



US 70 Corridor Commission

DIRECTOR'S REPORT M. DURWOOD STEPHENSON, DIRECTOR FOR MONTHS OF JANUARY & FEBRUARY, 2018

The great German poet, Rainer Maria Rilke wrote, "**And now we welcome the new year, full of things that never have been.**" We entered January, the new year before us, with the promise of a new beginning, but faced with challenges of the past that continue to plague us.

January brought the winds of a harsh winter: a record eight (8) consecutive days of subfreezing temperatures, snows that covered the State – even our sandy beaches with high winds that left many without power to generate our convenience appliances. In summary, a more difficult winter month than we are accustomed.

January also saw the winds of change escalate with new technology, changing demographics and as renowned author Richard Hass, wrote in his book A WORLD IN DISARRAY: "**Globalization is not a choice, but a reality.**" Competing in a global economy requires innovation and adaptation. In order for the United States to compete globally, we must be significantly more productive in order to offset lower wages in competing global markets.

As we continue the focus on January, in addition to the activities and events in which we as a region are deeply enmeshed, there were rare celestial events that despite our false sense of self-importance, were beyond our grasp and influence, the phenomenon of a super moon, blue moon and total lunar eclipse all taking place simultaneously: A rare spectacular visual presentation, last observed in 1866. As we gaze at the skies, we must be dazzled by the universe's orderly progression on its own course, recognizing our smallness and chaos living among such order.

Aside from the preponderance of the vastness of occurrences totally outside our scope, January witnessed several notable infrastructure achievements that are in concert with our agenda and resulted from human thought and effort:

- | | |
|-------------|---|
| January 24: | FERC (Federal Energy Regulatory Commission) approved permits allowing construction start to remove trees in Virginia and West Virginia along Atlantic Coast Pipeline (ACP) route. |
| January 26: | Governor Cooper announced State approval of ACP permits to allow tree "felling" in North Carolina. |

M. Durwood Stephenson
Director

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January 28:	Gallants Channel Bridge opened to public accepting traffic – ahead of schedule.
January 29:	Environmental Permits from NCDENR were approved and released allowing ACP to proceed in our State.
Havelock Bypass:	Negotiations with SELC are continuing with final resolution anticipated in late February or early March 2018.
Broadband:	NCDOT and consultant, AECOM are applying for a grant to provide Broadband along I-95 and U.S. 70 (I-42) another necessary infrastructure tool for developing our region.

January's nature continued to impact us. Our meeting scheduled for January 18 in Johnston County was rescheduled because of snow.

In a **WALL STREET JOURNAL** article on January 22, the reporter, Valerie Bauerlein reminded us again of the urban/rural divide and made a case for the region to support the Atlantic Coast Pipeline. As noted in the article, North Carolina is the second most rural state in the United States behind only Texas – continuing

“Unemployment is higher in the rural areas, while education levels are lower. The State’s 80 rural counties saw a 3% decline in taxable wages in the past decade, compared with 6% growth in the 14 suburban counties and 15% growth in the 6 urban counties, as reported by The Rural Center.”
“Many rural counties in the eastern part of the State are 40 miles from a natural gas line, a non-starter for manufacturing corporations.”
Another infrastructure tool that plagues our region. I deeply appreciate the strong advocacy of the elected officials, citizens and interested participants of our region. The countless Resolutions have been forwarded to appropriate persons, and groups.

In a January meeting of Greater Raleigh Chamber of Commerce, Mark Vitner senior economist, Wells Fargo Bank noted, **“The Triangle (Raleigh-Durham) and Charlotte have accounted for about 70 percent of North Carolina’s economic gains since the last recession.”** Forty percent (40% of all new jobs) since the recession were created in just two (2) counties: Wake and Mecklenburg.

Escalating inequality of our rural communities where poverty rates are high and growing and education levels are low has created a crisis that places rural America on the brink of extinction as hope falters and out-migration of the young population is alarming.

In a telephone interview with Tony Pew, Reporter for Charlotte Observer, on February 2, in response to his inquiry, I described the U.S. 70 Corridor Commission and the reason for our support of the Atlantic Coast Pipeline.

My response for ACP support and follow-up email are as follows:

The Atlantic Coast Pipeline is fully supported by most economic development interests in Eastern N.C. More than 80% of all property owners being impacted by the pipeline have already signed easements supporting the pipeline construction.

In addition to more than 4,400 jobs during pipeline construction, there are a large number of manufacturing companies that have expressed interest in locating in Eastern N.C. if natural gas is available. Natural gas is an efficient, cheaper source of energy for farmers, homes and economic development opportunities.

The pipeline is an invaluable infrastructure tool necessary to economic development. Although there is some opposition to the pipeline, a majority of the opposition comes from hard-line environmentalists who also oppose roads, electrical power lines, broadband and other infrastructure installations. It should also be noted a majority of the opposition comes from outside our region.

The environmental impact has been carefully scrutinized by several states, agencies and Federal authorities. All have concluded it is safe with minimal environmental impacts.

Admittedly there are some local property owners voicing opposition – but all are citing personal attachments to land or negotiating land acquisition pricing and not embracing the greater good for the region.

In addition to the countless benefits and economic opportunities, our rural counties will receive significant new tax revenues – more than \$ 28 million annually. Dollars that can be utilized to fund education, water, sewer and other benefits that will improve the quality of life in rural North Carolina.

I have offered my opinion on ACP support, but suggest to you that one of the best arguments for supporting the Atlantic Coast Pipeline was written by Harvey Schmitt former President and CEO of the Raleigh Chamber of Commerce written in 2016 is attached.

February's focus has been continuing U.S. 70/I-42 projects: Wilson's Mills, Pine Level, Princeton, Havelock, Kinston and James City. The large proposed interchange at U.S. 70/I-42 and I-95 in Johnston County has garnered much attention – probably a bit premature to become overly anxious with this project now.

Other notable concerns and effort include the Neuse River Flood Mitigation Study (Copy of presentation of February 27 meeting attached); the Atlantic Coast Pipeline and the need to fund taps and distribution; and the quiet, but persistent efforts of NCDOT Secretary, General Trogon and Chief of Staff, Bobby Lewis to continue the dialogue and promise of the CSX Intermodal HUB. We have continued our support of Food Commercialization Center in Ayden and are pleased to report there is progress. Hopefully, we will have a report on that progress at our May meeting.

After weather forced us to delay our planned Corridor Commission meeting in January, we were able to meet in Smithfield on February 22. The agenda included several significant topics of interest. I will not attempt to provide specifics that will be provided by Jennifer with meeting minutes. Pryor Gibson, recently appointed Director of Governor's Rural Initiatives, labeled Hometown Strong offered some insights on planned strategy to energize and support rural plans and programs. (See Attached Data)

During the past several months, there have been escalating chatter about Rural Initiatives and Economic Opportunity Zones. In recent days and discussions as I have learned more, I have become less enthusiastic about the prospects of the Economic Opportunity Zones and opportunities for rural North Carolina. Therefore, it is incumbent upon us to continue to seek solutions to our dilemma and to find solutions to restore our declining economic base and opportunities. Unfortunately, there are no funds to assist development – only a 10-year tax credit to be provided to developers investing funds. As we are aware, developers are more likely to make investments in more active zones i.e., Raleigh and surrounding towns. It appears there is little opportunity for rural Eastern North Carolina with this particular program, but we will find a way to become a participant in the global economy utilizing our historical trends, assets in a new technology age.

The skills and experience of our rural population makes us an obvious choice to participate in the necessity of feeding an expanding population. The United Nations estimates that by 2050 nearly 10 billion people will inhabit the planet. This population explosion is going to require more efficient methods for growing, processing and distributing food.

With a decline in number of farms and agricultural work force, the obvious path to success and enabling the farm productivity to feed the world's booming population lies in new technology. Technology is reshaping agriculture, manufacturing, construction and logistics. We have been exposed and amazed at 3D printers, robotics and artificial intelligence.

New technology dramatically impacts our daily lives and living habits affecting:

Entertainment Venues

Travel Modes

Eating Habits

Shopping

Pleasure

Rearing our children

Security

How we observe the world in which we live and how we react to it

Autonomous driving is closer than most of us think and will dramatically change travel in the future. Transportation leaders are already planning the future. Road building must be in concert with land planning; i.e., charging stations, high speed travel and housing patterns – especially housing seniors will be markedly different from the past.

Nissan is developing a futuristic car that will read your brain waves and react to your thoughts. The driver wears a skull cap with electrodes connecting the driver to the vehicle – allowing the vehicle to anticipated movements by reading driver thoughts. This vehicle is scheduled for release in 2022.

Futuristic trends are already a part of the younger culture accepting new technology that awes those of us of mature age.

In a recent dinner conversation with a couple of "Dookies" (Duke University graduates), one explained a research project developing self-driving vehicles and the task of developing artificial intelligence to complete the autonomy of the vehicles: distinguishing between a pot-hole and a plastic bag; distinguishing between a turtle and a cell phone. In a follow-up conversation with General Trogon he says one of the most emotional tasks in distinguishing between frogs and leaves – an understandable dilemma.

My mind cannot comprehend the future and the changes evolving technology is promising us how different our world will become – hopefully better – but not a certainty. In order to emerge economically, rural North Carolina must embrace new technology Feeding growing world population is one of the benefits.

Local noted **News & Observer** editor, Jonathan Daniels: wrote decades ago, **“We have traditions which are precious to us – and a destiny worthy of the best in our powers as in our past. We shall not find the way into the future easily – I find no easy roads for most people running through the past.”**

I guess the message, more apropos today than when written decades ago is look to the future and do not wallow in the past.

POINT OF VIEW: ATLANTIC COAST PIPELINE

Eastern N.C. pipeline will spur economy

BY HARVEY SCHMITT

If there is one thing that North Carolinians can generally support it would be positive infrastructure growth that brings a healthier economy to eastern North Carolina.

In my role as a professional economic developer in this state for many years, I've watched the exciting progress in several of the state's population centers, especially the Triangle, Triad, metropolitan Charlotte and Wilmington.

Sadly, little of that growth has spread to the east beyond Raleigh. Our neighbors in this largely rural and agricultural region need help, and they need it quickly.

Soon, welcome help will come in the form of the Atlantic Coast Pipeline, an underground, natural gas pipeline that will run about 200 miles through eight eastern North Carolina counties.

Dominion, Duke Energy, Piedmont Natural Gas and Southern Company Gas are now in the final federal permitting stages for the proposed pipeline. The 600-mile pipeline will span across three states and is expected to be in service by late 2019.

While a small, but vocal group of opponents has recently expressed concern about the pipeline, the overwhelming majority of North Carolina businesses, elected officials, local governments and residents support it.

The positive economic impacts of this project will be significant for eastern



JOHN HAMLIN

A few Johnston County landowners protested the Atlantic Coast Pipeline in 2015. The pipeline could help Eastern N.C.

North Carolina and will improve the lives of thousands of our residents. It is not an exaggeration to say that this project represents the largest capital investment in the economic future of our region in many decades.

For starters, the two-year construction process alone will stimulate almost \$700 million in economic activity and create more than 4,000 jobs across eastern North Carolina. And these aren't just any jobs. These are the good-paying, middle-class jobs that can provide a real future for working families in our communities - welders, pipefitters, equipment operators, to name only a few.

Construction will also generate lucrative opportunities for many local vendors, suppliers and subcontractors - to the tune of tens or even hundreds of millions of dollars over a two-year period. The pipeline company will need to enlist the services of local equipment and concrete suppliers, fencing and truck-

ing companies, vehicle services and hydraulics shops and many more. This kind of project only comes along once in a generation and will breathe new life into many of our local economies.

Over the long-term, having this new energy infrastructure in eastern North Carolina will enable this region to attract new industries, new jobs and additional tax revenues for many years to come. That is especially great news for Northampton, Halifax, Nash, Wilson, Johnston, Sampson, Cumberland and Robeson counties.

Over the first two decades of the ACP's operation, the pipeline is expected to generate \$1.2 billion in capital investment in North Carolina, and electric and gas customers are expected to save more than \$130 million in annual energy costs.

