



Hurricane Floyd was a large-scale disaster, compounded by preceding and subsequent drought and hurricane events, that struck at a community already under economic distress. The findings of this report illustrate that many of the economic conditions that became obvious as a result of this season's hurricanes and related flooding have other origins and only add to or intensify on-going trends in the region as a whole. Labor-force reductions in textile manufacturing, protracted litigation in the tobacco industry, and infrastructure limitations were already factors affecting the regional economy. These pre-existing conditions are not necessarily separable from impacts resulting from the hurricanes, but the recommendations that follow take the differences into consideration.

Although economic impacts will be felt in the region affected by Hurricane Floyd, the State of North Carolina is undergoing strong economic growth and is not anticipated to experience statewide long-term economic impacts resulting from Hurricane Floyd.

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### 5.1 Conclusions

#### 5.1.1 Non-Agriculture Business Sector

**The economy of the State of North Carolina is very strong and there is no direct evidence of a significant long-term effect on the State economy.**

The State of North Carolina holds an enviable position among all the states with its AAA bond rating status. The U.S. DOC, Bureau of Economic Analysis (BEA) reports that the State realized an increase of 5.6 percent in real GSP from 1996 to 1997, to \$218.9 billion. This increase was well above the national average of 4.3 percent. The projected \$4 billion revenue impact of Hurricane Floyd is less than 2 percent of the State's annual GSP. As widespread as the impacts of Hurricane Floyd were, the effects are not expected to be a strong force in changing the direction of the State's economy. The State may experience a minor economic effect with regard to building materials and government resources. Prices may rise due to reconstruction of damaged structures and government resources may be diverted from other parts of the State to assist in the rebuilding effort.

**In addition to the strong economy of the State, the potential for long-term economic impact of Hurricane Floyd has been diminished due to State and Federal response.**

The State of North Carolina has established agencies, notably the Division of Emergency Management, to focus State resources on immediate disaster response efforts. These resources were in operative mode as a result of Hurricane Dennis, which preceded Hurricane Floyd by a little over a week. FEMA, through its storm tracking network, moved supplies and equipment and positioned staff prior to Hurricane Floyd's landfall. FEMA also alerted sister agencies to their need for readiness to respond to potential mission assignments. These resources, combined with the financial support that storm victims and businesses will receive, were critical elements in reducing what may otherwise have been a devastating long-term disaster to the State's people and economy.

## Conclusions and Recommendations

**The 44-county area impacted by Hurricane Floyd has struggled to keep pace with the State's economic progress. The long-term impact to the region's overall economy will depend on the State's expansion of its pre-disaster economic development activities to include post-disaster recovery and mitigation efforts.**

Hurricane Floyd's immediate impact on the region's economy, an estimated \$4 billion in lost revenue and \$1 billion in structural damage to non-agricultural businesses, hits hard on an already distressed economy. It is the State's responsibility to take decisive and immediate action relative to the disaster recovery process, to implement mitigation measures, and institute economic development strategies to overcome the storm's impact and prepare for future disasters that are inevitable.

The region may benefit in the short-term from rebuilding activities associated with the recovery. However, a long-term vision ensuring against future business disruptions must be created and implemented to cope with the recurring natural disasters affecting this region.

**The State of North Carolina has no statewide land-use program aimed at mitigating the impact of disasters and sustaining economic development.**

Within the past ten years, North Carolina has experienced three catastrophic hurricanes (1989 – Hugo, 1996 – Fran, and 1999 – Floyd), plus an array of less notable storms. Catastrophic and minimal storm events are resulting in ever-increasing dollar damage. Land-use programs currently in effect, such as that established by the Coastal Area Management Act of 1974, are being publicly challenged as to effectiveness. The State actively supports mitigation planning and land-use initiatives which serve to increase mitigation opportunities. However, there is a need to expand efforts to more effectively implement mitigation measures.

**Available flood insurance coverage is not being obtained by those at risk.**

All 44 counties participate in the NFIP, as do 289 of the 318 local governments (with identified hazard areas). However, the number of policies in force is extremely low, particularly in the river basin areas of the coastal plain. Ten of the most severely impacted counties were below the 44-county average of 6.16 percent policy-to-household and business structure ratio. While most businesses carried insurance,

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### *Greenville, North Carolina*

One of the hardest hit communities during Hurricane Floyd was the town of Greenville, the county seat of Pitt County. Greenville is also the home of Grady-White Boat Company, which manufactures a line of sport fishing boats. The company has been a fixture in Greenville's economy for 40 years, with over 450 employees.

