

## II. Mitigation Action Plan

This section of the Plan summarizes study conclusions, outlines community goals and objectives, and describes the action plan to reduce community vulnerability to the effects of natural hazards in Brunswick County. Mitigation objectives are designed to support community goals while further defining the parameters for development of mitigation actions. Mitigation actions describe specific steps that are to be undertaken to achieve the stated objectives. Mitigation actions are intended to serve as benchmarks for evaluating progress on plan implementation.

### **A. Study Conclusions**

With limited financial and staff resources to dedicate to hazard mitigation, it is essential that those hazards with the highest likelihood of occurrence and the greatest potential impact receive immediate attention. Through hazard identification and analysis and vulnerability assessment, it has been determined that Brunswick County and the participating municipalities of Bolivia, Calabash, Navassa, St. James, and Varnamtown are susceptible to the impact of certain natural hazards as summarized at the conclusion of Appendix A Hazard Identification and Analysis.

Through the hazard mitigation planning process, the cooperating governmental units determined that the Brunswick County area is not at risk for tsunamis or volcanoes and that there is “low” risk of dam and levee failures, earthquakes, and landslides and sinkholes. Five hazards were rated “moderate” risk – riverine erosion, droughts and heat waves, severe storms and tornadoes, wildfires, and winter storms/freezes. Hurricanes and coastal storms, coastal erosion, and floods were rated as a “high” risk.

### **Moderate and High Hazard Threats**

#### **Droughts and Heat Waves**

In general, communities can have little influence or impact on mitigating the impact of droughts/heat waves on the local government level except through ensuring adequate water supplies for normal circumstances and through implementation of water conservation measures when drought conditions are imminent. Similarly, heat waves have wide ranging effects that are almost impossible to combat on a local government level. Communities, therefore, depend upon State and Federal agencies for assistance.

#### **Floods**

Flooding is often associated with hurricanes and coastal storms (most often general flooding) as well as with severe summer storms (typically flash flooding). Floods are the easiest hazard to quantify and isolate as flooding occurs only in known locations. The severity of a flood is generally dependent upon the amount of rainfall and prior soil conditions (including ground cover). Flood hazard vulnerability can be decreased through adoption and enforcement of local land use regulations and through cooperative, regional efforts to ensure that upstream jurisdictions are not contributing to downstream flooding problems.

### **High Winds (Severe Storms/Tornadoes and Hurricanes/Coastal Storms)**

Severe storms and tornadoes as well as hurricanes and coastal storms present high wind hazards. This hazard is mainly combated through building codes and construction. Enforcement of the current State building code and enhancement of the code in regards to wind resistance will prove the most beneficial in addressing high winds.

### **Riverine Erosion**

Riverine erosion has the potential to impact properties located along Lockwood Folly River, Cape Fear River, Shallotte River and Little River. Other properties located along major tributaries to these rivers may also be at risk.

### **Coastal Erosion**

Coastal erosion is limited to a small portion of study area, specifically locations along the Atlantic Ocean coastline and those in close proximity to the mouth of the Cape Fear River. The locations are susceptible to storm surges associated with hurricanes and coastal storms.

### **Wildfires**

Fortunately, wildfires in North Carolina, although frequent, are not normally a serious threat to large areas as is the case in western states where dry weather conditions and large expanses of timber increase the likelihood and extent of the impact of a wildfire. The North Carolina Division of Forest Resources has the responsibility for protecting state and privately owned forest land from wildfires. The program is managed on a cooperative basis with all one hundred counties in the State. The State fire program emphasizes fire prevention efforts; pre-suppression activities (including extensive training of personnel); aggressive suppression efforts on all wildfires; and law enforcement follow-up.

### **Winter Storms and Freezes**

Local governments also look to the State and to private utility companies for leadership in dealing with winter storms/freezes. The typical effects of snow and ice accumulation - loss of electrical power, phone, and cable service and treacherous road conditions - can be only minimally addressed at the local level. (The exceptions would be larger cities which have more snow/ice removal equipment and manpower and governments that own the local electrical distribution system.)

### **Statement of Commitment to Mitigating Impacts of Natural Hazards**

Based on this analysis, the primary responsibility of the participating local governments should be to take immediate and sustained action to reduce the level of vulnerability of people and property to future flooding and erosion and to consider, at a lower priority, how to address the threat of damage from high winds. Thus, the elected and appointed leadership and the citizens of Brunswick County and the participating municipalities commit to engage in activities and practices, both as individuals and as members of the larger community of Brunswick County, to mitigate the impacts of future natural hazards with particular emphasis on mitigating the effects of flooding and secondarily on mitigating the effects of high winds, as practicable at the local government level.

## **B. Community Goals**

The primary goal of all local governments is to promote the public health, safety, and welfare of the citizens of the community. In keeping with this standard, Brunswick County and the participating municipalities have developed four goal statements for local hazard mitigation planning. Each goal, purposefully broad in nature, serves to establish parameters that were used in developing more specific objectives and mitigation actions. Consistent implementation of objectives and actions will over time ensure that community goals are achieved.

- Goal #1** Protect the public health, safety and welfare by increasing public awareness of hazards and by encouraging collective and individual responsibility for mitigating hazard risks.
- Goal #2** Improve technical capability to respond to hazards and to improve the effectiveness of hazard mitigation actions.
- Goal #3** Enhance existing or create new policies and ordinances that will help reduce the damaging effects of natural hazards.
- Goal #4** Protect the most vulnerable populations, buildings, and critical facilities through the implementation of cost-effective and technically feasible mitigation actions.