Localities along the pipeline's route also stand to gain a significant amount of new tax revenue from the pipeline. In fact, Dominion and its partners will contrib-

ute about \$28 million in new property tax revenue every single year to cities and counties along the ACP's route, every single year the pipeline is in operation.

Understandably, safety is a concern when it comes to pipelines. However, thanks to regular monitoring and inspection, and the use of redundant safety measures, natural gas pipelines are actually the safest form of energy transportation in our country. It is far safer to deliver natural gas through an underground pipeline, than to transport propane and other energy fuels by rail or truck.

I have learned that more than 72 million American homes and businesses use natural gas every day with very few problems. Pipelines are a safe, normal and beneficial part of the everyday life of millions of Americans. Once construction is complete and the pipeline is buried several feet underground, the surface of the land is fully restored back to its original condition and the pipeline goes pretty much unnoticed. Farmers continue growing crops and pasturing livestock right on top of the pipeline, and wildlife populations continue to flourish.

Communities in eastern North Carolina deserve a brighter and more prosperous future. I'm excited about the possibility of bringing new jobs and new industries to our state, and particularly this region. The opportunity to have millions in new tax dollars will allow necessary public investments to rebuild communities across eastern North Carolina. This region deserves new opportunities, and that's what the Atlantic Coast Pipeline is all about. It's opportunity time for eastern North Carolina. Let's seize the moment.

Harvey Schmitt is the former president and CEO of The Raleigh Chamber of Commerce.

GENERAL 3-YEAR TIMELINE

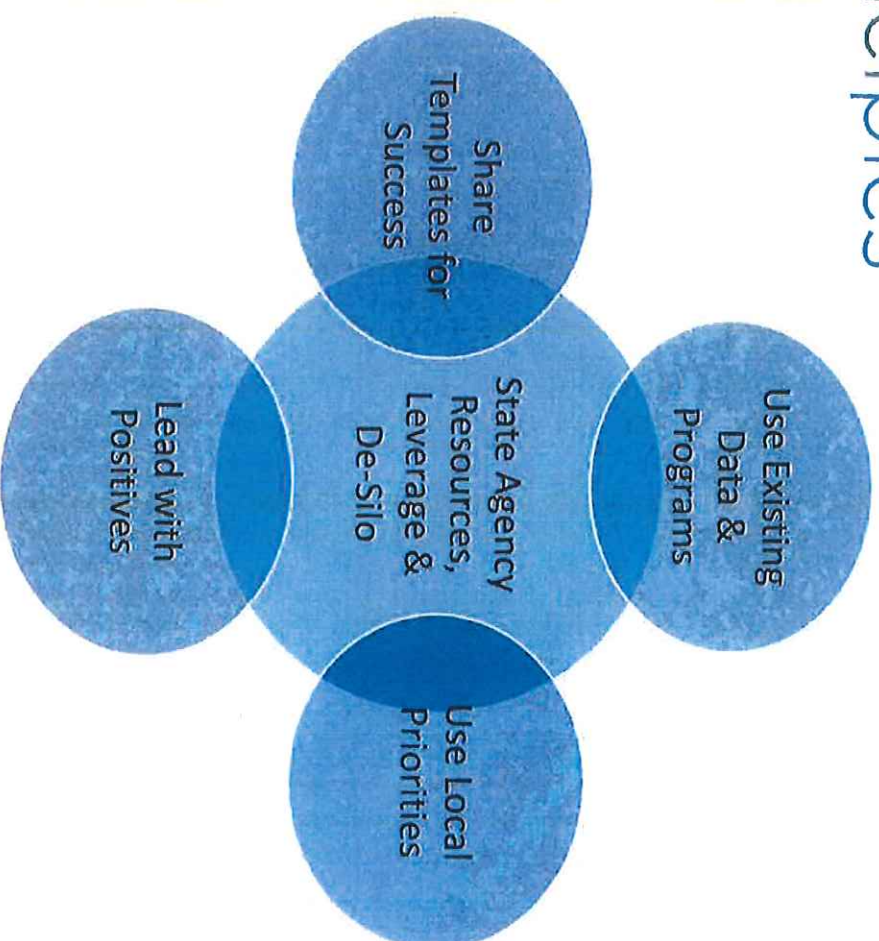
2017	2018	2019	2020
Create Create Rural Action Plan; compile data from published, ongoing sources for baseline & analysis on progress; address flood recovery; attract companies to rural areas through existing programs; identify additional or underutilized state resources for rural areas	Initiate Publicize Rural Action Plan; identify initial counties and roadmap for adding more counties over time; engage local leadership and partners; customize action plans for specific local needs; leverage state resources with cross-agency activity	Templates Expansion Publicize Rural Asset Mapping Tool; publish success models and templates from initial counties; engage additional counties	Sustain Publicize progress on best-in-nation goals & execution; share additional success models and templates; engage additional counties

NEAR-TERM TIMELINE

**HOMETOWN
STRONG**

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
<ul style="list-style-type: none"> • Workgroup into Action Team • Meetings with key local, state, federal, non-governmental organizations, non-profits, & business leadership • Internal prioritization • Tools, website, internal asset development • Soft Build with website development and video shoot 	<ul style="list-style-type: none"> • Meetings with strategic partners at local level and working in rural areas • Asset map building (6-month overall, but prioritize ID of assets for immediate projects) • Action plans on immediate projects customized by locals • Measurement, metrics, benchmarks 	<ul style="list-style-type: none"> • Hard Launch with announcement of initial counties, website launch and local events • Rural Action Team deep dive on customized action plans • Continual updates through communications channels • Begin field outreach 	<ul style="list-style-type: none"> • Field outreach expanded • Local leadership engagement • Partner development • Asset mapping initialized • Focus, cusp & catalyst projects prioritized and timed 	<ul style="list-style-type: none"> • Analysis of Strengths, Weaknesses, Opportunities, & Threats • Field outreach • Local action plans • Partner action plans • Benchmarks & timelines • Field & Focus media opportunities 	<ul style="list-style-type: none"> • Expansion • Catalyst project review • Next focus projects • New leadership groups • Task out additional partners

Core Principles



**HOMETOWN
STRONG**

County Engagement Process

**HOMETOWN
STRONG**

Initial Action Plan

- State Agency Information
- Local Comprehensive Economic & Community Development Priorities
- Layer Map & Alignment
- Establish & empower Communication and Convening

Local Asset Map

- Built Infrastructure
- Natural Resource
- Cultural
- Human & Health
- Financial
- Social & Life Quality
- Planning & Review
- Sustainability & Commitment
- Align w/ State & Fed

Community Connectors

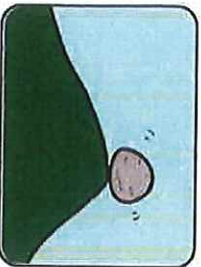
- Inclusion & de-silo
- Review & add value to existing relationships
- add new/broad partners
- Local List Review & Affirm
- Listen, Trust, Act

Custom Action Plan with Locals

- Match assets with opportunities
- ID template & cusp projects for momentum ad share other areas

Types of Projects

**HOMETOWN
STRONG**



Cusp

- Needs a push to make it happen
- Short term



Convener

- Needs to pull all decision-makers into agreement on next steps
- Medium term



Catalyst

- Needs help with momentum
- Long term



Common Themes

**HOMETOWN
STRONG**

- **Broadband**

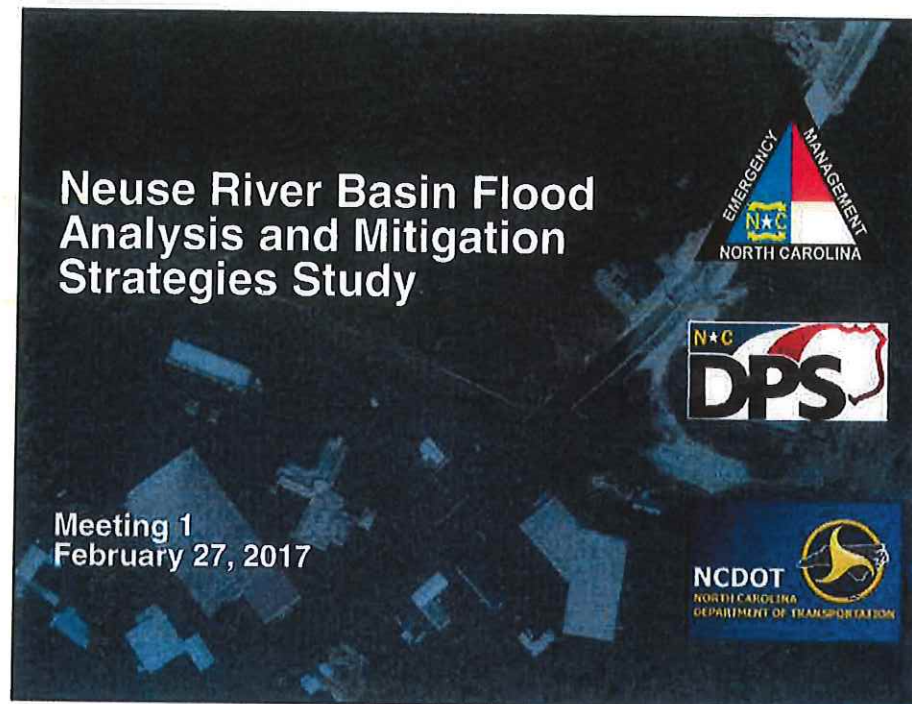
- Education – digital literacy & application; homework gap
- Health – remote/home/regional care
- Business – Up&Down capacity, entrepreneurship, telecommute

- **Workforce**

- Next Generation Jobs – Career Pathways/Ready, Hi Ed options
- Underemployment, Certificate & Reciprocity, Community College
- Veterans, Seniors, Immigration, Existing Business/Entrepreneur aid

- **Infrastructure**

- Water Sewer Roads Bridges BB Variance
- Bldg re-use, Main St.'
- conversations



Flood Study Analysis and Mitigation – Purpose / Partners

The primary purpose / objectives of this project is to:

- Research primary causes and magnitude of flooding
- Calculate the impacts of flood frequencies on: Built Environment; Living Environment; and Economy.
- Identify and Assess Mitigation Strategies
- Assess short and long term benefits to costs of Mitigation Strategies
- Provide Potential Solutions

The Study / project utilizes the following partners to widely communicate results and gain valuable input and feedback:

- NC DPS – Emergency Management
- NC Department of Transportation
- Impacted County Governments and Municipalities
- ACOE
- NC Department of Commerce
- NC Department of Agriculture and Consumer Services
- Engaged Stakeholders and Non-Profits
- Informed: Congressional and Legislative Representatives

Meeting 1 Purpose

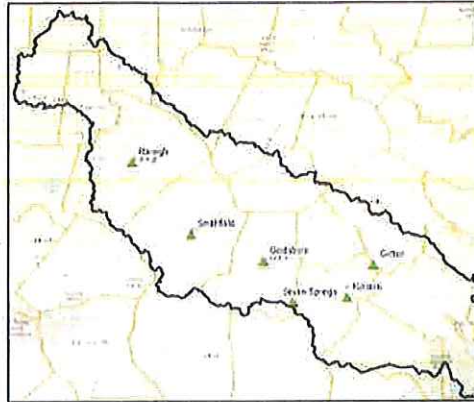
Introduce Study Purpose and Methodology

Provide Basin History and Profile

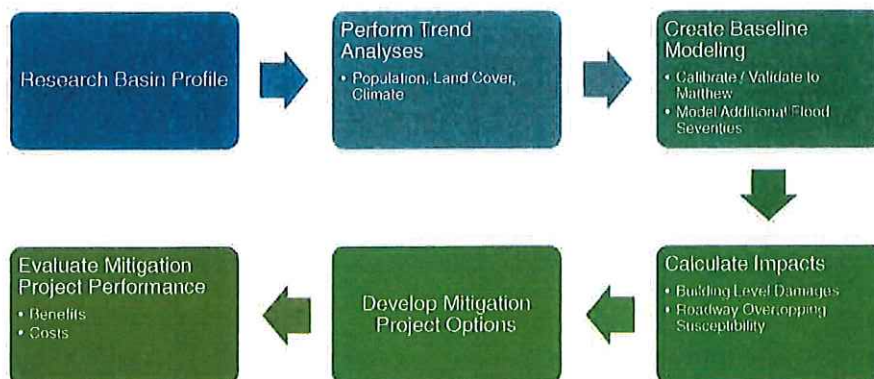
Present Modeling Approach

Provide Flooding Impacts Summary

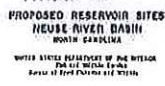
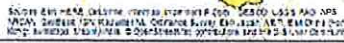
Introduce Potential Mitigation Solutions