During Hurricane Floyd, the Tar River crested at over 20 feet above flood stage, cutting the Grady-White Boat Company off from the rest of the community. The primary concern for company president Kris Carroll was the safety and welfare of the employees, many of whom lost homes and transportation during the hurricane. Acknowledging that production would not resume at "full throttle" until the needs of the employees were addressed, priority was given to instituting a company-wide self-help initiative that focused on three fundamental objectives: providing transportation to employees, arranging for housing of the displaced, and addressing immediate needs of workers (including short-term financial assistance).

As a result of the spontaneous company-driven relief effort, the Grady-White Boat Company was able to resume business operations quickly. Equally important, the disaster has served as the impetus in a new effort by Kris Carroll to launch a county-wide business vulnerability assessment project. The premise is that with advances in risk assessment tools and technologies, it is possible to anticipate the consequences of natural hazards. What Pitt County and its neighbors need, according to Kris Carroll, is an organized approach to addressing these perils.

businesses were in general either uninsured or underinsured relative to flood-related damages. Businesses insurance covered only 18 percent of losses, on average. Small businesses were the least prepared. The risk associated with flood-related damages is not clearly recognized by businesses. Possible reasons for low business participation in the NFIP include: lack of risk-perception, pricing, lack of knowledge of NFIP, outdated floodplain mapping, no "full disclosure" law, and the lack of business understanding of their business insurance policies. Updates need to account for changes in floodprone areas as a result of new infrastructure, economic development and population growth.

**Some impacts of Hurricane Floyd were exacerbated by a history of decision-making based on urgent, short-term needs taking precedence over long-term visions or planning.**

The State is expanding its economic planning efforts through

the establishment of the Task Force on Rural Prosperity. The eastern region of North Carolina is largely rural. Historically, economic viability has been dependant on agriculture. Rapid changes in the industry (i.e., tobacco and hog production) have forced local communities to react quickly to bolster their economies. For example, infrastructure improvements and/or construction are needed to accommodate industrial farms. While these improvements are needed, potential impacts from future disasters must also be considered.

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### **The State of North Carolina had resources in place to address disaster response.**

Frequent storms over the past ten years have forced North Carolina to aggressively develop mitigation strategies. Following Hurricane Fran in 1996, the North Carolina Division of Emergency Management assembled a Disaster Recovery Task Force and developed a set of 84 action plans. All appropriate agencies of State government were engaged in response. The State is well positioned to build on its current response programs by providing local governments with the information, tools, incentives, and resources needed to mitigate disaster potentials, while establishing an environment of sustainable economic growth.

### **Eastern North Carolina's small business sector was the most impacted by Hurricane Floyd.**

Although they are the premiere job creation force in the State, small businesses are the most prone to setbacks due to disruptions that follow a disaster of the scale of Hurricane Floyd. Small businesses in the most severely impacted areas have had the most difficulty in resuming normal operations. The Institute for Business and Home Safety reports that, of all businesses that close down following a disaster, more than 43 percent never reopen, and an additional 29 percent close down permanently within two years. Small business recovery will be dependent upon successfully absorbing uninsured losses, restructuring debt, re-capitalizing, and properly assessing the post-disaster marketplace for their products and services. Also, small businesses have a clear need for affordable capital in the form of bridge or gap financing, and equity capital, to successfully recover. Consumer spending habits, as consistent with other large-scale disasters, are not expected to change significantly. However, due to the amount of uninsured flooding losses suffered by consumers, small businesses serving severely impacted local communities must be cognizant of the potential for lower disposable income levels. Small business sustainability will be dependent upon addressing business risk through mitigation and insurance.

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**Business continuation is supported by infrastructure and support services. Disruption in these areas leads to widespread business disruption beyond those suffering direct storm damage.**

The results of the Business Impact Survey indicate that businesses were twice as likely to experience disruption as a consequence of damage to infrastructure and lack of support services as they were to experience direct damage to their property or contents. A widely destructive event such as Hurricane Floyd creates disruption to economies that were not directly damaged. These disruptions are due to infrastructure failures such as power outages and road closures. Hurricane Floyd had an immediate negative impact on the planned growth of small, medium and large sized businesses throughout the 44-county impacted area, most immediately reflected in labor force reductions. Infrastructure needs, workforce support, material supply, and product-delivery systems and operations are important to support the business community. Effects of business disruptions in one area can be felt throughout the economic network. Future disruptions are anticipated as stress related damages to wastewater systems result in failures. The private and public sectors must collaborate to produce effective mitigation and sustainability strategies.