## **C. Mitigation Objectives**

Mitigation objectives are designed to support community goals while further defining parameters for development of mitigation actions. Objectives are numbered to correspond with the goal that each supports.

- Objective 1.1** The County and municipalities will engage in activities and practices that will help mitigate the impacts of natural hazards.
- Objective 1.2** The County and municipalities will implement a public awareness campaign to educate citizens of the possible hazards associated with locating in floodplains and of measures that can be taken to lessen impacts of future floods.
- Objective 1.3** The County and municipalities will work to ensure that emergency services are adequate to protect public health and safety.
- Objective 2.1** The County and municipalities will work together to develop policies that limit the provision of public services (water and sewer) to proposed new development in flood hazard areas.
- Objective 2.2** Brunswick County will continue to evaluate participation in the Community Rating System to help monitor hazard mitigation efforts and to improve the affordability of flood insurance for citizens.
- Objective 3.1** The County and municipalities will continue to ensure future development occurs in such a way as to protect wetlands, floodplains, and other natural features that serve to reduce flood hazard susceptibility.
- Objective 3.2** The County and municipalities will enforce National Flood Insurance Program (NFIP) development standards and also study additional

methods that would help prevent increases in flood velocities and levels that endanger both people and property. (Some of the municipalities will be adopting flood damage prevention regulations for the first time by November 1, 2004 as required by NCEM/FEMA.)

**Objective 4.1** The County and municipalities will continue to restrict development, as practicable, in known or predictable pathways of natural hazards such as in identified floodplains. Where hazard locations cannot be predicted, as in the case of hurricane force winds, the County and municipalities will continue to ensure that new structures are built to be as resilient as possible to the impacts of a natural hazard.

**Objective 4.2** While recognizing that property owners have the constitutional right to put land to an economically viable use, the County and participating municipalities will honor this right while working to limit development in areas that may cause emergency workers to put lives at risk to rescue someone from a structure knowingly built in a hazardous area.

#### **D. Mitigation Actions**

The Brunswick County mitigation actions are outlined in Table II-1. These are the mitigation actions that are to be undertaken by the County as the lead agency with the municipalities serving in a supporting role where appropriate. Each municipality also has a separate, specific set of mitigation actions that will be undertaken at the municipal level. Municipal Mitigation Action Plans are shown in alphabetical order in Tables II-2 through II-6.

Mitigation actions were developed with an eye toward reducing vulnerability to all natural hazards that can be addressed in a practicable way at the local level. The listed actions do, however, primarily focus on ways Brunswick County and the municipalities can act to lessen and, ideally, eventually eliminate repetitive flood losses and prevent future flood losses from inappropriate new development.

Mitigation actions were developed and prioritized by County and town staff responsible for implementation of the specific action. The planning team reviewed the results of the hazard identification and analysis; vulnerability assessment; and the community capability assessment in determining which mitigation actions should be undertaken. The County and towns also worked together to determine:

1. Cost effectiveness, i.e., do returns or savings produced by implementation of the action outweigh the cost of implementation?
2. Environmental impact, i.e., are actions designed to protect environmentally fragile areas as natural stormwater storage areas? and
3. Technical feasibility, i.e., can the action be undertaken by the County/towns using current staff and local funds, State, or Federal funds, or do other funding sources need to be identified?

The County and towns categorized actions as low, moderate or high priority based on assessment of the need for the specific action, the projected cost of implementation, the potential beneficial effects from implementation of the action, and available funding sources. The implementation years – between 2004 and 2009 – were determined using projected resources (personnel, vehicles, etc.) and operating funds. As discussed under Study Conclusions, the planning team determined that some potential actions were more

appropriately addressed at the State level due to long established priorities and responsibilities assumed by the State of North Carolina and local governments.

In developing actions, the County and municipalities relied on the following six mitigation policy categories provided by FEMA:

1. Preventive (P) Measures

Preventive measures are intended to keep hazard problems from getting worse. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or where capital improvements have not been substantial. Examples of prevention measures include:

- (a) Comprehensive land use planning
- (b) Zoning regulations
- (c) Subdivision regulations
- (d) Open space preservation
- (e) Building code
- (f) Floodplain development regulations
- (g) Stormwater management

2. Property Protection (PP) Measures

Property protection measures protect existing structures by modifying the building to withstand hazardous events, or removing structures from hazardous locations. Examples of property protection measures include:

- (a) Building relocation
- (b) Acquisition and clearance
- (c) Building elevation
- (d) Barrier installation
- (e) Building retrofit

3. Natural Resource (NR) Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their mitigative functions. Such areas include floodplains, wetlands, and dunes. Parks, recreation or conservation agencies and organizations often implement these measures. Examples include:

- (a) Wetland protection
- (b) Habitat protection
- (c) Erosion and sedimentation control
- (d) Best management practices (BMPs)
- (e) Stream dumping
- (f) Forestry practices

4. Emergency Services (ES) Measures

Although not typically considered a mitigation technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- (a) Hazard warning system
- (b) Emergency response plan
- (c) Critical facilities protection
- (d) Health and safety maintenance
- (e) Post-disaster mitigation

5. Structural Projects (S)

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event. The projects are usually designed by engineers and managed or maintained by public works staff.

Examples include:

- (a) Reservoirs, retention and detention basins
- (b) Levees and floodwalls
- (c) Channel modifications
- (d) Channel maintenance

6. Public Information Activities (PI) Activities

Public information and awareness activities are used to advise residents, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques that the public can use to protect themselves and their property. Examples of measures to education and inform the public include:

- (a) Map information
- (b) Outreach projects
- (c) Library
- (d) Technical Assistance
- (e) Real estate disclosure
- (f) Environmental education

## Mitigation Action Tables - Explanation of Columns and Acronyms

### Columns

#### Action #

Action # corresponds to FEMA mitigation policy categories listed above.