Study Methodology

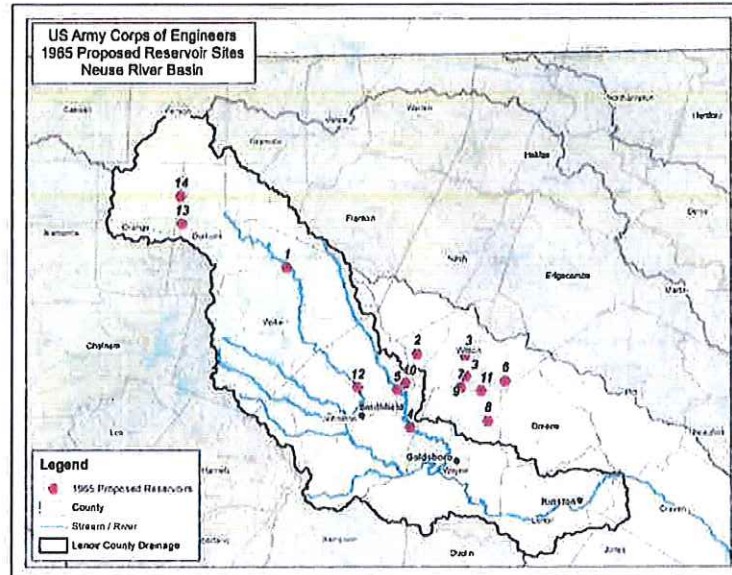


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Falls Lake
Recommended
As the priority

Profile – Historical Studies

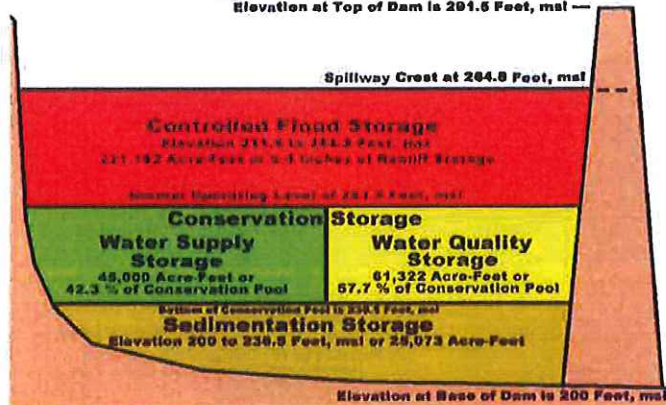


Profile – Falls Lake

Falls Lake – Operating Levels

Falls Lake Project Profile

Elevation at Top of Dam is 291.5 Feet, msl

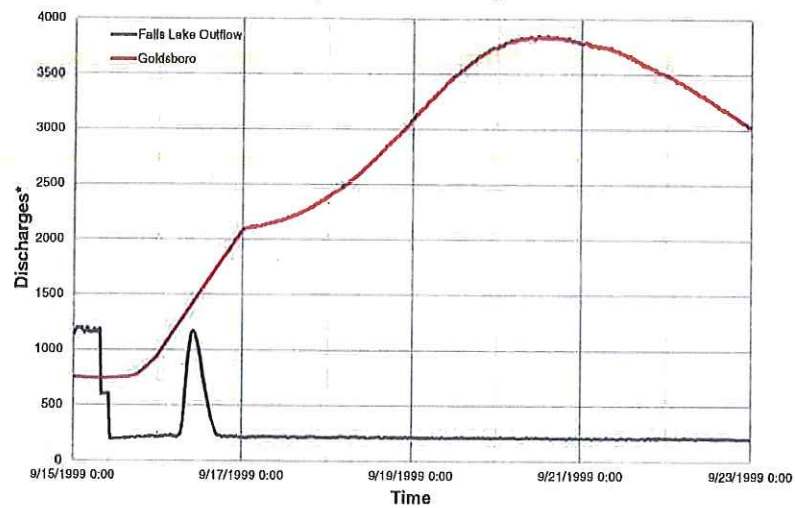


From USACE presentation 9/16/15

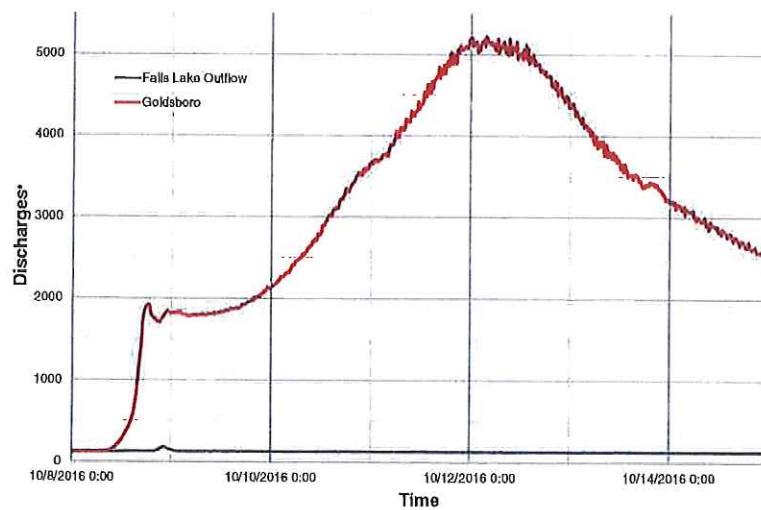
Construction
Completed in 1981

Controls 770 Square
Miles

Controlled Flood
Storage:
221,000 ac-ft.
(5.39 in.)

Profile – Falls Lake: Floyd**Floyd Peak Discharges**

* Discharges at Goldsboro Reduced by a factor of 10 for Scale

Profile – Falls Lake: Matthew**Matthew Peak Discharges**

* Discharges at Goldsboro Reduced by a factor of 10 for Scale

Profile – Falls Lake: Fran

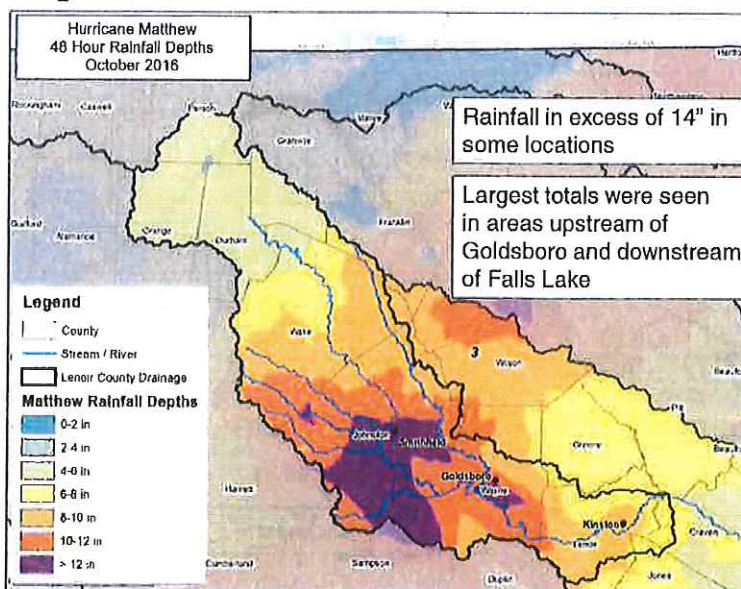
The historic peak discharge from Falls Lake of approximately 7,500 cfs was recorded on September 15, 1996 following Hurricane Fran

Peak discharge at Clayton during Hurricane Fran was 19,700 cfs on September 7, 1996. Falls Lake discharge on this day ranged between 300 and 500 cfs.

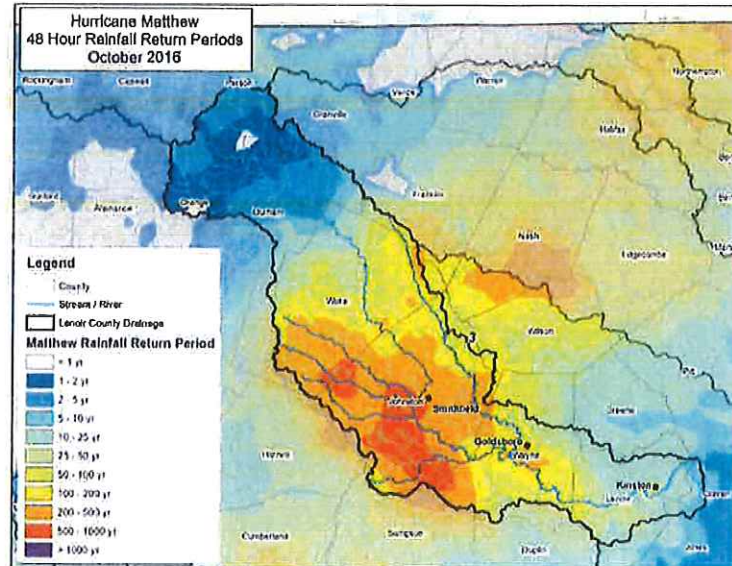
Peak discharge at Goldsboro during Hurricane Fran occurred on Sept. 12th



Background – Hurricane Matthew



Background – Hurricane Matthew



Trend Analysis

Trend Analysis:

Land Cover Analysis: Show trends in land cover in the Neuse Basin and determine if changes in land use may be a contributing factor to any increase in downstream flooding

Population Change: Establish which areas are experiencing increased growth and determine if population increases may be a contributing factor to downstream flooding

Discharge Gages: Determine if a statistically significant trend of increasing discharges is evident at any of the gage sites on the Neuse River

Rainfall: Determine if there is a statistically significant trend of increasing rainfall depths in the Neuse River Basin (In Progress)