**Communities that had implemented mitigation measures prior to Hurricane Floyd were less impacted than those that had not.**

Communities in North Carolina incorporated numerous and varied mitigation measures that were found to be successful against the forces brought on by Hurricane Floyd. Communities employed strategies that mitigated damages and disruptions to their own community as well as supported other communities. While it is difficult to put an exact dollar value on avoiding damage and disruption, it is clear that the benefit of ensuring business continuation in areas recognized as disaster prone is immense.

Examples include:

- (1) The Town of Ayden took steps following Hurricane Floyd to establish a looped water system to ensure adequate water pressure for fire protection for a major employer.
- (2) The Town of Louisburg's Tar River Water Reclamation Facility has been recognized nationally for its mitigation efforts. As a part of the post-Fran recovery, the facility received over \$550,000 in EDA grants to increase capacity and mitigation. Even though the town was encircled

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by flood waters during Hurricane Floyd, it continued operation and provided water and waste treatment to two nearby communities that otherwise would have had none. Mitigation efforts prevented the possible release of contaminants into the community.

### 5.1.2 Agriculture Business Sector

**Hurricane Floyd had a significant regional impact on individual farmers and other agricultural producers.**

The agricultural sector in North Carolina has been challenged in recent years by weather conditions, court actions and environmental legislation, low market prices, and declining farm manpower. The combination of all these factors has brought about high debt-loads for many farmers. Hurricane Floyd has only added to these problems. Many farmers are so deep in debt that they cannot accept more. Crop and livestock losses may only impact farm sales this year, since farmers will be able to raise new crops and livestock next year. Facilities losses, on the other hand, will require longer recovery times. Most of the farm failures will be a result of the high cost of rebuilding or repairing farm facilities. Absent direct cash intervention by Federal, State, or other funding institutions, such as foundations, there is the distinct possibility that a number of small farmers will sell their farms.

**Hurricane Floyd did not have a significant impact on State or National agricultural markets.**

While the losses were significant to individual producers, they are not expected to impact the agriculture market prices at the national or State level. Most commodities had supply surpluses from other areas of the nation. The impact of Hurricane Floyd did not significantly reduce the available supply, and prices remained steady. The only

#### *Project Impact – City of Wrightsville Holiday Inn*

The Holiday Inn, a large resort hotel located on elevated beachfront property overlooking the Atlantic Ocean, is a major business for the City of Wrightsville. In 1996, Hurricane Fran struck the coast of North Carolina and the hotel sustained substantial damage of \$5 million. The hotel owners decided to demolish the structure and rebuild in such a way as to prevent, as much as possible, future hurricane damage by taking the following steps:

- Prior to construction of the new building, the lot was raised 15 feet and built up 4 feet above grade.
- The first floor of the new building was 21 feet above base flood elevation.

Hotel managers report damage from Hurricane Floyd was minimal - the hotel suffered very little wind damage and no water damage due to flooding. Benefits of the preventative measures taken by the Holiday Inn include uninterrupted employment and lodging availability.



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exception to this may be the sweetpotato market, since North Carolina produces 40 percent of the national supply, and almost all planted acreages were affected by flooding.

### 5.2 Recommendations

#### 5.2.1 Non-Agriculture Business Sector

**The State should move forward with their efforts to establish and implement a comprehensive State Disaster Recovery Program within the Governor's Office.**

The State must identify, coordinate, develop, and target resources to support economic recovery. For example, while the State's Division of Emergency Management was able to address immediate response needs, specific departmental responsibilities, activities, staff, and funding resources must be established and available to the Governor for disaster recovery. To be effective, the Division of Emergency Management, DOC, USDA and Environment and Natural Resources, and the Disaster Recovery Task Force should be part of the Disaster Recovery Program. This effort should:

- assemble pre- and post-disaster economic information and data collection;
- refine the State's current recovery activities into an established procedure to determine the needs resulting from specific occurrences;
- identify unmet programmatic and resource needs and matching grant requirements; and
- provide information and recommendations to guide executive, legislative and regulatory approaches to disaster recovery and mitigation plans.

The State needs to establish a disaster recovery information system that exceeds minimum FEMA standards for database analysis, impact modeling, and disaster assessment methodology.