#### Action

Description of action to be undertaken. Where applicable, CRS category is referenced (Brunswick County). Note: An explanation of CRS activities is included in Tables II-7 – II-10.

#### Hazard

Hazard which the action addresses.

#### Objective(s) Addressed

Reference to the numbered objective which the action supports.

#### Relative Priority

Low, moderate or high priority for funding and implementation.

#### Funding Sources

State and Federal sources of funds are noted, where applicable.

#### Responsible Party

Staff department responsible for undertaking the action. Note: The Brunswick County Board of Commissioners and the individual Town boards have ultimate authority to approve any policy, program or regulation revisions.

#### Acronyms

CRS – Community Rating System

EMS - Brunswick County Emergency Management Services

FEMA - Federal Emergency Management Agency

GIS - Brunswick County Geographic Information Services

NCDENR - North Carolina Department of Environment and Natural Resources

NCDOT - North Carolina Department of Transportation

NCEM - North Carolina Division of Emergency Management

NRCS - Natural Resource Conservation Services

PD - Brunswick County Planning and Development Department

U - Brunswick County Utilities Department

USAC – US Army Corp of Engineers

#### Target Completion Date

Date by which the action should be completed.

**Table II-1: Brunswick County Mitigation Actions – Ordered by Action #**

Action #	Brunswick County Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
<b>Prevention Actions</b>							
P-1	Set up program to advise/assist property owners in retrofitting homes, businesses, and institutional facilities. (Retrofitting is defined as any modification to an existing building or yard to protect the property from flood damage.) (CRS 320)	All	1.1	Moderate	FEMA Local	BC BI	On-going
P-2	Continue/expand efforts to partner with area utility districts to encourage proper development of regional sewer systems.	All	1.1 2.1	Moderate	Local	BC EMS	On-going
P-3	When possible, ensure that no public facilities are proposed for flood hazard areas. Protect new critical facilities (e.g., schools, hospitals, fire stations, emergency shelters) to 2' above the 500-year flood elevation (5' above BFE) (CRS 430).	Flood	2.1	High	FEMA Local	BC EMS	On-going
P-4	Participate in the voluntary purchase of land parcels located in hazard areas or rendered unbuildable by storms or other events, for the purpose of shorefront access.	Flood	1.1	Moderate	FEMA Local	BC EMS BI	On-going
P-5	Continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services - fire, rescue, medical, etc.	All	1.1 2.1	Moderate	Local	BC EMS NCDOT	On-going
P-6	Maintain County Storm Water Ordinance (effective September 16, 2002) in conjunction with land use ordinances for compatibility of EPA Phase II NPDES requirements.	Flood	1.1	High	Local	BC BI	On-going
P-7	Complete Community Rating System Application using Hazard Mitigation Plan components to fulfill application requirements.	Flood	1.1	High	Local	BC BI	1-5 Years
P-8	Continue to address and strengthen approach to “scattered and sprawling, large lot subdivision activity”, “unplanned commercial strip development”, “sewage problems and sewage solutions”, and “storm water runoff and drainage”.	All	1.1 3.1	Moderate	Local	BC PB/PD	On-going
P-9	Strengthen the land use classification system by more closely defining allowed uses and designating certain areas as off limits to development.	All	1.1 3.1	Moderate	Local	BC PB/PD	1-5 years

Action #	Brunswick County Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
P-10	Develop an open space plan; target key properties for an open space acquisition program. (CRS 420)	All	1.1	Low	FEMA Local	PD Parks & Rec.	1-5 Years
P-11	Strengthen policies regarding directing urban level growth to appropriate locations where services can be provided.	All	2.1	Moderate	Local	BC PB/PD	1-5 Years
P-12	Review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430). Consider raising the minimum flood protection level from 1' above base flood elevation to 2' or more above BFE. All substantially damaged buildings should be elevated to this level (CRS 430).	Flood	3.2	High	Federal State	FEMA NCDENR NCDEM	1-5 Years
P-13	Evaluate the zoning ordinance for its ability to target and direct growth to areas consistent with the land classification map, the water distribution system, and existing and future sewer systems.	All	1.1 4.1	High	Local	BC PB/PD	1-5 Years
P-14	Continue efforts to revise, update and improve subdivision regulations particularly with regard to open space and tree preservation.	All	1.1	Low	Local	BC PB/PD	1-5 Years
P-15	Continue to improve road access standards to protect the integrity of significant traffic-carrying roadways throughout the County.	All	1.1	Moderate	Local	BC PB/PD NCDOT	1-5 Years
P-16	Employ specific provisions of the zoning ordinance, subdivision regulations and infrastructure improvement plans to encourage a town and country development pattern.	All	1.1 4.1	Moderate	Local	BC PB/PD	1-5 Years
P-17	Continue to count building improvements cumulatively (maintain permit history so when cumulative improvements equal 50% of building value, (substantial improvement) building must be brought up to flood protection standards for new construction) with a goal to eventually have all flood hazard endangered buildings brought up to flood protection standards (CRS 430).	Flood	1.1 1.2	High	Local	BC BI	On-going
P-18	Review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.	All	1.1	Moderate	Local	BC BI PB/PD	On-going
P-19	Continue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of the 100-year floodplain (CRS 310).	Flood	1.1 2.1	High	Local	BC BI	On-going