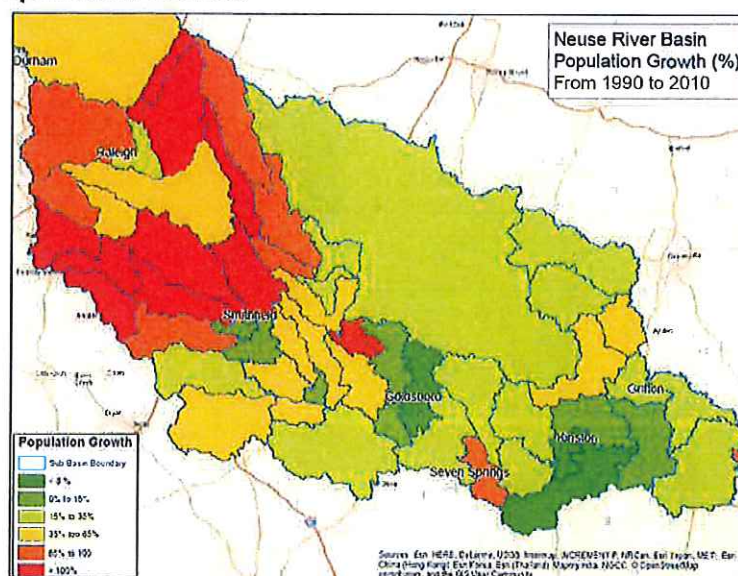
Land Cover Trends

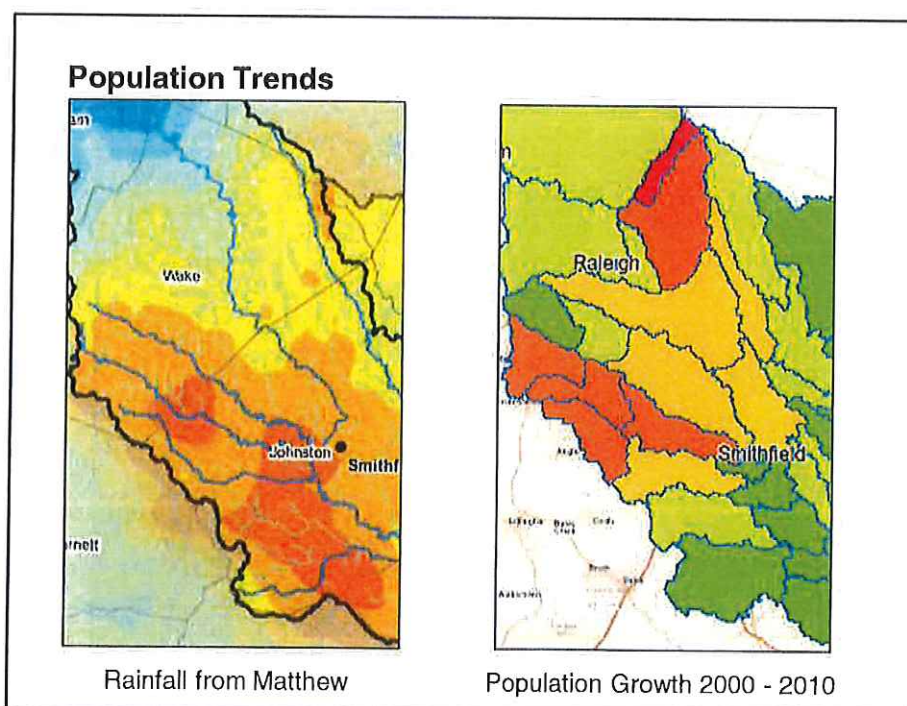
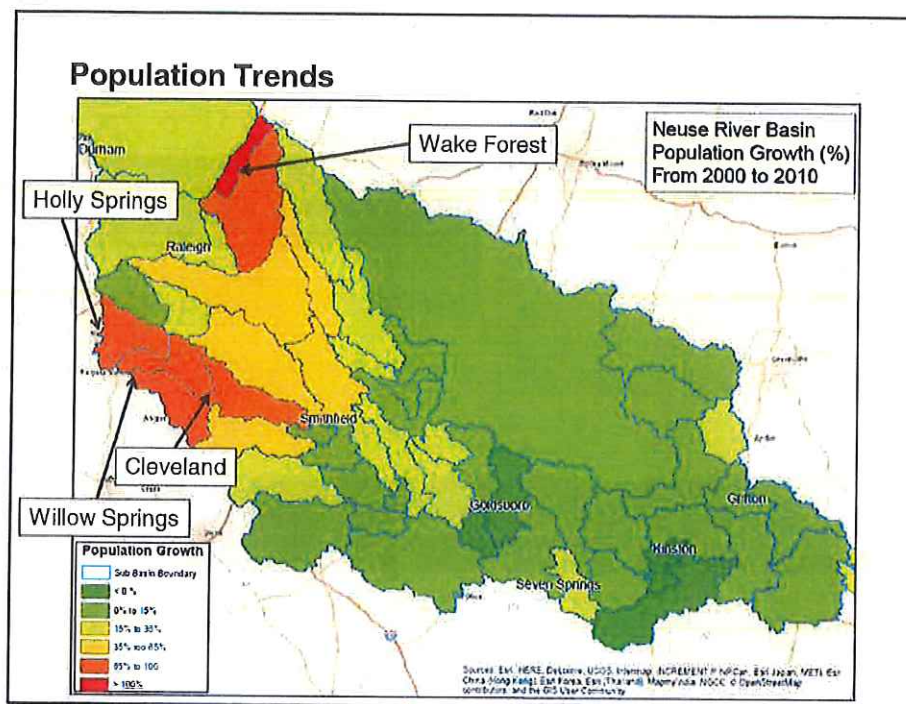
Neuse Basin Landcover			
Land Cover	2001	2006	2011
Developed	13.8%	15.0%	15.6%
Forest	29.9%	28.5%	27.5%
Water/Wetlands	15.4%	15.4%	15.4%
Crops/Pasture	32.5%	32.2%	31.6%
Grassland/Scrub	8.4%	8.9%	9.9%
Total	100%	100%	100%
Impervious	2.7%	3.1%	3.4%

Land Cover	2001	2006	2011
Developed	18.7%	20.9%	22.0%
Impervious	3.9%	4.6%	5.1%

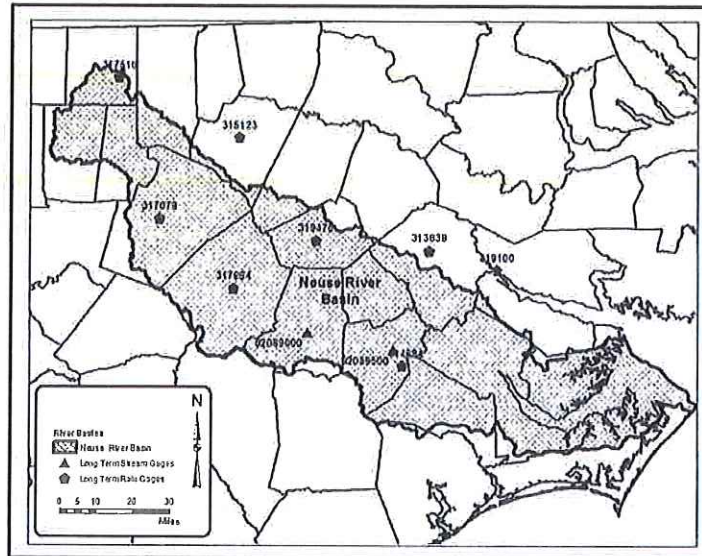
Development in Floodplain (Areas in Acres)					
Community	Total Area in Floodplain	Developed (2001)	Developed (2011)	2001 % Developed	2011 % Developed
Smithfield	1,809	108	133	6.0%	7.4%
Goldsboro	1,991	664	710	33.4%	35.6%
Kinston	1,571	408	430	26.0%	27.4%

Population Trends





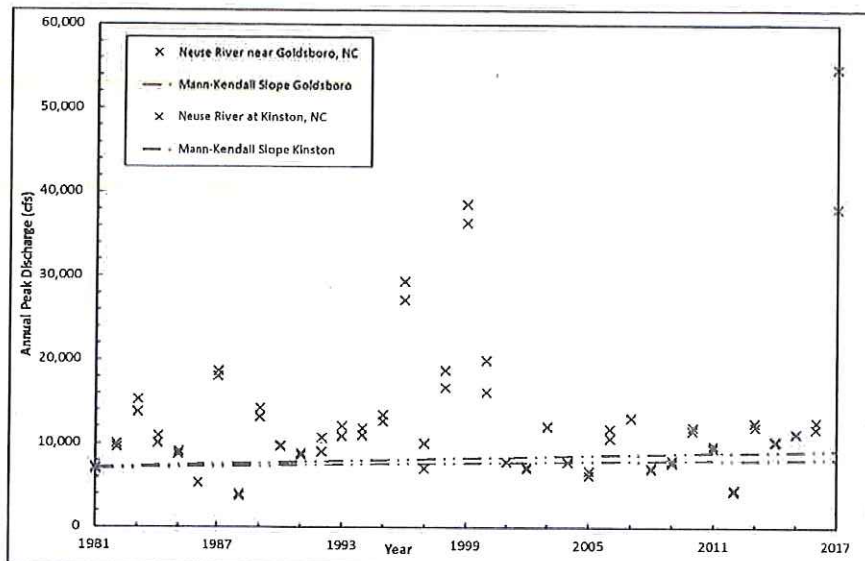
Streamflow Trends



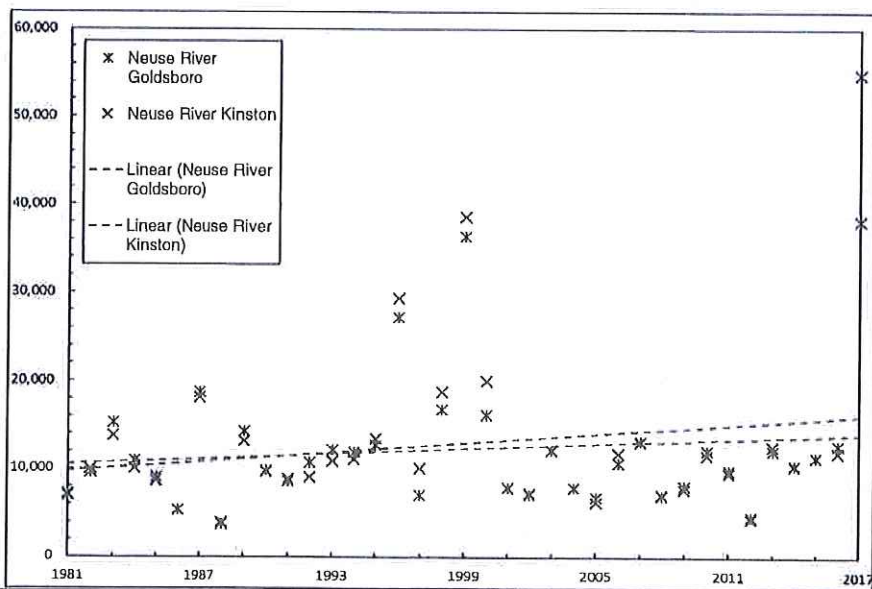
Streamflow Trends

Site Type	Site Name	County	Drainage Area (mi. ²)	Period of Record
Rainfall Gages with at least 100-year Period of Record	Greenville	Pitt	n.a.	1875 - 2017
	Kinston 7 Se	Lenoir	n.a.	1899 - 2017
	Louisburg	Franklin	n.a.	1893 - 2017
	Raleigh State Univ	Wake	n.a.	1892 - 2017
	Roxboro 7 Ese	Person	n.a.	1893 - 2017
	Smithfield	Johnston	n.a.	1892 - 2017
	Washington Wwtp 4w	Beaufort	n.a.	1893 - 2017
	Wilson 3 Sw	Wilson	n.a.	1916 - 2017
Streamflow Gages on Neuse River with record for full regulated period	Neuse River near Goldsboro, NC	Wayne	2,399	Regulated period by Falls Lake (1981 - 2017)
	Neuse River at Kinston, NC	Lenoir	2,692	

Streamflow Trends – Gage Analysis



Streamflow Trends – Gage Analysis



Streamflow Trends – Gage Analysis

- Mann – Kendall test for trend
 - Tau (τ) measures the strength of the relation between time (years) and annual peak flows (cfs.). The trend is measured in the relation to the overall predominant trend, either increasing, decreasing, or no change.
 - Positive values for τ indicate that occurrences of annual peak stream flows are increasing with time for the period of record. Negative values of τ indicate that annual peak stream flows are decreasing with time for the period of record. The magnitude of τ is related to the strength of the trend, but not necessarily the significance of the trend detected

Site	Period of Record	Kendall's TAU	P-value	Slope (cfs/year)	Peaks	Trend detected (0.05 significance)
Neuse River near Goldsboro, NC	1981 - 2017	0.094	0.43	57.6	36	No
Neuse River at Kinston, NC	1981 - 2017	0.059	0.62	34.6	37	No

Streamflow and Rainfall Trend Summary

- Streamflow
 - No trends in annual peaks at Neuse River Goldsboro or Neuse River Kinston
 - 1% annual chance changes over time due to increase number of annual peaks available for analysis
 - Natural variation in flows makes trend detection difficult
- Rainfall
 - Analyzing monthly and annual rainfall values at 8 long-term rain gages in Neuse River basin vicinity.
 - Comparing rainfall depths from TP-40 to NOAA Atlas 14 (Raleigh, Smithfield, and Kinston) for various storm frequencies.
 - TP-40 was published by the U.S. Weather Bureau in 1961 and was used to characterize rainfall events until NOAA published Atlas 14 in 2004.

Hydrologic Modeling

Hydrologic Analysis:

Purpose: Develop existing conditions scenario to evaluate current flooding risk and provide baseline for mitigation project comparisons.