**Initiate a long-range strategic planning process that includes relocation of critical facilities, vulnerable structures, and unsafe land-use activities out of the floodplain. To the extent these actions can be accomplished in conjunction with the rebuilding process, the community can recover and grow in a more disaster-resistant, livable, and sustainable manner.**

These "guiding principles" are based on an understanding of what has been successful for other communities under similar situations and should help guide short- and long-term recovery efforts by the State and local communities.

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### **Integrate mitigation concepts within short- and long-term economic recovery planning.**

It is critical for the local government to connect its recovery operations with disaster mitigation concepts to help businesses recover and encourage new business development in ways that make them more disaster-resistant and less vulnerable to real property damage. The State and affected counties should begin immediately to integrate mitigation concepts into economic recovery operations and planning efforts. This can be realized through a wide range of activities including elevating substantial business assets such as furnaces and electrical boxes above flood elevations; using materials and building practices that are more flood-resistant; or selecting safe locations for storing business records. These efforts should always be coordinated with the pursuit of opportunities for increasing diversity and sustainability in the business community.

### **Review building codes and ensure effective enforcement.**

Review building codes to ensure they are up to date and are serving to build a stronger and more disaster-resistant community. Future losses can be significantly reduced by ensuring that existing codes and ordinances are followed and enforced.

Carolina Beach, located in New Hanover County, is an island community that has taken positive steps towards mitigating the impact of natural disasters on its local economy. Carolina Beach Lake serves as a drainage basin for more than 500 acres of the island's waterways. As a result of historic hurricane damage, Carolina Beach had taken the following steps, prior to Hurricane Floyd, to prevent future damage:

- To reduce or avoid the impact of anticipated flooding, temporary pumps were installed in Carolina Beach Lake. By lowering the level of the Lake to within six inches of the bottom, the Lake would have an increased storage capacity and minimal flooding would occur; this, in turn, would reduce flooding of local businesses. Because of the success of this operation during Hurricane Floyd, the city plans to purchase and install a permanent pump to provide protection in the future.
- Some structures were elevated above the floodplain level or were relocated to higher elevations, including utilities in the marina (saving thousands in repair costs).
- Generators were purchased in advance of the storm to return power quickly to critical buildings.
- The city bid debris-removal contracts in advance.

The preventative measures that the city had taken resulted in minimal flooding and lessened damage caused by Hurricane Floyd. At least two businesses avoided damages and municipal assets were saved. Additionally, local fire and police departments were able to concentrate on their duties rather than focus on trying to get out of harm's way.

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**To the extent possible, relocate critical facilities outside the floodplain or, where this is not feasible, protect them from flooding through approved structural measures.**

Critical facilities are those that are vital to providing community services. They include major roadways; water supply and waste treatment plants; police and fire stations, hospitals, electrical generation facilities, emergency operations, and response centers; and emergency shelters and evacuation routes.

**Unsafe land-use activities should be relocated and prohibited from high hazard floodplains.**

This will serve to reduce pollution of floodwaters by hazardous materials. Unsafe land uses include structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials that can cause great environmental damage.

**The State should continue its efforts to enact comprehensive disaster mitigation legislation that consolidates all mitigation functions into single authority.**

To support a long-term, comprehensive program addressing mitigation issues, the State should immediately pursue legislation that incorporates disaster mitigation measures relative to the Coastal Area Management Act, land use and zoning issues (including agricultural standards), infrastructure permitting, building codes and permits, storm-water runoff, hazardous waste storage, and implementation of State programs. Legislation establishing consistency in implementation and ensuring against fragmented or partial application is critical. Additionally, the State, its municipalities and counties must continue to develop and implement means to fund pre-disaster mitigation measures and post-disaster programs that are in-place, operational, and have resources to immediately assist a local economy when a disaster occurs.

**The State should implement its Comprehensive Strategic Economic Development Plan and ensure that the plan is used to guide disaster economic recovery.**

The NCDOC, in partnership with regional and county economic development entities as well as the private sector, must provide leadership in ensuring that the State's Economic Development Plan is implemented and that it addresses growth, mitigation and sustainability. The Plan's goals of widely shared prosperity and

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sustainable development should receive increased attention in the wake of Hurricane Floyd. The Strategic Plan for Economic Development should be amended to integrate strategies for economic recovery in the hurricane impacted counties. This strategy should include bi-annual recommendations to the Governor and Legislature on the coordination of existing programs and new programs to address unmet needs. The strategy must take into account all State resources, including bonds, general funds, receipts from the tobacco settlement, and other revenues and grants. Used effectively, these income resources can be a significant component of the overall rebuilding process by acting as a catalyst for long-term, diversified economic growth that incorporates mitigation and sustainability.