Action #	Brunswick County Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
P-20	Review written policies on water and sewer system extensions and tap on policies to ensure that the County is adequately addressing and discouraging inappropriate development in sensitive environmental areas and areas prone to flood or storm surge hazards.	Flood	1.1 4.1	High	Local	BC PB/PD Util./Eng	1-5 Years
P-21	Continue to allot capital funding for the implementation of hazard mitigation activities.	All	1.1	Moderate	Local	BC	On-going
P-22	Consider a shoreline overlay district to include requirements for more intense review of proposed drainage, and limitation on the type of land uses allowed within the overlay district.	Flood	1.1 4.1	Moderate	Local	BC PB/PD	1-5 Years
P-23	Implement specific zoning standards to discourage or prohibit floating homes from locating in public trust waters.	All	1.1	Moderate	Local	BC PB/PD	1-5 Years
P-24	Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of development.	Flood	1.1	Low	Local	BC	On-going
<b>Property Protection Actions</b>							
PP-1	Continue to acquire destroyed or substantially damaged properties and relocate households. Seek Federal and State funding. (voluntary program) (CRS 520/420).	All	2.2	Moderate	FEMA NCEM	BC	On-going
PP-2	Integrate publicly acquired land into public park and greenway systems. (CRS 420)	All	2.2	Low	Local	BC PB/PD Parks & Rec.	1-5 Years
PP-3	Consider establishing an involuntary program to acquire properties susceptible to flood damage (CRS 420/510).	Flood	2.2	Moderate	FEMA NCEM	BC PB/PD EMS	1-5 Years
PP-4	Identify properties for potential public acquisition and establish a list of priority properties for acquisition following subsequent natural disasters.	All	1.1 2.2	Moderate	Local	BC	On-going
PP-5	Consider establishing a program for purchase of development rights for floodplain properties. (CRS 420). (Possible partial or full tax deduction for charitable donation by property owner(s)).	Flood	2.2	Moderate	Local	BC	On-going
PP-6	Require residential construction to meet latest wind-resistance standards; encourage replacement of doublewide garage doors to improve wind resistance.	Wind	1.1	High	Local	BC BI	On-going

Action #	Brunswick County Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
PP-7	Require new masonry chimneys > 6' above roof to have continuous vertical reinforcing steel to help resist high winds. Retrofit existing chimneys.	Wind	1.1	High	Local	BC BI	On-going
PP-8	Ensure doorframes are securely anchored; especially double doors that can be very dangerous in high winds.	Wind	1.1	High	Local	BI	On-going
PP-9	Make sure that architectural features are designed, manufactured and installed to limit wind-borne debris.	All	1.1	High	Local	BI	On-going
PP-10	Encourage use of wind-resistant construction techniques used in coastal regions.	Wind	1.1	High	Local	BI	On-going
PP-11	Consider a policy for contractors to pick up building material and building debris prior to coastal storms.	All	1.1	Moderate	Local	BI/PD	On-going
<b>Natural Resource Actions</b>							
NR-1	Continue providing density credits for developments that establish perpetual easements for ecologically sensitive lands.	All	3.1	Low	Local	BC PB/PD	On-going
NR-2	Enhance and develop new public accesses to waterway resources in a manner as to protect sensitive environment areas from development and implement the priority recommendations contained in the Brunswick County Shoreline Access Plan Update.	All	1.2 3.1	Moderate	FEMA NCDENR Local	BC PB/PD	On-going
<b>Emergency Services</b>							
ES-1	Improve Hazard Warning and Response Plan (warning and evacuating critical facilities, getting persons out of flood prone or isolated areas, controlling vehicles on evacuation routes, evacuation of hazard materials) (CRS 610).	Flood	1.1 1.3	High	FEMA State Local	ES	On-going
ES-2	Continue and expand the program to retrofit schools and other public facilities to serve as emergency shelters.	All	1.1	Moderate	FEMA State Local	ES	Beyond 5-year update
ES-3	Use State grant funds to retrofit public properties as shelters.	All	1.1	Moderate	FEMA State Local	ES	Beyond 5-year update
ES-4	Provide training for "first responders" in identifying and reporting opportunities to mitigate the effects of future disasters.	All	1.1 1.3	Moderate	FEMA State Local	ES	On-going
ES-5	Work with industry to develop emergency response plans for specific industries and ensure that all plans are fully coordinated with County emergency management plans.	All	1.1 1.3	Moderate	FEMA State Local	ES	On-going

Action #	Brunswick County Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
ES-6	Ensure adequate evacuation time in case of major hazard event.	All	1.1 1.3	High	Local	ES	On-going
ES-7	Evaluate areas with limited evacuation capacity and pursue methods of improving capacity.	All	1.1 1.3	High	Local	ES	On-going
ES-8	Protect new critical facilities by floodproofing or locating outside the 500-year floodplain.	All	4.1 4.2	Moderate	Local	ES	Beyond 5-year update
ES-9	Establish program for evaluation and improvements of critical services and facilities.	All	1.3	High	Local	ES NCDOT DU H	On-going
ES-10	Evaluate flood or access problems for critical facilities; develop recommendations for protecting critical facilities. Identify alternative command posts.	All	1.3	High	Local	ES	On-going
<b>Structural Projects</b>							
S-1	Continue debris removal program to correct problem sites.	All	1.1	Moderate	Local	BC	On-going
S-2	Continue to support the dredging of waterways to improve function and water quality.	All	1.1	Moderate	Federal NCDENR Local	BC USACE	On-going
S-3	Continue to maintain/enforce an overall cap of 5% on post development storm water discharge increase over pre-development conditions.	All	1.1	Moderate	Local	BC	On-going
S-4	Continue to enforce and strengthen the County appearance code concerning removal of potential projectiles/debris such as junked motor vehicles and mobile homes, and dilapidated housing.	All	1.1	Moderate	Local	BC PB/PD	On-going
S-5	Continue to provide funding support for the artificial reef program.	All	1.1	Moderate	NCDENR	BC	On-going
S-6	Continue to support efforts to place spoil materials from channel maintenance and dredging on Brunswick County beaches, including each of the incorporated municipalities, as warranted.	All	1.1	Moderate	NCDENR USACE	BC	On-going
S-7	Section 206 Lower Lockwood Folly River Aquatic Habitat Restoration Project. (Removal of sediment bars to increase tidal flushing and improve aquatic habitat.)	All	1.1	Moderate	NCDENR USACE	NCDENR BC USACE	On-going
S-8	Complete phase-in of EPA Phase II requirements.	All	1.1	High	Local	BC	1-5 Years