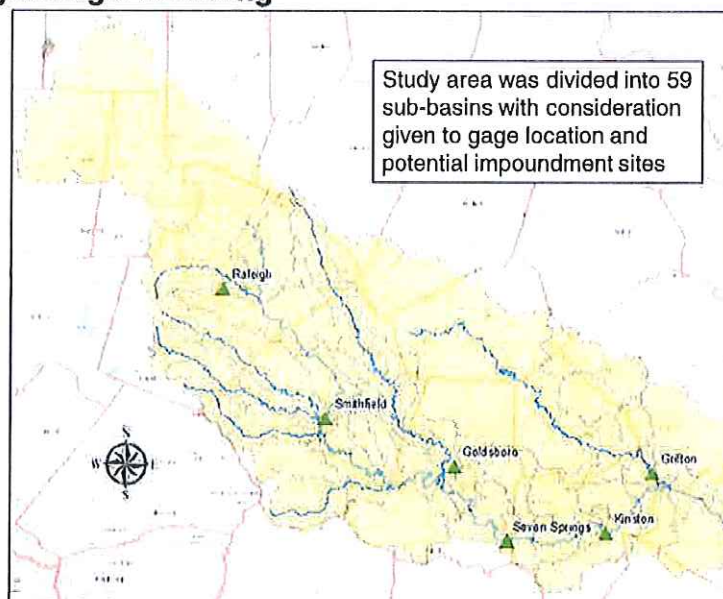
Methods: Establish a coarse HEC-HMS rainfall runoff model for the Neuse River downstream of Falls Lake Dam.

SCS Curve Number -- National Land Cover Database
Gage adjusted radar rainfall from Hurricane Matthew
NOAA Atlas 14 for Recurrence Interval events

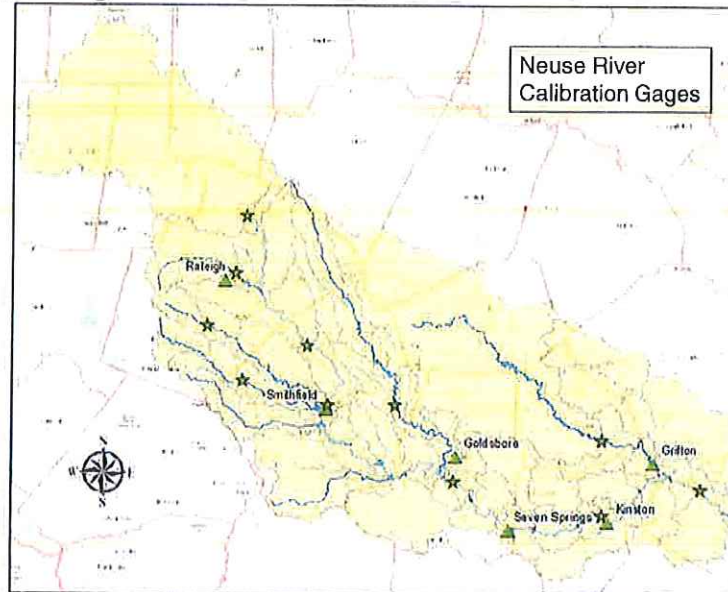
Calibration: Calibration performed using and hydrograph data collected during Hurricane Matthew

The hydrologic model will also be used to investigate mitigation solutions with impacts on peak discharges such as new detention facilities or retrofitting existing impoundments

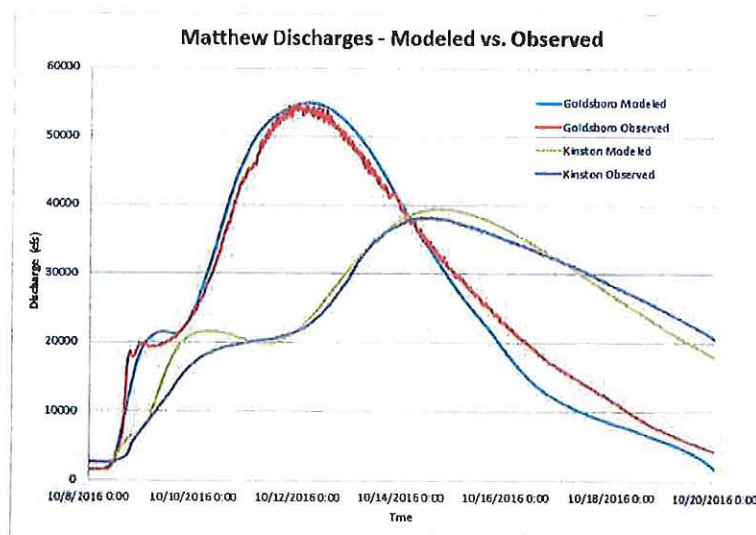
Hydrologic Modeling



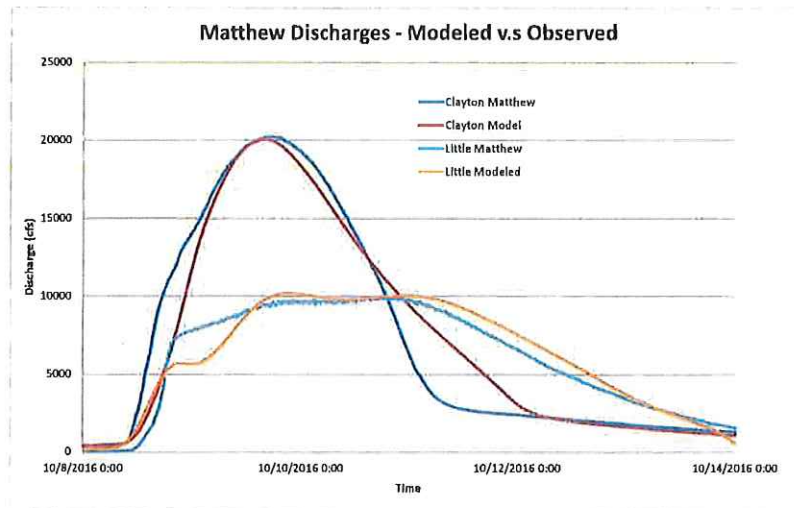
Hydrologic Model Calibration



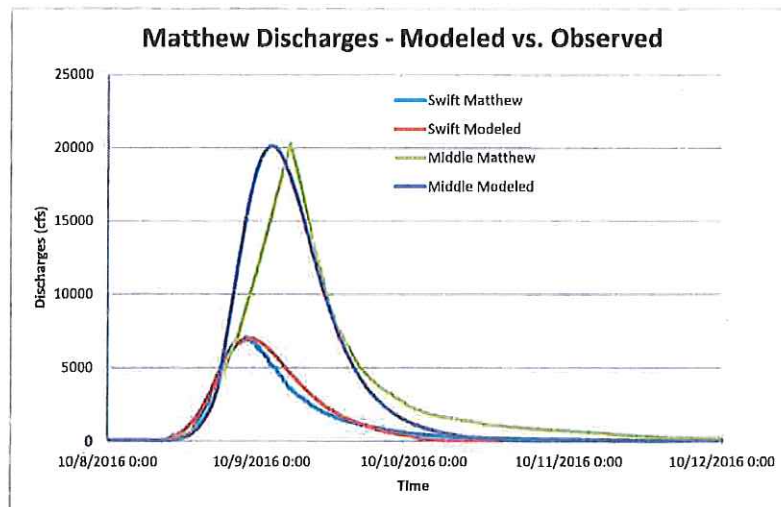
Hydrologic Model Calibration



Hydrologic Model Calibration



Hydrologic Model Calibration



Hydraulic Modeling

Hydraulic Analysis:

Use existing, effective hydraulic models provided by the North Carolina Floodplain Mapping Program (NCFMP)

Run the hydraulic models with project discharges for Hurricane Matthew and calibrate to high water marks

County	Location	Observed WSEL	Modeled WSEL	Difference
Johnston	Castle Drive	128.5	128.26	-0.24
	HWY 70*	127.39	127.52	0.13
	W. Wellons St.	127.1	127.18	0.08
Wayne	Stevens Mill Rd.	76.5	77.15	0.65
	Smitty Lane	75.8	75.65	-0.15
	Railroad	72.4	72.39	-0.01
	Arrington Bridge Rd.*	71.52	71.62	0.1
Lenoir	New Bern Road	39.73	40.45	0.72
	NC11 and NC55*	38.11	37.9	-0.21
	Neuse Rd. at Casey Rd.	31.81	32.17	0.36
Craven	Maple Cypress Rd.*	19.43	19.47	0.04

* USGS Gage Locations

Hydraulic Modeling

Hydraulic Analysis:

Run the validated hydraulic models with project frequency discharges to establish baseline project water surface elevations for the 10-, 4-, 2-, 1-, 0.2-, and 0.1-percent annual chance event

Steady Flow Data - Multiple

File Options Help

Enter/Edit Number of Profiles (25000 max): 0

Reach Boundary Conditions ...

+ Add Reach

Location of Flow Data Sources

River: Neuse River

Add Multiple...

Reach: Reach1 River Sta.: 1107813

Add A Flow Change Location

Stationing Location

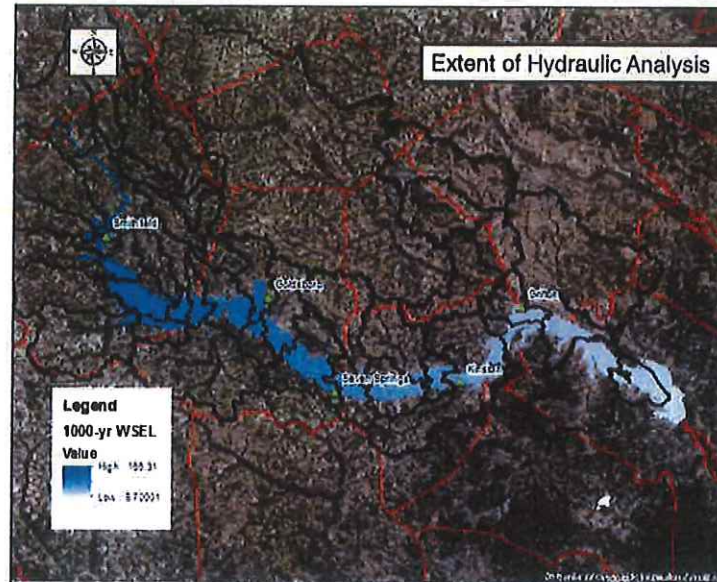
Flow (CFS) at Station

River	Reach	Sta	10pct	4pct	2pct	1pct	0.2pct	0.1pct	Matthew
1 Neuse River	Reach1	1107813	10100	13500	16300	19500	27000	30600	20100
2 Neuse River	Reach1	1057526	9500	12100	15100	17900	24900	28100	21900
3 Neuse River	Reach1	903257	8600	11700	14500	16600	22100	26100	20300
4 Neuse River	Reach1	955420	12500	16900	22000	26500	42500	50100	40800
5 Neuse River	Reach1	959777	15000	20500	25000	30100	44400	52500	43300
6 Neuse River	Reach1	914764	13500	19000	23300	28400	42100	49100	40500
7 Neuse River	Reach1	165822	13400	18500	22000	27700	40500	47200	38900
8 Neuse River	Reach1	822620	15200	21400	26200	31900	47300	55000	45300

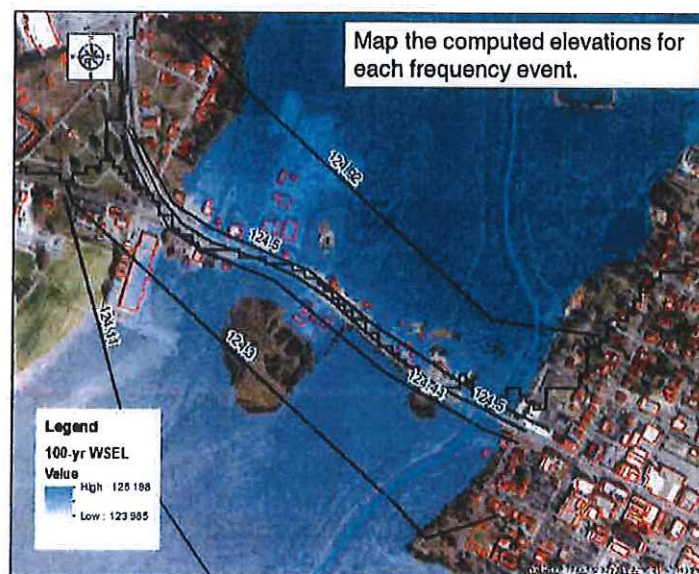
(Observed Water Surfaces Entered)

Edit Steady flow data for the profiles (cfs)