**State and local governments need to plan and finance economic development activities that will assist recovery and mitigation efforts.**

Resources that are available to local governments and nonprofit development corporations to plan and finance economic development infrastructure are limited. The State, through the NCDOC, should develop a program to assist local governments in planning economic development activities that include site mitigation. The State, through the NCDOC and the Local Government Commission, should assess the financial impact of Hurricane Floyd to local governments in the 44-county area and then, based on this assessment, the State should develop a program to finance economic development activities using grants and loans.

### ***PROJECT IMPACT - Wilmington, NC***

The City of Wilmington serves as the county seat for New Hanover County and has incorporated mitigation as a way of life. Situated at the junction of the northeast and northwest branches of the Cape Fear River, the city's hazard mitigation activities go beyond State guidelines and are included in both the city's comprehensive and land-use management plans.

In 1989, the devastation created by Hurricane Hugo created a push in North Carolina for more stringent building codes to help buildings withstand high winds.

As an example of mitigation, and to bolster itself against future disasters, Wilmington spent \$26 million on the Sweeney Water Plant to:

- relocate the facility outside the floodplain,
- design the new facility to sustain 120 mph winds, and
- provide two 1,250 kW diesel generators to supply power for 2-3 days to ensure continued operation.

The new system, built after 1989, performed as expected following both Hurricane Fran and Hurricane Floyd. According to local officials, had the old system been in place and failed, the impacts would have been catastrophic, resulting in thousands of people without drinking water and sewage disposal for weeks.

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**The State should continue efforts to establish a land-use program that defines statewide goals and that delegates to local governments the responsibility for action plans to implement the goals. The program should incorporate regional needs, particularly river basins.**

Land-use programs are often inappropriately interpreted as being another phrase for “zoning,” which is, in turn, all too frequently seen as an attack on property rights. Emotional arguments have been presented on both sides of the issue for many years. The question for North Carolinians, particularly those in disaster prone areas, is “what is being lost as the ‘debate’ continues?” How much in economic value is lost when businesses are unwilling to accept the risk of locating in the area, when businesses are unable to restart following disaster, or when populations leave to find quality jobs elsewhere? An initiative similar to that established in Oregon, a State with economic diversity, cultural resources and economic power similar to North Carolina, should be considered. Oregon ranked first among all states with 7.6 percent change in real GSP between 1996 and 1997; this suggests their law has not hindered growth. Basically, the State establishes statewide goals and “guidelines,” or suggestions, which are not mandatory. Applicable to local governments, special districts, and State agencies, the laws strongly emphasize coordination and partnership between State and local governments. The State requires cities and counties to plan. It does not zone land or administer permits for local planning actions like variances and conditional uses.

**The State is encouraged to partner with Federal agencies and others in conducting disaster recovery seminars and workshops.**

The post recovery process can be lengthy and potentially frustrating. Resources available at the Federal level can be used by the State to address some of the early educational needs of the public. Examples would include requesting FEMA resources to assist in conducting community workshops on mitigation strategies, working with EDA and its local partners to present regional seminars on infrastructure related grant programs, or seeking NFIP assistance to conduct workshops on flood insurance. Additionally, in the development of this economic impact assessment, many Federal, State, public, nonprofit, and higher-educational resources were called upon to contribute to the final product. Many of these entities, particularly those based locally, have a deep understanding of the State, in social and economic terms, and

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have done significant work in disaster related issues. Accessing these resources would be beneficial in the early stages of recovery so as to impart knowledge and procedures designed to streamline the recovery process.

**The State is urged to pursue a river basin/watershed area project, preferably in the Nuese, Tar, or Cape Fear river basin, to demonstrate mitigation strategies and sustainable economic development. The project could be constructed around the Project Impact model.**

The State of North Carolina should use the success of FEMA Project Impact in Wilmington as a model for a project to include an entire river basin. Hurricane Floyd caused multi-county, multi-jurisdictional flooding throughout the eastern river basins. The issue of flood impact to down-stream communities resulting from up-stream development has reached a new level of debate. The need is clear for a regional, basin-wide approach to the problem, bringing a diverse and multi-talented representation of the region together. Concentrating resources, energy and funds on a single area could create the prototype for other similar areas within the State.