Action #	Brunswick County Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party	Target Completion Date
<b>Public Information Activities</b>							
PI-1	Develop a tracking system to evaluate progress and revise mitigation activities as necessary. Track benefits in flood loss reduction.	Flood	1.1	High	NCDEM Local	BC	1-5 Years
PI-2	Produce an annual progress report on how well the plan is being implemented – send the report with the annual CRS re-certification and submit a copy to NC Division of Emergency Management.	Flood	1.1	Moderate	Local	BC	1-5 Years
PI-3	Establish a 5-year schedule for reviewing and updating the hazard mitigation plan.	All	1.1	High	Local	BC	1-5 Years
PI-4	Preliminary mapping of the Lumber River Basin has been completed and is under review for adoption. The Cape Fear River Basin mapping is on-going. Review of the preliminary maps can be viewed at <a href="http://www.ncfloodmaps.com">www.ncfloodmaps.com</a> .	Flood	1.1 1.2	High	FEMA NCDENR	FEMA NCDENR	1-5 Years
PI-5	Incorporate new FEMA digital FIRMs into the County GIS. (CRS 320)	Flood	1.1	High	Local	BC GIS	FY 05-06
PI-6	Develop and implement a hazard awareness program (elevation certificates, FIRM data, bulletin on property protection measures and flood insurance, etc.) that is available through the County's website <a href="http://www.brunscoco.net">www.brunscoco.net</a> (CRS 310/320/330/340/440).	Flood	1.2	High	Local	BC EMS	1-5 Years
PI-7	Establish locations for flood awareness signs – show elevations of high water during/after Hurricane Floyd, the base flood, and the base flood plus 2'. Signs should be surveyed to serve as elevation reference marks.	Flood	1.1 1.2	Moderate	Local	BC EMS	1-5 Years
PI-8	Expand efforts to disseminate flood insurance rate maps to realtors, developers, financial institutions, and insurance agencies.	Flood	1.2	Moderate	Local	BC BI PB/PD EMS/GIS	1-5 Years
PI-9	Early Warning System/Dissemination of information regarding need to seek shelter in safe room when high winds expected.	All	1.1	Moderate	Local	BC EMS	1-5 Years
PI-10	Establish and maintain retrofitting techniques and publicize in the public libraries, and also through citizen newsletters (CRS 330/350/360).	Flood	1.2	Low	Local	BC BI	1-5 Years

Source: Brunswick County.

**Table II-2: Town of Bolivia Mitigation Actions – Ordered by Action #**

<b>Action #</b>	<b>Town of Bolivia Actions</b>	<b>Hazard</b>	<b>Objective(s) Addressed</b>	<b>Relative Priority</b>	<b>Funding Sources</b>	<b>Responsible Party<sup>1</sup></b>	<b>Target Completion Date</b>
Bolivia P-1	Work with Brunswick County to set up program to advise/assist property owners in retrofitting homes, businesses, and institutional facilities. (CRS 320)	All	1.1	Moderate	FEMA Local	BC BI	On-going
Bolivia P-2	Work with Brunswick County to ensure that no public facilities are proposed for flood hazard areas. Protect new critical facilities (e.g., schools, hospitals, fire stations, emergency shelters) to 2' above the 500-year flood elevation (5' above BFE) (CRS 430).	Flood	2.1	High	FEMA Local	BC EMS	On-going
Bolivia P-3	In cooperation with Brunswick County, continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services - fire, rescue, medical, etc.	All	1.1 2.1	Moderate	Local	BC EMS NCDOT	On-going
Bolivia P-4	Continue to address and strengthen approach to “scattered and sprawling, large lot subdivision activity”, “unplanned commercial strip development”, “sewage problems and sewage solutions”, and “storm water runoff and drainage”.	All	1.1 3.1	Moderate	Local	BC	On-going
Bolivia P-5	Review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430). Consider raising the minimum flood protection level from 1' above base flood elevation to 2' or more above BFE. All substantially damaged buildings should be elevated to this level (CRS 430).	Flood	3.2	High	Federal State	FEMA NCDENR NCDEM	1-5 Years
Bolivia P-6	Evaluate the zoning ordinance for its ability to target and direct growth to areas consistent with the land classification map, the water distribution system, and existing and future sewer systems.	All	1.1 4.1	High	Local	BC	1-5 Years

Source: Town of Bolivia.

