordinances. As such having up to date flood maps is critical.	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.	Jobs and businesses will benefit from better floodmapping as this will help them better understand their risk and avoid development in areas where they are most prone to flooding.	Agree
For how long will this solution be effective?	Less than 10 years	Agree
How effective is the risk reduction?	>200 year event	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?	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?	Better understanding of where natural areas should be preserved because of their location in the floodplain.	N/A
What is the capability of the local government to administer this project?	Minimum	Agree
What is the financial range of this project?	\$501K - \$1M	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

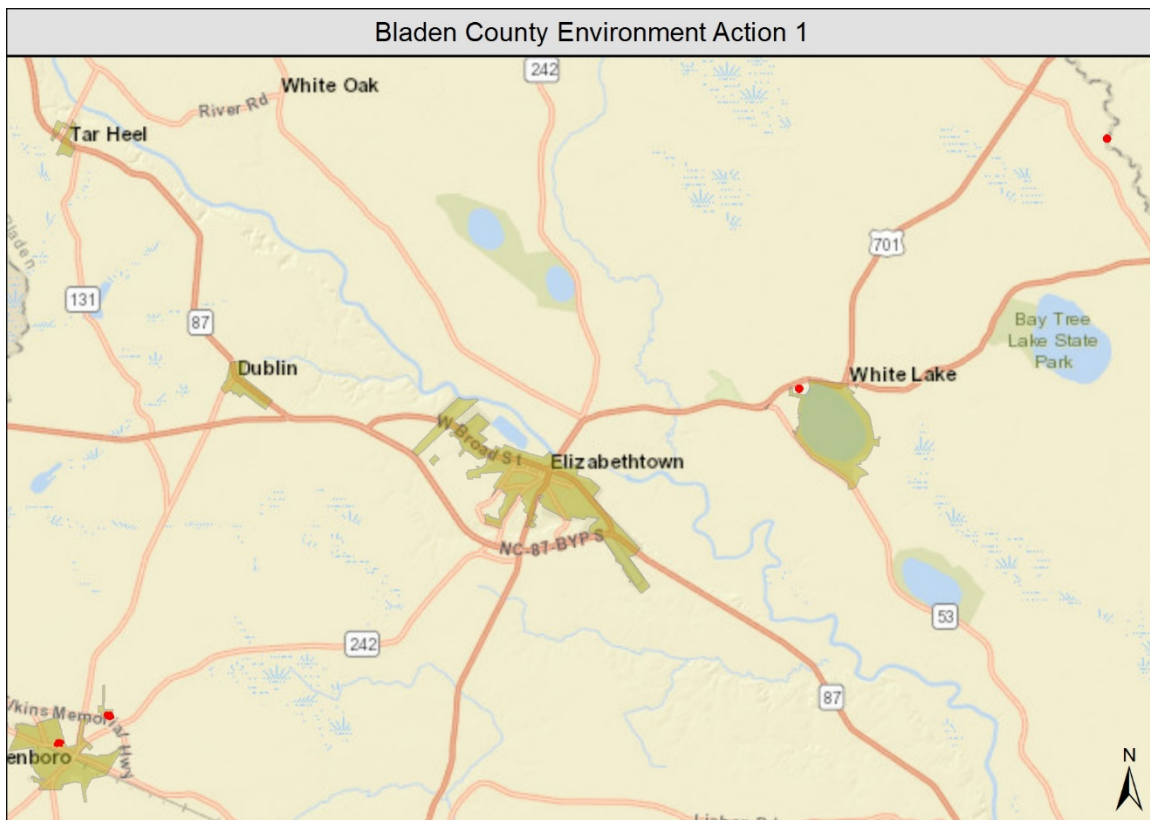
## Low Priority Environmental Strategies

Pillar	Action Name	Priority	Overall Ranking
Environment	EN1- Recreational/Open Space Additions and Enhancements	Low	

**Table 16. Bladen Low Priority Environmental Summary**

This project represents the environmental strategy that Bladen County indicated is of a lower priority to address. Additional detail can be found below:

- **EN1 - Recreational/Open Space Additions and Enhancements:** Create a new 3 to 4 acre park and recreational area in White Lake to also serve as drainage relief during heavy rainfall events. The city has identified a potential location on State owned land with ease of access to the 7-mile trail currently under development. Expand and enhance two parks in Bladenboro: Wateree Park (currently 5 acres) and McLean Park (currently 7 acres).



**Figure 29. Recreational/Open Space Additions and Enhancements**

## EN1- Recreational/Open Space Additions and Enhancements

**County:** Bladen

**Priority Grouping:** Low Priority

**Priority Ranking:** 3

**Project Timeframe:** 3-5 years

**Location:** New Trail System and Recreational Facility in the Town of White Lake, Wateree Park Expansion in Bladenboro, McLean Park Expansion in Bladenboro (Map ID: EN1)

**Project Summary:** Problem: Flooding due to stormwater that could be mitigated with additional pervious surface area. Repetitive flooding, road washouts, and residential access are major issues.

Strategy: Create a trail system around White Lake which is about 7 miles around. Also add a new recreational area northwest of the lake on existing state-owned land (3-4 acres) to serve as drainage relief during heavy rainfall events and supplement this with a parks facility. Expand and enhance Wateree Park (5 acres) and McLean Park (7 acres) in Bladenboro. Additional options for further carrying out this strategy include:

- Assess viability of parks, recreation areas, sports fields, and trails along the lake or near the lake for biking and running.
- Identify what positive effects this may have to stormwater management and potential flood risk reduction through increased pervious surface area.
- Consider green infrastructure to revitalize area – rain gardens with indigenous plants – highlight local aspect, increasing property values.
- Assess potential economic benefits for surrounding communities – bringing people back to downtown commerce areas and White Lake 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.	Additional open space can act as pervious surface area that allow for more filtration of potential floodwaters and also potentially removes areas that are at risk to flooding from further development thereby reducing risk.	N/A
Consistent with existing plans (describe points of intersection/departure)	Local parks and recreation plans are already in place and moving towards creating/expanding these parks. However funding has been an obstacle. Nevertheless this project is consistent with all local 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.	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?	More than 50 years	Agree
How effective is the risk reduction?	<50 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 26 and 50%	Agree
What impacts to the environment of the county will result from this project?	This project is focused on increasing and enhancing open space which naturally lends itself to environmental benefits.	N/A
What is the capability of the local government to administer this project?	High	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?	Local	Agree

## 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 the 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.