**The State is encouraged to monitor the need to expand the resources available through the Local Governments Commission to counties and municipalities in the area of debt restructuring and budgeting in anticipation of greater demand for these services over the next year.**

The State must take appropriate actions to assist local governments in the construction of infrastructure necessary to provide basic public services. Consistently, the Local Governments Commission is recognized by the private financial sector as being central to the financial integrity and soundness of the State's local governments. It is unknown at this time the level of its resources that will be called upon relative to the fiscal impact of the storm on local governments. The State should be prepared to respond quickly to needs in this area.

**FEMA and the National Flood Insurance Program (NFIP) State Coordinator should determine the reason for the low participation in the NFIP and take appropriate steps to improve participation.**

The economy of local communities and the region must continue following a natural disaster. This assessment has found community participation in the NFIP to be significant, however individual and

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business insurance coverage is seriously lacking. It will take time to address the many issues in the flood insurance debate (i.e., mapping, disclosure, affordability and risk awareness). Until then, the most immediate mitigation action available to individuals and businesses, if relocation is not an option, is flood insurance. FEMA is encouraged to study the NFIP as it is currently offered and identify reasons for the low participation in floodprone areas and take corrective actions as appropriate.

**Economic development organizations at the State and local level should establish new capital sources targeting medium and small businesses.**

The small business community makes significant contributions to the State's economy and job growth, and needs to be supported accordingly. The EDA's Economic Adjustment Revolving Loan Fund Program (RLF) presents opportunities for economic development districts and nonprofit organizations to establish revolving loan programs targeting disaster recovery efforts. When used as "gap" financing, the RLF loans better leverage limited equity positions and enhance private-sector lending, thus maintaining or creating jobs in the local community. The RLF programs are an ideal capital resource for small and medium businesses and small communities, the groups most impacted by Hurricane Floyd. Importantly, RLF programs should mandate use of standard documentation and centralized servicing to be easily packaged or securitized, and sold. This would allow a more rapid cycling of funds for additional loans. Also, the State should consider creating a small business capital consortium that encompasses both loans and innovative equity capital infusions that target disaster impacted businesses. Given the particular distress that the region's minority populations potentially faces, the consideration of a minority capital program is encouraged. Additionally, business incubators linked to higher education institutions, as well as higher education focus on small business sustainability presented through distance learning programs, need to be explored. These programs would have an objective of business sustainability. Graduation from these programs could be the gateway to greater economic support through the loan and equity programs noted earlier.

## Conclusions and Recommendations

### **Communities, businesses, and farmers should implement measures to mitigate against the effects of future hurricanes.**

Natural disasters are beyond business or community control, while mitigating their effects is not. Being more versus less prepared for a disaster has been shown to pay off. FEMA estimates that for every dollar spent on mitigation, two dollars are saved on disaster recovery.

### **Integrate mitigation and economic recovery planning.**

FEMA can help identify businesses that should be considered as principal “targets” for mitigation - those structures subject to repetitive flood losses. FEMA has already begun to list target structures in many communities. This information can and should be incorporated into mitigation and recovery planning.

### **5.2.2 Agriculture Business Sector**

#### **Agricultural structures and facilities should not be rebuilt in the floodplain and damaged structures should be repaired using floodproofing techniques.**

If an agricultural structure or facility, like an animal waste system, must be rebuilt, then that facility should not be rebuilt in the floodplain. The NCDENR has established a policy, based on State and Federal law, that animal waste systems that need to be replaced must be rebuilt outside of the 100-year floodplain.<sup>36</sup> Compliance with FEMA regulations also requires structures within the 100-year floodplain with substantial damage (over 50 percent of market value) to be either elevated above the 100-year flood elevation or relocated outside the floodplain.

Structures that were not substantially damaged can also mitigate flood damage by elevation or relocation. In addition, structures can be repaired using construction methods and materials that can provide some amount of floodproofing. This includes dry floodproofing methods, which prevent floodwaters from entering structures, and wet floodproofing methods, which make them resistant to flood damage.<sup>37</sup> In the wake of the Midwest floods of 1993, FEMA sponsored research into wet floodproofing of agricultural buildings. The research found that

<sup>36</sup> DENR, “DENR Announces Emergency Waste Management and Rebuilding Policies for Animal Operations” (<http://www.ehnr.state.nc.us/EHNR/floyd/rebuild.htm>)

<sup>37</sup> FEMA, Homeowner’s Guide to Retrofitting. (<http://www.fema.gov/mit/rfit/>)

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wet floodproofing (for up to 6 feet of flooding) is technically feasible for many pole-frame and metal-frame agricultural structures, including many intensive livestock facilities.<sup>38</sup>

Technical assistance for rebuilding structures and facilities is available from FEMA, USDA, and the NCDA&CS (especially the Cooperative Extension Service) and through the Internet. The USDA, NRCS EWP Program and FSA Emergency Conservation and Emergency Loan Programs can all provide funding for agricultural recovery. The USDA also has programs like the Farm Labor Housing Program that can provide assistance and loans for construction of housing for migrant workers.<sup>39</sup> NCDENR can also provide financial assistance through the Clean Water Management Trust Fund. Press releases from the fund indicate that grants have already been approved that will purchase conservation easements on swine operations, helping protect waters from lagoon overflow.