**Table II-3: Town of Calabash Mitigation Actions – Ordered by Action #**

Action #	Town of Calabash Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party <sup>1</sup>	Target Completion Date
Calabash P-1	Update the Land Use Plan.	All	1.1	Moderate	Local State	PB TB	1-5 Years
Calabash P-2	Revise/update Storm water Management Ordinance.	Flood	2.1	Moderate	Local	TB	1-5 Years
Calabash P-3	Update the Town Zoning Ordinance.	All	1.1.	Moderate	Local	PB TB	On-going
Calabash P-4	Work with Brunswick County to enforce NC Building Codes for wind resistance.	All	2.1	High	Local	BI	On-going
Calabash P-5	Ensure Mobile/Manufactured Homes are installed and secured properly.	All	2.1	High	Local	BI	On-going
Calabash P-6	Consider revising Flood Damage Prevention Ordinance.	Flood	1.1	Moderate	Local	PB TB	1-5 Years
Calabash S-1	Work with Brunswick County to enforce debris removal program to correct problem sites.	All	1.1	Moderate	County	BI TB County	On-going
Calabash PI-1	Produce an annual progress report on the status of actions proposed in the HMP.	All	1.1	Moderate	Local	TB	1-5 Years

<sup>1</sup> Abbreviations: PB – Planning Board, TB – Town Board, BI – County Building Inspections, County – Brunswick County.  
 Source: Town of Calabash

**Table II-4: Town of Navassa Mitigation Actions – Ordered by Action #**

<b>Action #</b>	<b>Town of Navassa Actions</b>	<b>Hazard</b>	<b>Objective(s) Addressed</b>	<b>Relative Priority</b>	<b>Funding Sources</b>	<b>Responsible Party<sup>1</sup></b>	<b>Target Completion Date</b>
Navassa P-1	In cooperation with Brunswick County, set up a program to advise/assist property owners in retrofitting homes, businesses, and institutional facilities. (CRS 320)	All	1.1	Moderate	FEMA Local	TN BC BI	On-going
Navassa P-2	Continue/expand efforts to partner with area utility districts to encourage proper development of regional sewer systems.	All	1.1 2.1	Moderate	Local	NWS	On-going
Navassa P-3	In cooperation with Brunswick County, ensure, when possible, that no public facilities are proposed for flood hazard areas. Protect new critical facilities (e.g., schools, hospitals, fire stations, emergency shelters) to 2' above the 500-year flood elevation (5' above BFE) (CRS 430).	Flood	2.1	High	FEMA Local	TN BC EMS	On-going
Navassa P-4	In cooperation with Brunswick County, continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services - fire, rescue, medical, etc.	All	1.1 2.1	Moderate	Local	TN BC EMS NCDOT	On-going
Navassa P-5	In cooperation with Brunswick County, continue to address and strengthen approach to “scattered and sprawling, large lot subdivision activity”, “unplanned commercial strip development”, “sewage problems and sewage solutions”, and “storm water runoff and drainage”.	All	1.1 3.1	Moderate	Local	NPB BC PB/PD	On-going
Navassa P-6	In cooperation with Brunswick County, continue to strengthen the land use classification system by more closely defining allowed uses and designating certain areas as off limits to development.	All	1.1 3.1	Moderate	Local	NPB BC PB/PD	On-going
Navassa P-7	In cooperation with Brunswick County, continue to strengthen policies directing urban level growth to appropriate locations where services can be provided.	All	2.1	Moderate	Local	NPB BC PB/PD	On-going
Navassa P-8	In cooperation with Brunswick County, continue to review and update the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430). Consider raising the minimum flood protection level from 1' above base flood elevation to 2' or more above BFE.	Flood	3.2	High	Federal State	NPB FEMA NCDENR NCDEM	1-5 Years

Action #	Town of Navassa Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party <sup>1</sup>	Target Completion Date
Navassa P-9	Evaluate zoning ordinance for ability to target and direct growth to areas consistent with the land classification map, the water distribution system, and existing and future sewer systems.	All	1.1 4.1	High	Local	NPB	On-going
Navassa P-10	Continue efforts to revise, update and improve subdivision regulations particularly with regard to open space and tree preservation.	All	1.1	Low	Local	NPB	On-going
Navassa P-11	Continue to improve road access standards to protect the integrity of significant traffic-carrying roadways throughout the Town.	All	1.1	Moderate	Local	NPB MPO NCDOT	On-going
Navassa P-12	In cooperation with Brunswick County, continue to review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.	All	1.1	Moderate	Local	TN BC BI PB/PD	On-going
Navassa P-13	In cooperation with Brunswick County, continue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of the 100-year floodplain (CRS 310).	Flood	1.1 2.1	High	Local	TN BC BI	On-going
Navassa P-14	Continue to allot capital funding for the implementation of hazard mitigation activities.	All	1.1	Moderate	Local	NWS	On-going
Navassa P-15	Consider a shoreline overlay district to include requirements for more intense review of proposed drainage and limitation on the type of land uses allowed within the overlay district.	Flood	1.1 4.1	Moderate	Local	BC PB/PD	1-5 Years

<sup>1</sup> Abbreviations: TN – Town of Navassa, NPB – Navassa Planning Board, NWS – Navassa Water/Sewer, MPO – Metropolitan Planning Organization