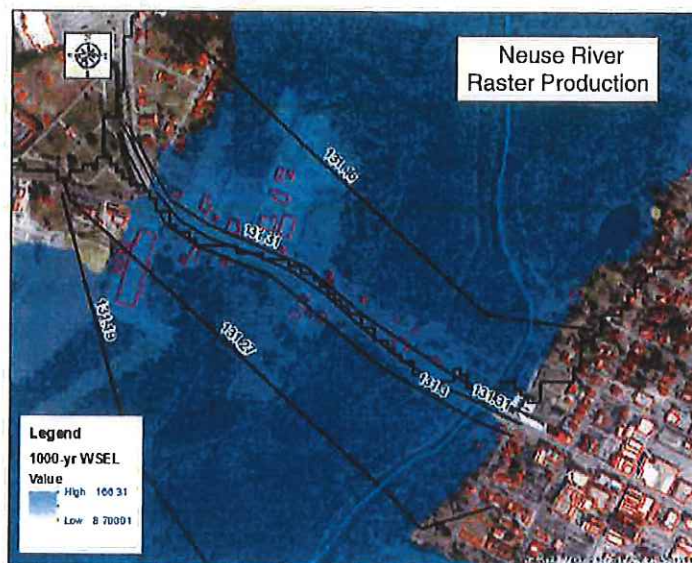
Hydraulic Modeling



Hydraulic Modeling



Hydraulic Modeling



Calculating Impacts

For each event, the water surface elevation at every building was compared to available first floor elevations to calculate flood depth

Depth-damage curves based on occupancy type are used to estimate structural and contents damage for each building

Total Building Damages - Neuse Study Area				
Frequency	Non-Res	Public	Residential	Total
10-yr	\$ 1,099,455	\$ 436,122	\$ 441,467	\$ 1,977,044
25-yr	\$ 10,270,828	\$ 5,057,271	\$ 1,780,978	\$ 17,109,077
50-yr	\$ 21,141,476	\$ 10,423,360	\$ 4,518,083	\$ 36,082,919
100-yr	\$ 43,089,928	\$ 25,308,217	\$ 10,545,708	\$ 78,943,853
500-yr	\$ 182,509,195	\$169,094,940	\$ 68,053,100	\$419,657,235
1000-yr	\$ 348,428,529	\$327,809,829	\$ 145,375,894	\$821,614,252
Matthew	\$ 103,521,483	\$ 32,986,177	\$ 42,950,989	\$179,458,649

Community Impacts

Community	Neuse River Building Damages - 10 Year Frequency Flood							
	Residential		Non-Residential		Public		Total	
	Structures	Damages	Structures	Damages	Structures	Damages	Structures	Damages
Smithfield	1	\$ 12,131	0	\$ -	0	\$ -	1	\$ 12,131
Johnston Co.	36	\$ 72,090	0	\$ -	0	\$ -	36	\$ 72,090
Goldboro	8	\$ 22,157	0	\$ -	0	\$ -	8	\$ 22,157
Seven Springs	11	\$ 10,787	0	\$ -	0	\$ -	11	\$ 10,787
Wayne Co.	109	\$ 425,335	2	\$ 182,960	0	\$ -	111	\$ 608,295
Kinston	3	\$ 114,061	1	\$ 45,948	0	\$ -	4	\$ 160,009
Lenoir Co.	59	\$ 130,796	4	\$ 824,600	0	\$ -	63	\$ 955,396
Groton	0	\$ -	0	\$ -	0	\$ -	0	\$ -
Pitt Co.	16	\$ 16,994	0	\$ -	0	\$ -	16	\$ 16,994
Craven Co.	30	\$ 62,450	0	\$ -	0	\$ -	30	\$ 62,450
Event Total	273	\$ 866,801	7	\$ 1,053,508	0	\$ -	280	\$ 1,920,309

Community Impacts

Community	Neuse River Building Damages - 25 Year Frequency Flood							
	Residential		Non-Residential		Public		Total	
	Structures	Damages	Structures	Damages	Structures	Damages	Structures	Damages
Smithfield	11	\$ 23,671	1	\$ 3,384	1	\$ 1,490,792	13	\$ 1,517,847
Johnston Co.	42	\$ 128,206	3	\$ 35,941	0	\$ -	45	\$ 164,147
Goldboro	57	\$ 137,993	2	\$ 30,952	1	\$ 22,955	60	\$ 191,900
Seven Springs	38	\$ 90,756	5	\$ 12,634	0	\$ -	43	\$ 103,390
Wayne Co.	289	\$ 2,424,514	12	\$ 644,736	0	\$ -	301	\$ 3,069,250
Kinston	7	\$ 308,986	5	\$ 270,309	1	\$ 1,025,193	13	\$ 1,604,488
Lenoir Co.	186	\$ 777,804	41	\$ 9,256,124	1	\$ 3,060	228	\$ 10,036,988
Groton	8	\$ 5,145	0	\$ -	0	\$ -	8	\$ 5,145
Pitt Co.	28	\$ 52,155	2	\$ 4,113	0	\$ -	30	\$ 56,268
Craven Co.	119	\$ 256,263	0	\$ -	0	\$ -	119	\$ 256,263
Event Total	785	\$ 4,205,493	71	\$ 10,258,193	4	\$ 2,542,000	860	\$ 17,005,686

Community Impacts

Community	Neuse River Building Damages - 50 Year Frequency Flood							
	Residential		Non-Residential		Public		Total	
	Structures	Damages	Structures	Damages	Structures	Damages	Structures	Damages
Smithfield	27	\$ 52,300	7	\$ 265,140	2	\$ 3,128,493	36	\$ 3,445,933
Johnston Co.	43	\$ 173,483	4	\$ 97,496	0	\$ -	47	\$ 270,979
Goldboro	230	\$ 824,478	6	\$ 161,458	6	\$ 953,185	242	\$ 1,939,121
Seven Springs	63	\$ 360,833	12	\$ 365,113	0	\$ -	75	\$ 725,946
Wayne Co.	513	\$ 4,642,174	32	\$ 1,649,105	1	\$ 23,516	546	\$ 6,314,795
Kinston	19	\$ 368,961	12	\$ 690,787	1	\$ 1,331,366	32	\$ 2,391,114
Lenoir Co.	323	\$ 1,865,414	62	\$ 17,482,613	1	\$ 7,308	386	\$ 19,355,335
Golffon	25	\$ 18,749	0	\$ -	0	\$ -	25	\$ 18,749
Put Co.	40	\$ 161,907	12	\$ 61,474			52	\$ 223,381
Craven Co.	237	\$ 668,442	1	\$ 3,179	0	\$ -	238	\$ 671,621
Event Total	1520	\$ 9,136,741	148	\$ 20,776,365	11	\$ 5,443,868	1679	\$ 35,356,974

Community Impacts

Community	Neuse River Building Damages - 100 Year Frequency Flood							
	Residential		Non-Residential		Public		Total	
	Structures	Damages	Structures	Damages	Structures	Damages	Structures	Damages
Smithfield	46	\$ 245,548	15	\$ 875,125	3	\$ 6,931,679	64	\$ 8,052,352
Johnston Co.	48	\$ 261,769	10	\$ 185,340	0	\$ -	58	\$ 447,109
Goldboro	477	\$ 2,130,774	54	\$ 1,747,800	8	\$ 6,671,120	539	\$ 10,549,694
Seven Springs	69	\$ 1,064,566	18	\$ 1,132,244	0	\$ -	87	\$ 2,196,810
Wayne Co.	730	\$ 7,273,715	73	\$ 4,578,670	2	\$ 339,335	805	\$ 12,191,720
Kinston	74	\$ 518,927	31	\$ 4,034,442	1	\$ 1,500,246	106	\$ 6,053,615
Lenoir Co.	508	\$ 3,979,733	80	\$ 29,083,952	1	\$ 12,087	589	\$ 33,075,772
Golffon	63	\$ 66,650	2	\$ 3,467	0	\$ -	65	\$ 70,117
Put Co.	57	\$ 450,244	20	\$ 279,565	3	\$ 1,854,804	80	\$ 2,584,613
Craven Co.	389	\$ 1,480,219	4	\$ 37,079	0	\$ -	393	\$ 1,517,298
Event Total	2461	\$ 17,472,145	307	\$ 41,957,684	18	\$ 17,309,271	2786	\$ 76,739,100

Community Impacts

Community	House River Building Damages - 500 Year Frequency Flood							
	Residential		Non-Residential		Public		Total	
	Structures	Damages	Structures	Damages	Structures	Damages	Structures	Damages
Smithfield	103	\$ 4,433,032	28	\$ 4,750,517	5	\$ 15,527,471	136	\$ 24,711,020
Hamilton Co.	64	\$ 847,978	19	\$ 598,769	0	\$ -	83	\$ 1,446,747
Greif Bros	709	\$ 19,161,163	191	\$ 43,444,302	18	\$ 23,937,929	918	\$ 86,543,394
Seven Springs	74	\$ 3,120,720	21	\$ 2,638,296	0	\$ -	95	\$ 5,759,016
Wayne Co.	1223	\$ 21,591,986	155	\$ 18,766,435	9	\$ 2,821,126	1387	\$ 43,179,547
Kinston	356	\$ 6,572,952	117	\$ 45,011,786	8	\$ 2,193,876	481	\$ 53,778,614
Lenoir Co.	1177	\$ 16,879,611	156	\$ 58,235,698	4	\$ 582,099	1337	\$ 75,697,408
Geffen	173	\$ 1,874,336	16	\$ 1,767,570	2	\$ 303,450	191	\$ 3,945,356
Pitt Co.	86	\$ 2,694,538	30	\$ 1,179,644	5	\$ 101,567,308	121	\$ 105,441,490
Craven Co.	462	\$ 9,151,828	43	\$ 3,476,432	6	\$ 270,103	511	\$ 12,898,363
Event Total	4427	\$ 86,328,144	776	\$ 179,869,449	57	\$ 147,203,362	5260	\$ 413,400,955

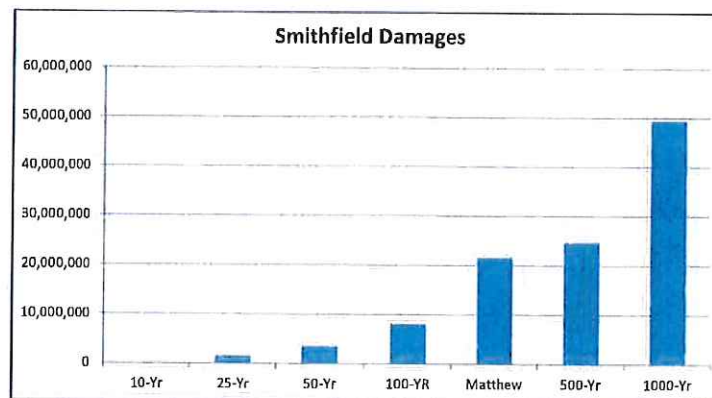
Community Impacts

Community	House River Building Damages - 1000 Year Frequency Flood							
	Residential		Non-Residential		Public		Total	
	Structures	Damages	Structures	Damages	Structures	Damages	Structures	Damages
Smithfield	266	\$ 13,890,178	32	\$ 8,565,239	7	\$ 26,942,882	305	\$ 49,398,299
Hamilton Co.	75	\$ 1,476,188	22	\$ 872,300	0	\$ -	97	\$ 2,348,488
Greif Bros	897	\$ 51,481,768	272	\$ 151,291,893	28	\$ 46,506,141	1137	\$ 249,229,792
Seven Springs	74	\$ 4,118,611	21	\$ 3,104,420	0	\$ -	95	\$ 7,223,031
Wayne Co.	1387	\$ 35,959,114	194	\$ 30,205,408	14	\$ 4,382,446	1595	\$ 70,546,968
Kinston	483	\$ 12,119,773	135	\$ 65,493,024	9	\$ 3,141,486	627	\$ 80,754,283
Lenoir Co.	1356	\$ 28,343,180	162	\$ 68,768,651	5	\$ 852,173	1523	\$ 97,964,004
Geffen	219	\$ 4,838,352	19	\$ 5,131,464	3	\$ 373,721	241	\$ 10,343,537
Pitt Co.	93	\$ 4,259,226	31	\$ 1,613,938	6	\$ 206,108,535	130	\$ 211,981,699
Craven Co.	462	\$ 17,642,296	64	\$ 9,318,393	8	\$ 3,636,503	534	\$ 30,597,192
Event Total	5252	\$ 174,078,686	952	\$ 344,364,720	80	\$ 291,943,887	6284	\$ 810,387,293