### **Farmers should consider alternative agriculture management practices that are more flood-resistant.**

Some of the livestock losses from Hurricane Floyd were caused by starvation when electrically powered animal feeding equipment could not function, due to flooding or lack of power. If those livestock operations continue in or near the floodplain, producers need to consider elevating equipment above flood elevations, use of generators or other temporary sources of electrical power, or purchasing equipment that can function without electrical power (gravity driven systems). The USDA and FEMA may also want to fund research into development of flood-resistant agricultural equipment.

However, there will still be crop losses during major floods to fields located in the floodplain. In these cases, farmers may want to consider planting more flood-resistant crops, growing crops that are typically harvested early in the hurricane season, or removing land from production. Livestock producers may also want to consider raising grazing livestock, like cattle, that can better cope with flood conditions.

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<sup>38</sup> Greenhorne & O'Mara, Inc, 1997, "An assessment of technical and economic feasibility of wet floodproofing for agricultural and accessory structures under the National Flood Insurance Program". Prepared for FEMA's Mitigation Directorate, 3/14/97 -Contract EMW-94-4484, TO #7.

<sup>39</sup> USDA, Programs for Farmworkers (<http://www.usda.gov/news/releases/1998/04/0164>)

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Aquaculture production also provides an alternative to conventional agriculture that is more disaster-resistant and conducive to low-lying areas. For farmers considering taking land out of production, the USDA has programs like the NRCS Wetland Reserve Program and the FSA Flood Risk Reduction and Conservation Reserve Programs.<sup>40</sup> The NCDENRs Clean Water Management Trust Fund can also fund projects that acquire or protect floodprone land if the project helps protect water quality. The EarthSat crop loss estimates predicted around 20 percent of the cropland in the 44 counties were flooded. Converting these areas to alternative uses may help protect farms from future flood events and lessen the flooding impacts.

**Local, State, and Federal agencies need to assist farmers with disaster preparation and response coordination.**

Some of the agricultural losses from Hurricane Floyd could have been avoided with better disaster preparation and response coordination. Losses of agricultural equipment might have been avoided if disaster plans had included temporary relocation of equipment to higher ground. Counties and communities should consider developing temporary equipment relocation plans that provide a number of locations that are above any projected flood heights. Relocating livestock could also be an option, but would require extensive coordination and transportation needs. Facilities that are equipped for animal housing, like a county fairground, might serve as a temporary home for livestock from flooded farms.

After a disaster, response coordination helps prevent farm failure. Locally, county agents of the FSA, NRCS, and Cooperative Extension Service need to work with communities to develop disaster response plans that address agricultural producers needs. The key to helping farmers survive a disaster like Hurricane Floyd is in helping them understand what assistance is available and when they can expect reimbursement. Many of the unmet agricultural needs reported following Hurricane Fran resulted from the amount of time it took those programs to evaluate applications and distribute funding, and not from a lack of assistance programs.<sup>41</sup> State and Federal agencies can streamline the agricultural assistance process by using techniques

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<sup>40</sup> USDA, Conservation Programs, (<http://www.nrcs.usda.gov/NRCSProg.html>)<sup>42</sup> North Carolina Hurricane Fran Disaster Task Force Report and Current Status (<http://www.dem.dcc.state.nc.us/taskforce/execsum.htm>)

<sup>41</sup> NC Hurricane Fran Disaster Task Force Report and Current Status (<http://www.dem.dcc.state.nc.us/taskforce/execsum.htm>)

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employed by FEMA to streamline their assistance programs. Some of these techniques include providing specializing training on programs to prepare personnel for disasters, standardizing and computerizing evaluation tools, and deploying personnel in the field to assist local efforts. The Internet also facilitates coordination of information between local, State, and Federal personnel.