Source: Town of Navassa

**Table II-5: Town of St. James Mitigation Actions – Ordered by Action #**

Action #	Town of St. James Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party <sup>1</sup>	Target Completion Date
St. James P-1	Continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services - fire, rescue, medical, etc.	All	1.1 2.1	Moderate	Local	BC SJ NCDOT	On-going
St. James P-2	Consider participation in the Community Rating System using Hazard Mitigation Plan components to fulfill application requirements.	Flood	1.1	High	Local	BC SJ	1-5 Years
St. James P-3	In cooperation with Brunswick County, review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430). Consider raising the minimum flood protection level from 1' above base flood elevation to 2' or more above BFE.	Flood	3.2	High	Federal State	FEMA NCDENR NCDEM	1-5 Years
St. James P-4	Employ specific provisions of the zoning ordinance to seek ways to expand the ETJ as well as the existing corporate limits to control land use.	All	1.1 4.1	Moderate	Local	SJ BC PB/PD	1-5 Years
St. James P-5	In cooperation with Brunswick County, review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.	All	1.1	Moderate	Local	SJ BC BI PB/PD	On-going
St. James P-6	Consider an inventory of existing lots and structures within flood hazard areas to establish base flood elevation and finished 1 <sup>st</sup> floor elevation.	Flood	1.1	Low	Local	SJ BC	On-going
St. James PP-4	The Town will continue to actively participate in the Fire Wise program to reduce and remove debris that has the potential for fire hazards.	Fire	1.1	High	Local	SJ	On-going
St. James PP-5	The Town will continue to pursue efforts to reduce storm water runoff by draining, in advance of major storm events, the numerous retention ponds located on golf courses to reduce the amount of localized flooding.	Flood	1.1	High	Local	SJ	On-going
St. James ES-1	In cooperation with Brunswick County, ensure adequate evacuation time in case of major hazard events. The Mayor of St. James can invoke mandatory evacuation when needed.	All	1.1 1.3	High	Local	SJ ES	On-going

Action #	Town of St. James Actions	Hazard	Objective(s) Addressed	Relative Priority	Funding Sources	Responsible Party <sup>1</sup>	Target Completion Date
St. James ES-2	Evaluate areas with limited evacuation capacity and pursue methods for improving capacity. The Town of St. James has the ability, in case of an emergency evacuation, to open a secondary exit route via the application of gravel to an existing drainage ditch.	All	1.1 1.3	High	Local	SJ ES	On-going
St. James ES-3	Evaluate flood or access problems for critical facilities and develop recommendations for protecting these facilities. Identify alternate command post sites.	All	1.3	High	Local	SJ ES	On-going
St. James S-1	Continue debris removal program to reduce potential hazards during a hazard event.	All	1.1	Moderate	Local	SJ BC	On-going
St. James S-2	In cooperation with Brunswick County, continue to support the dredging of waterways to improve function and water quality.	All	1.1	Moderate	Federal NCDENR Local	SJ BC USACE	On-going
St. James PI-1	Develop and implement a hazard awareness program (elevation certificates, FIRM data, bulletin on property protection measures and flood insurance, etc.) that is available through the County's website <a href="http://www.brunesco.net">www.brunesco.net</a> and also available through the St. James website <a href="http://www.stjamespoa.org">www.stjamespoa.org</a> (CRS 310/320/330/340/440).	Flood	1.2	High	Local	SJ BC EMS	1-5 Years
St. James PI-2	Continue to educate town residents of potential effects of hurricanes and other natural disasters through the annual "Hurricane Awareness Symposium".	All	1.1 1.2	High	Local	SJ	On-going

<sup>1</sup>Abbreviations: SJ – Town of St. James

Source: Town of St. James

**Table II-6: Town of Varnamtown Mitigation Actions – Ordered by Action #**

<b>Action #</b>	<b>Town of Varnamtown Actions</b>	<b>Hazard</b>	<b>Objective(s) Addressed</b>	<b>Relative Priority</b>	<b>Funding Sources</b>	<b>Responsible Party<sup>1</sup></b>	<b>Target Completion Date</b>
Varnamtown P-1	Update Land Use Plan.	All	1.1	High	Local	TB PB	2006
Varnamtown P-2	Ensure that mobile/manufactured homes are installed and secured properly.	Wind	1.1	Moderate	County	County	On-going
Varnamtown P-3	Continue to encourage NC State Building Code enforcement for wind restriction.	Wind	1.1	Moderate	County	County	On-going
Varnamtown S-1	Support Brunswick County debris removal program to correct problem sites.	All	1.1	Moderate	County	County	On-going
Varnamtown S-2	Support the dredging of waterways to improve function and water quality.	All	3.1	Moderate	State	NCDENR USACE	On-going
Varnamtown S-3	Support the Brunswick County Appearance Ordinance.	All	1.1	Moderate	County	County	On-going
Varnamtown PI-1	Continue to provide flood maps for staff and public use.	Flood	1.1 3.1	Moderate	Local	PB	On-going

<sup>1</sup> Abbreviations: TB – Town Board of Commissioners, PB – Planning Board, County – Brunswick County, NCDENR – North Carolina Department of Environmental and Natural resources, USACE – United States Army Corp of Engineers.  
Source: Town of Varnamtown

### **E. Community Rating System**

The CRS has three major goals: to reduce flood losses, to facilitate accurate insurance ratings, and to promote awareness of flood insurance. There are four mitigation categories (Series 300, 400, 500 and 600) with a total of eighteen creditable floodplain management activities. Reference to the CRS category is included, as applicable, in Table II-1. A brief explanation of the four CRS mitigation categories is included in Tables II-7 – II-10. For more information, please contact the Federal Emergency Management Agency Regional Office in Atlanta (see Appendix D: State and Federal Resources for contact information).

#### **Public Information (Series 300)**

This series credits programs that advise people about flood hazards, flood insurance, and ways to reduce flood damage. These activities also provide data for insurance agents for accurate flood insurance rating. These programs serve all members of the community and work toward all three goals of the CRS. Activities for which credit is given are described in Table II-7.