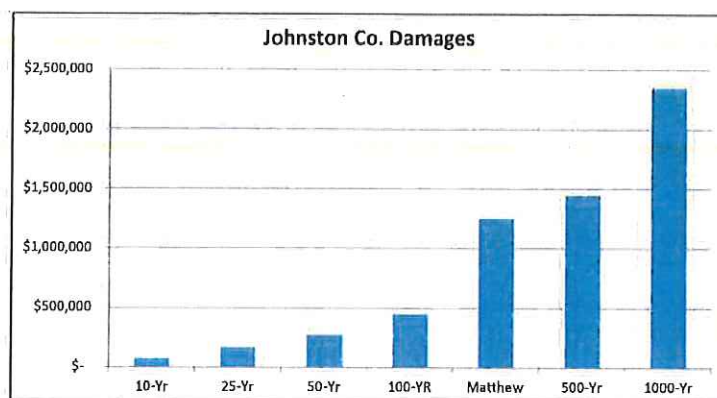
Community Impacts

Community	Residential		Neuse River Catchment Damages - Hurricane Matthew				Total	
	Structures	Damages	Structures	Damages	Structures	Damages	Structures	Damages
Smithfield	86	\$ 3,495,790	27	\$ 3,912,580	5	\$ 14,130,485	118	\$ 21,538,855
Johnston Co.	58	\$ 724,677	19	\$ 524,827	0	\$ -	77	\$ 1,249,504
Guilford Co.	630	\$ 9,515,301	145	\$ 19,137,941	11	\$ 15,443,490	786	\$ 44,096,732
Swain County	74	\$ 2,014,651	21	\$ 1,992,471	0	\$ -	95	\$ 4,007,122
Wayne Co.	925	\$ 14,527,991	131	\$ 14,176,967	8	\$ 1,573,278	1064	\$ 30,278,236
Perston	141	\$ 1,926,393	71	\$ 23,512,681	2	\$ 1,662,915	214	\$ 27,101,989
Lenoir Co.	634	\$ 8,024,197	109	\$ 45,142,193	3	\$ 173,613	746	\$ 53,340,003
Groff	39	\$ 92,575	4	\$ 19,440	1	\$ 2,396	44	\$ 114,411
Blk Co.	62	\$ 666,241	20	\$ 440,673	3	\$ 3,570,015	85	\$ 4,676,929
Craven Co.	424	\$ 2,117,879	8	\$ 108,417	0	\$ -	432	\$ 2,226,296
Event Total	3073	\$ 43,105,695	555	\$ 108,968,190	33	\$ 36,556,192	3661	\$ 188,630,077