### **Farmers can decrease the economic risk posed by natural disasters by purchasing flood, property, and crop insurance.**

Many of the agricultural losses from Hurricane Floyd can be covered by insurance. The NFIP covers many types of structures, but does not cover agricultural equipment. According to the North Carolina Farm Bureau, flood losses of agricultural equipment and livestock can be covered by most farm property insurances.<sup>42</sup> Crop losses for major crops are covered by the USDA Risk Management Agency's Crop Insurance Program.<sup>43</sup> Those crops not covered under the program can be covered by the FSA Noninsured Crop Disaster Assistance Program.<sup>44</sup>

While insurance is available to cover most flood losses to agriculture, many farmers do not purchase policies. Usually farmers will have property insurance that covers equipment and livestock losses. However, few have flood insurance through FEMA or crop insurance through USDA. For some farmers, the past history of natural disasters did not convince them of a substantial risk. For other farmers, the cost of insurance does not provide enough coverage to make it worthwhile.<sup>45</sup> The high cost of crop insurance has been acknowledged in the \$8.7 billion U.S. Farm Rescue Plan signed on October 22, 1999, which included measures to help subsidize crop insurance, in addition to compensation for low market prices and funding for direct disaster relief.<sup>45</sup> According to news reports, the first checks to grain and cotton growers should have arrived by mid-November.<sup>46</sup> State and Federal agencies should develop materials and presentations that help inform farmers of the benefits provided by insurance. Farmers can also mitigate flood losses by taking land out of production.

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<sup>42</sup> North Carolina Farm Bureau (<http://www.ncfb.com/>)

<sup>43</sup> USDA, Risk Management Agency. (<http://www.rma.usda.gov/>)

<sup>44</sup> Farm Service Agency Online, Natural Disaster Assistance (<http://www.fsa.usda.gov/pas/disaster/assistance1.htm>)

<sup>45</sup> Reuters Limited, 10/22/99, "Highlights of \$8.7 billion U.S. Farm Rescue" (<http://biz.yahoo.com/rf/991022/zn.html>)

<sup>46</sup> Charles Abbott, Yahoo! News, 10/23/99, "Clinton Signs \$8.7 Billion Farm Bail-Out" ([http://dailynews.yahoo.com/h/nm/19991023/pl/clinton\\_farm\\_3.html](http://dailynews.yahoo.com/h/nm/19991023/pl/clinton_farm_3.html))

## Conclusions and Recommendations

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### **The preservation of small family-owned farms will depend on State and Federal support.**

The State and Federal governments will need to take an active role in the preserving of family-owned farms. The State first needs to determine if it is in their best interest to shift from small family-owned farms toward large agri-business corporation-owned farms or if it should allow more farmland to be converted to housing tracts. If a shift away from small family-owned farms is acceptable, the State need do nothing. If, on the other hand, the State would like to preserve the existing stock of small family-owned farms, the State must intervene with grant and other programs and must marshal Federal funding sources to assist. Most farms that will fail following Hurricane Floyd are the small family-owned farms that could not afford the insurance or did not have the assets to overcome their losses. Through existing State and Federal agencies like the Cooperative Extension Service, USDA FSA, and NRCS, programs and legislation can be developed that fulfill the specific financial and technical needs of these farms. These programs could facilitate the creation of co-op programs in which groups of small farmers act as a single entity to compete with large corporate farms. Zoning and State laws could help keep farmlands in the hands of families. Educational programs promoting insurance could help farmers withstand future disasters. Whatever the program, State and Federal agencies will need to coordinate their efforts.

### **Knowledge gained from Hurricane Floyd should be used to enhance existing policies.**

Following Hurricane Fran, the North Carolina Governor's Task Force developed a report detailing long-term recovery recommendations. Most of the recommendations in the agricultural sector dealt with shortcomings of Federal programs, excessive damages and recovery to forestry, and better coordination and planning. The response to Hurricane Floyd provides an opportunity to revisit the Hurricane Fran recommendations and determine any new issues that may have arisen. Local, State, and Federal agencies should determine what needs have gone unmet by existing technical and financial assistance and develop action plans to address them.

## Section 5

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### 5.3 Postscript

The recommendations presented in this assessment respond to the specific and extraordinary damages to North Carolina resulting from Hurricane Floyd's landfall. Any state having the potential to be impacted by natural disasters, and particularly those subject to recurring disasters, must learn from these events. The message is clear - the on-going need for preparedness through implementation of mitigation and sustainability strategies is critical for continued economic growth, for community viability, and for safeguarding the public's welfare. To do anything less would be to ignore the inevitability of future disaster events.