**Table II-7: Public Information (Series 300)**

<b>Code</b>	<b>Activity</b>	<b>Description</b>
310	Elevation Certificates	<ol style="list-style-type: none"> <li>1. Maintain on all new construction and substantial improvements;</li> <li>2. Use FEMA form; and</li> <li>3. Make copies available to public.</li> </ol>
320	Map Information	<ol style="list-style-type: none"> <li>1. Consult Flood Insurance Rate Maps (FIRMs) in response to public;</li> <li>2. Advise of requirement for flood insurance;</li> <li>3. Maintain copies of FIRMs;</li> <li>4. Update maps to reflect new subdivisions, changes in corporate limits, and all new FIRM data from flood insurance restudies, map revisions, map amendments, Letters of Map Amendment (LOMA) and Map Revision (LORM); and</li> <li>5. Publicize service annually, keep record of service.</li> </ol>
330	Outreach Projects	Annually advise public of: <ol style="list-style-type: none"> <li>1. Flood hazards;</li> <li>2. Availability of flood insurance; and</li> <li>3. Flood protection methods.</li> </ol>
340	Hazard Disclosure	Disclosure information <ol style="list-style-type: none"> <li>1. Must be volunteered (not in response to a request); or</li> <li>2. Appear on a document, e.g., Multiple Listing Service printout or offer to purchase contract that person sees before committing to purchase property.</li> </ol>
350	Flood Protection Library	Local public library <ol style="list-style-type: none"> <li>1. Available to all branches;</li> <li>2. Maintain flood-related documents;</li> <li>3. No credit for keeping in planning office.</li> </ol>
360	Flood Protection Assistance	Annually publicize flood hazard information available: <ol style="list-style-type: none"> <li>1. Newsletter;</li> <li>2. Telephone book; or</li> <li>3. Other outreach project.</li> </ol>

### **Mapping and Regulations (Series 400)**

This series credits programs that provide increased protection to new development. Growing communities have opportunities for additional credit in this category. Activities include mapping areas not shown on the FIRM, preserving open space, enforcing higher regulatory standards, and managing stormwater. These activities work toward the first and second goals of the CRS - damage reduction and accurate insurance rating. Activities for which credit is given are described in Table II-8.

**Table II-8: Mapping and Regulations (Series 400)**

<b>Code</b>	<b>Activity</b>	<b>Description</b>
410	Additional Flood Data	<ol style="list-style-type: none"><li>1. Credit for studies conducted outside the Special Flood Hazard Area (SFHA);</li><li>2. Studies conducted in the SFHA where base flood elevations (BFEs) were not shown on FIRM;</li><li>3. Re-studying an area shown on the FIRM where new study produced higher BFEs; and</li><li>4. Studies that were conducted to higher standards than the normal FEMA mapping.</li></ol>
420	Open Space Preservation	<ol style="list-style-type: none"><li>1. Credit for preserving land in the floodplain as open space through:<ol style="list-style-type: none"><li>a) public ownership; or b) by development regulations that prohibit buildings and filling.</li></ol></li><li>2. Can be used for public parks, private preserves, playing fields, golf courses, etc.</li></ol>
430	Higher Regulatory Standards	Regulations that require new development to be protected to one or more standards stricter than the NFIP's minimum requirements.
430LZ	Low-Density Zoning	<ol style="list-style-type: none"><li>1. Credit for having at least 5 acres of floodplain in one or more zoning districts that requires a minimum lot size of 1 acre.</li><li>2. Available for undeveloped land within low-density zoning districts as well as for areas developed in accordance with the density requirements.</li></ol>
440	Flood Data Maintenance	Credit for keeping floodplain maps and elevation reference marks current, useful and accurate in order to improve local regulations, planning, disclosures, and property appraisals.
450	Stormwater Management	Credits regulation of new development within the watershed (not just the floodplain) to minimize adverse impacts of stormwater runoff on downstream flooding and water quality.
400SH	Special Hazard Areas	<ol style="list-style-type: none"><li>1. 413SH Additional Flood Data in Special Hazard Areas.</li><li>2. 423SH Open Space Preservation in Special Hazard Areas.</li><li>3. 433SH Higher Regulatory Standards in Special Hazard Areas.</li></ol>

### **Flood Damage Reduction (Series 500)**

This series credits programs for areas in which existing development is at risk. Credit is provided for a comprehensive floodplain management plan, relocating or retrofitting floodprone structures, and maintaining drainage systems. These activities work toward the first goal of the CRS – damage reduction. Activities for which credit is given are described in Table II-9.

**Table II-9: Flood Damage Reduction (Series 500)**

<b>Code</b>	<b>Activity</b>	<b>Description</b>
500	Repetitive Loss Areas	Create outreach project to inform property owners of flood damage prevention methods and flood insurance options.
510	Floodplain Management Planning	Expand Hazard Mitigation Plan to meet Section 511 standards if there are repetitive loss areas.
520	Acquisition and Relocation	Credit provided for acquiring, relocating or otherwise clearing buildings out of floodplains. Credit provided only if community also receives credit for vacant lot under Activity 420 Open Space Preservation.
530	Retrofitting	Credit provided for buildings that have been floodproofed, elevated, or otherwise modified to protect them from flood damage.
540	Drainage System Maintenance	Credit for inspecting drainage system, removing debris, correcting drainage problem sites and regulating dumping into the system.

### **Flood Preparedness (Series 600)**

This series credits flood for flood warning, levee safety, and dam safety programs. These activities work toward the first and third goals of the CRS – damage reduction and hazard awareness. Activities for which credit is given are described in Table II-10.

**Table II-10: Flood Preparedness (Series 600)**

<b>Code</b>	<b>Activity</b>	<b>Description</b>
610	Flood Warning Program	Credit for program that provides timely identification of impending flood threats, disseminates warnings to appropriate floodplain occupants, and coordinates flood response activities.
620	Levee Safety	Credit to communities protected by levees that are properly maintained and operated.
630	Dam Safety	Credit for any community in a state with a dam safety program that has submitted the necessary documentation of its program to FEMA. (Note: North Carolina has submitted documentation.)