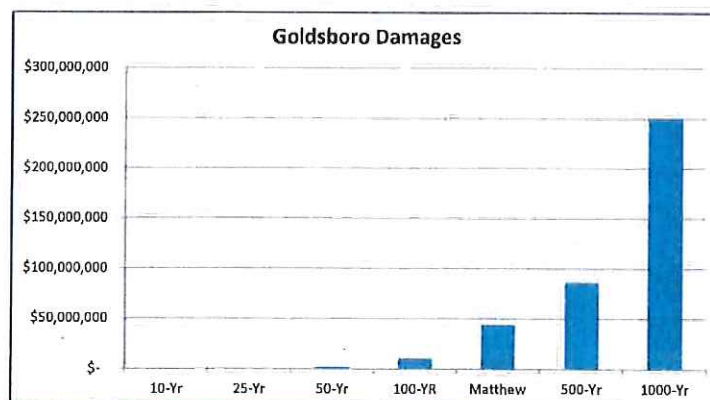
Community Impacts



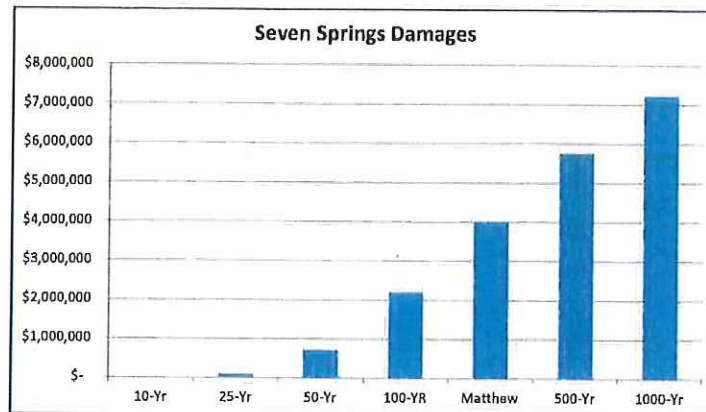
Community Impacts



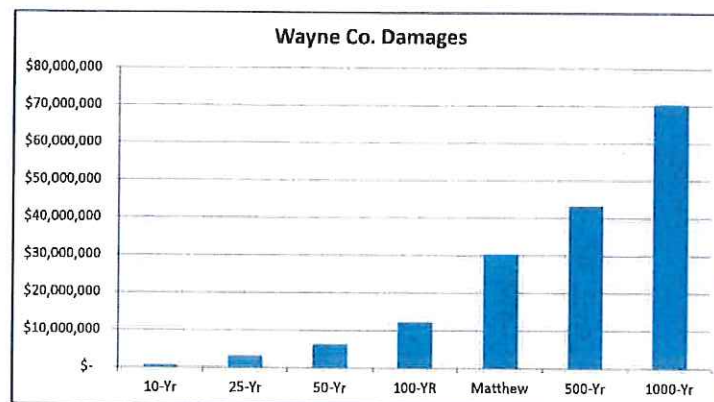
Community Impacts



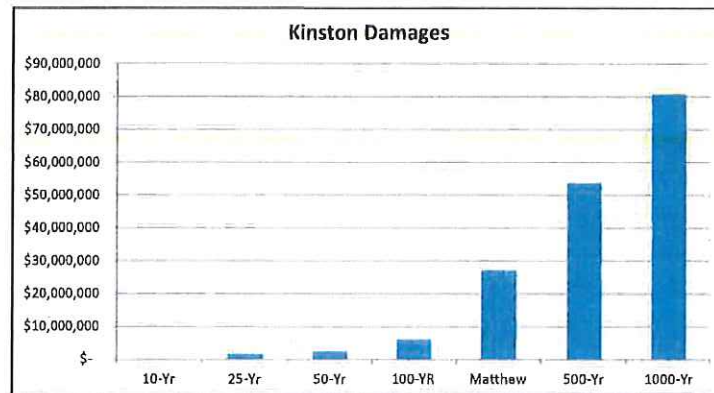
Community Impacts



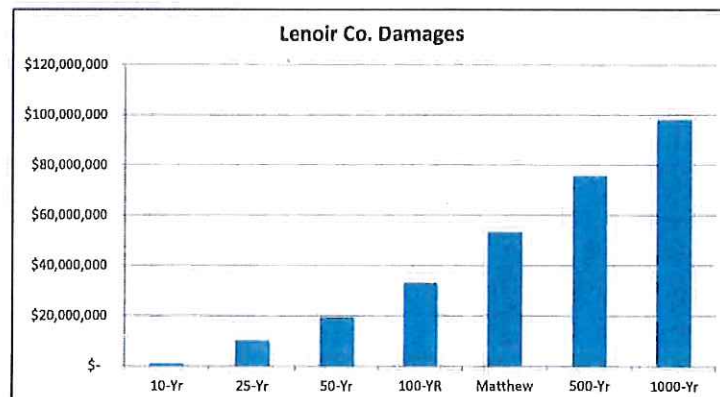
Community Impacts



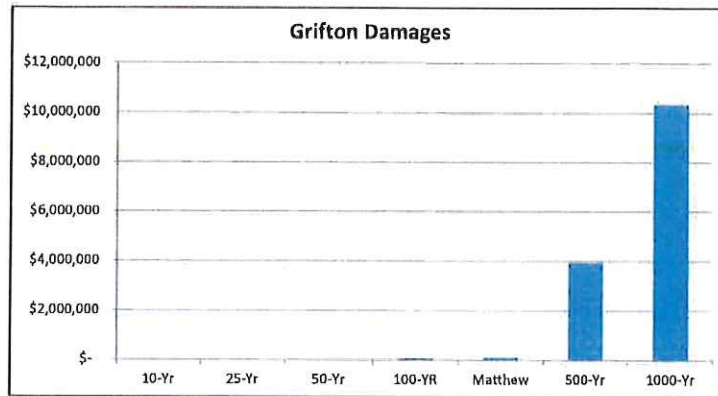
Community Impacts



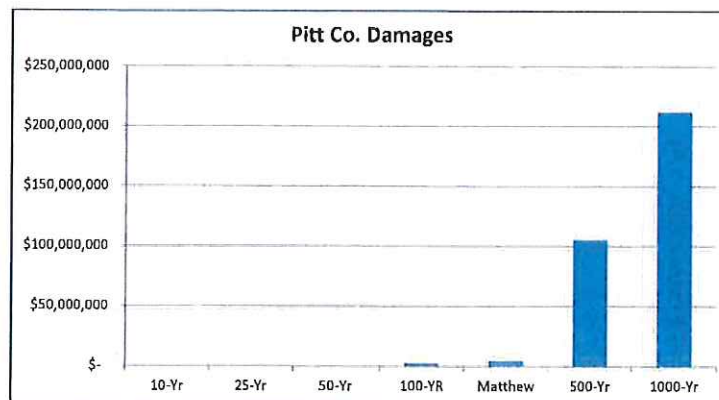
Community Impacts



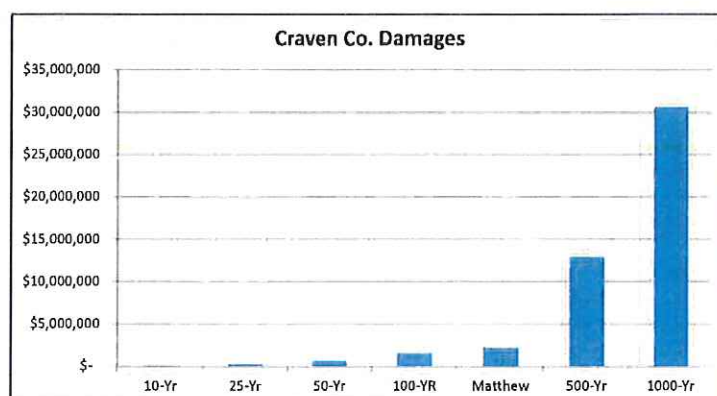
Community Impacts



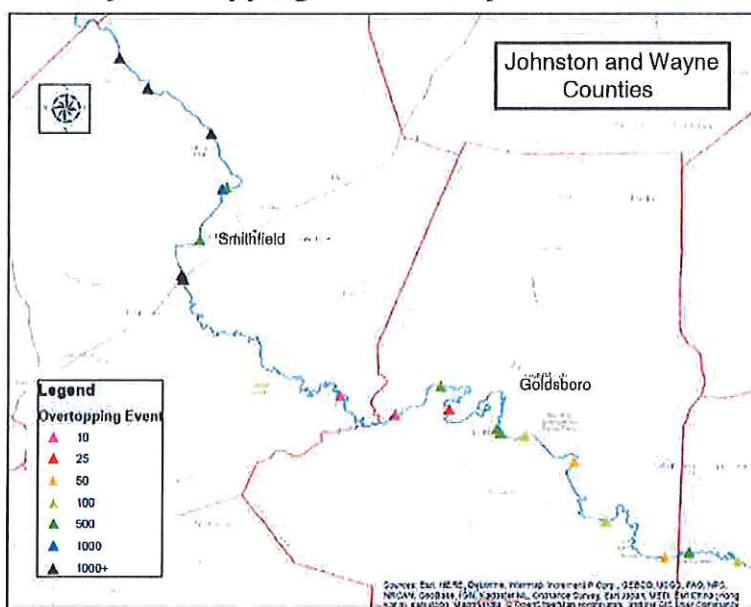
Community Impacts

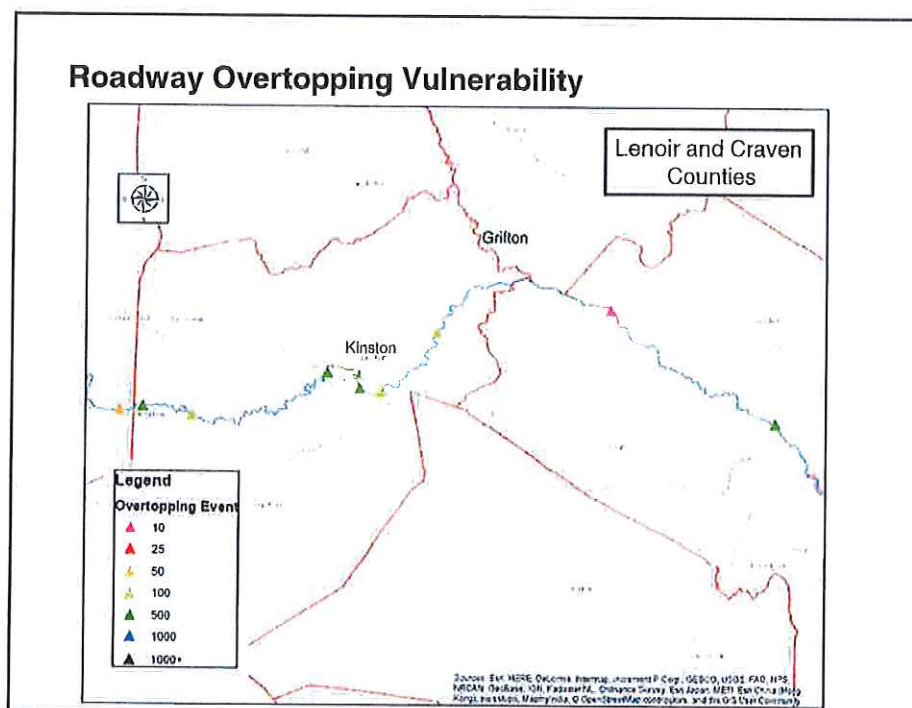
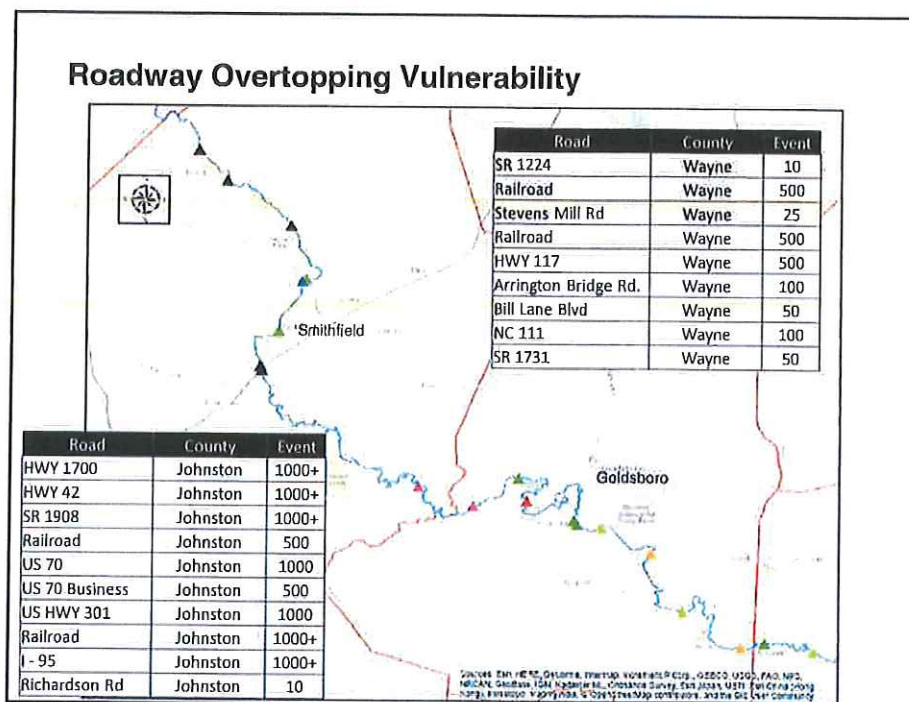


Community Impacts



Roadway Overtopping Vulnerability





DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT

MEMORANDUM

TO: KAYE SCOTT, FINANCE DIRECTOR
FROM: JENNIFER COLLINS, INTERIM PLANNING DIRECTOR
DATE: APRIL 12, 2018
RE: GWTA MARKETING AND PUBLIC RELATIONS SERVICES

Please issue check payable to:

Quest Corporation of America, Inc.
17220 Camelot Court
Land O' Lakes, FL 34638

in the amount of \$7,427.30 which represents payment for professional services relative to marketing and public relations services provided to Goldsboro-Wayne Transportation Authority (NOTE: Charge Urban Dollars Only). This is a continuation of a previous contract, however, a new Purchase Order has been input for FY2017-18 activities.

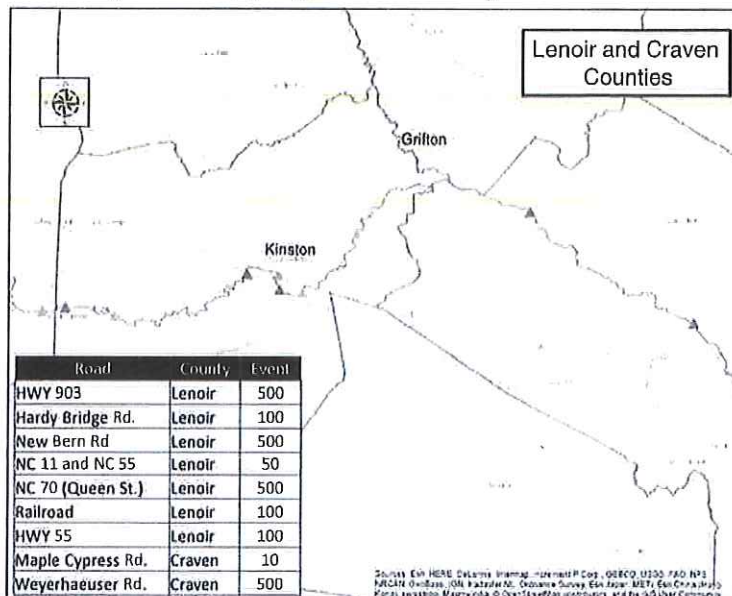
Please charge this amount to P1800190 and return to the Planning Department for disbursement on April 20, 2018. Attached is an invoice for this amount.

If any additional information is needed, please advise.

P1800190	\$28,000.00
Payment No. 1	- 1,560.00
Balance	\$26,440.00
Payment No. 2	- 1,860.00
Balance	\$24,580.00
Payment No. 3	- 5,480.00
Balance	\$19,100.00
Payment No. 4	- 1,440.00
Balance	\$17,660.00
Payment No. 5	- 580.00
Balance	\$17,080.00
Payment No. 6	\$ 1,720.00 (Nov., 2017 Payment)
Balance	\$15,360.00
Payment No. 7	- 1,880.00
Balance	\$13,480.00
Payment No. 8	- 7,427.30
Balance	\$ 6,052.70

Jennifer Collins
Interim Planning Director

Roadway Overtopping Vulnerability



Mitigation Options Master List

New Detention Structure(s)

- a. Large Regional Structure: Identify a feasible location for a single large flood control dam and reservoir to provide flood storage and reduce peak flows and flooding downstream. Goal would be to provide regional benefits to multiple communities. Would require significant planning, design, and permitting and likely large scale-buyouts for the future impounded area. May also provide economic benefits for future development and recreation.
- b. Series of Smaller Structures: Identify locations for a series of smaller flood control dams either in series or within the same basin. Based on topography and available open space, these smaller structures may work together to provide significant flood reduction downstream with reduced impacts to existing property.
- c. Combination of the above options.

Mitigation Options Master List

Existing Detention Structure Retrofit/Enhancement

- Enhance existing detention structure(s) to provide increased flood control capability.
- Accomplished by elevating the dam and redesigning the outlet works.
- Would likely require change in operating procedure and may conflict with existing primary purpose (e.g. Water Supply).
- Could impact existing development around the pool and require elevation/buyouts.

Offline Storage

- Utilize storage off of the main channel(s) to reduce peak flows and flooding downstream.
- Examples include quarries in the vicinity of floodplains and low swampy areas that may be bermed to create storage areas.
- Set trigger elevations based on targeted flood levels to activate storage areas.
- May require designed means of connection (e.g. overflow channel).

Mitigation Options Master List

New Embankment Structures

- a. Certified Levee: Design and construct a flood protection levee to remove flood impacts up to a targeted level. Comply with CFR 65.10 to enable FEMA certification. This would require flood protection up to the 1% annual chance event with required freeboard in place. Flood insurance premiums behind the levee would be reduced. As levees remove natural flood storage from the overbanks, need to analyze impacts elsewhere to ensure no adverse impacts or take steps to mitigate.
- b. Dike/Berm: Design and construct a dike/berm to provide flood protections up to a targeted level. Could be used to prevent recurring flooding at lower levels. Although some flood protection would be gained, structures in the "protected" area would still have insurance premiums based on current flood zone.

Existing Levee Repair/Enhancement

- Determine impacts of repairing or enhancing existing levees so that they meet NFIP standards (CFR65.10) for protection.
- FEMA certification would enable flood insurance purchase for structures behind the levee at reduced premiums.
- May require extensive study and construction to meet requirements.

Mitigation Options Master List

Roadway Elevation

- Identify road crossings that are impacting communities due to water damming and evaluate options for reducing these backwater effects.
- Identify critical transportation routes and determine if elevating the roadway is a feasible solution to keep the road operational during a flood.

Community Buyouts / Elevation / Relocation

- Buyouts of blocks of flood prone properties can help to:
 - Minimize rescues and disaster relief
 - Create potential for recreation areas
 - Provide environmental benefits by restoring floodplain to natural state
- Elevation reduces risk by raising structure above flood elevation
- Relocation removes structure from floodplain

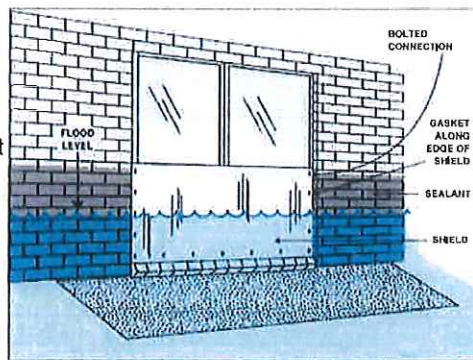
Mitigation Options Master List

Large Scale Floodproofing

- Wet floodproofing allows water to enter the enclosed area of a building
 - Reduces hydrostatic pressure on the structure which greatly reduces the risk of structural damage
 - Generally used to reduce damage to buildings with basements, crawlspaces, or attached garages
 - Not practical for areas used as living space

Dry Floodproofing

- Preventing water intrusion by sealing the exterior of the building
- Protection of service equipment



Mitigation Options Master List

Land Use / Impervious Restrictions

- Develop strategies to reduce current and future flooding:
 - Planned communities and smart development to minimize sprawl
 - Large scale rain barrel program / downspout disconnection

River Corridor Greenspace Implementation

- A Greenspace Implementation program would reduce future damages by protecting undeveloped space in the floodplain
 - Publically owned land such as stream buffer or recreation areas
 - Private land such as farms, woodlands, golf courses

Mitigation Options Master List

Wildlife Management

- Removal of wildlife that may contribute to flooding such as beavers



John Dorman
Assistant State EM Director for Risk Management
NC Emergency Management
Phone: (919) 825-2310
Email: John.dorman@ncdps.gov

Tom Langan, P.E., CFM
Engineering Supervisor
NC Emergency Management
Phone: (919) 825-2328
Email: tom.langan@ncdps.gov



Next Steps

- Develop modeling runs with mitigation projects in place
- Evaluate changes to impacts with mitigation option(s) in place
- Perform Benefit/Cost Analysis for mitigation options
- Develop report
- Meeting 2 scheduled for 3/27
 - Present mitigation option results
- Meeting 3 scheduled for 4/26
 - Present final report