



### 2.1 Introduction

This assessment report has three objectives:

- Provide recommendations and guidelines for the economic recovery of the State and affected communities,
- Give guidance to disaster-prone communities on becoming more disaster-resistant, and
- Continue the development of a database to assess economic impacts of disasters in the United States.

This report identifies the economic needs and available resources within the affected business communities to better integrate economic impact concerns early in the disaster response. This section discusses the approach and methodology used to acquire the data obtained from various State and Federal sources and a survey of impacted businesses.

To provide a comprehensive picture of the impact Hurricane Floyd had on the North Carolina economy, the EDA team interviewed a representative sample of the primary business owners or managers that were affected by the hurricane. For the agriculture business sector, the EDA team used data generated by North Carolina County Offices of the United States Department of Agriculture (USDA) Farm Service Agency (FSA).

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In this report, the agricultural business sector required a separate analysis of damage for several reasons:

- First, the impact of Hurricane Floyd in North Carolina was widespread and caused significant damage to the agricultural business sector. Unlike some natural disasters like tornadoes, which only affect small, localized areas, Hurricane Floyd affected the entire eastern half of North Carolina. One of the primary economic sectors in that half of the State is agriculture.
- Second, most of the statistics and information maintained about employment and wages concern those businesses that are insured under the North Carolina Employment Security Law (around 99 percent of the total State employment). Among the businesses left out are small farms, where the workers are self-employed farmers or short-term farm workers, including young family members or migrant workers.<sup>1</sup>

It is worth noting here that methods for generally estimating disaster-related economic impacts are available through HAZUS Earthquake Loss Estimation Methodology (FEMA Technical Manual, 1997). If actual data could not have been retrieved through interviews with a significant portion of the business community, then the use of national averages to estimate losses would have been appropriate.

For this disaster, actual data was obtained for the preparation of this report and the HAZUS methodology was not used. However, there is a strong desire on the part of FEMA to increase the ability of HAZUS methodology to account for a broader range of disaster types and conditions. Therefore, an important benefit of this report and similar efforts is the data that can be used for further refinements and calibrations of the HAZUS methodology. The HAZUS methodology is included with this report as Appendix C for reference.

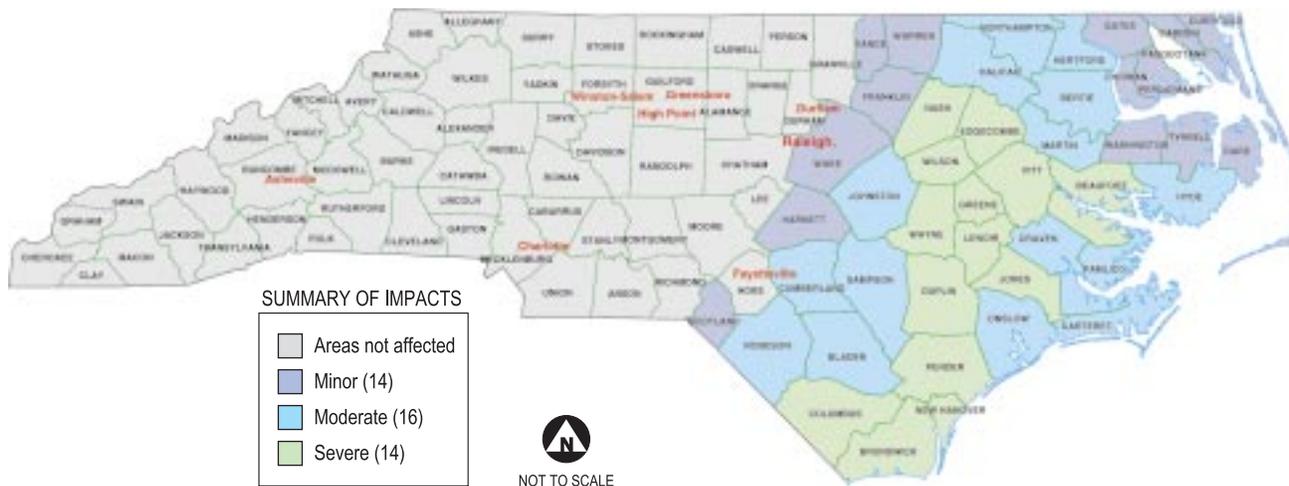
### 2.2 Pre-Disaster Economy

The EDA team first characterized the pre-disaster economy of the State of North Carolina and the 44 most impacted counties (Figure 2-1). Data was collected from existing sources available through the North Carolina Department of Commerce (NCDOC), USDA and other State and local agencies. Information collected included primary industries, tax structures, farm production, and employment.

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<sup>1</sup> North Carolina Employment Security Commission: North Carolina Employment and Wage Information (<http://so11.esc.state.nc.us/lmi/ew/preface.htm>)

**Figure 2-1 Counties with Severe, Moderate, and Minor Damage**



## 2.3 Post-Disaster Economy

### 2.3.1 Non-Agriculture Business Sector

Primary data was collected from impacted businesses through telephone interviews to provide insight into the post-disaster economy beyond the limited published information available. These interviews, as described below, were supplemented by interviews with State officials, financial institution representatives, minority group representatives, and others affected by the disaster.

A questionnaire first developed for use in assessing the impacts of tornadoes that struck in Kansas, Oklahoma and Texas in May 1999 was modified for use in North Carolina. Because of the large number of potentially impacted businesses in the 44-county area and the need for immediate results, it was impractical to personally interview each business owner/manager. Therefore, the Team engaged the services of East Carolina University’s (ECU) Survey Research Laboratory to randomly select a statistically significant number of businesses in each county to interview.

The Team chose a representative sample that was cross-referenced by the following factors:

- Business sector,
- Number of employees (small = 1 to 9 employees, medium = 10 to 99, and large = 100 or more), and
- By county according to the severity of its damage impact, as determined by an early evaluation.

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No severely- or moderately-impacted county had fewer than 50 interview opportunities, with the highest number (188) in severely-impacted New Hanover County. The counties with minor impacts had 40 interview opportunities each. The sample size is 2,461, with a collective margin of error of plus or minus 2.0 percent, at a 95 percent confidence level.

The ECU Survey Research Laboratory, using the Business Impact Survey questionnaire, conducted telephone interviews of this representative sample. In-person interviews were conducted by the regional economic development agencies when telephone interviewers were unable to contact the business.

The ECU survey data was collected for direct impacts to business. The data was categorized based on business size (i.e. number of employees). Direct impacts include:

- the cost of repair and replacement of damaged and destroyed buildings;
- the costs of damage to building contents;
- losses of inventory;
- relocation expenses;
- loss of productivity, services or sales;
- wage loss; rental income loss (to building owners); and
- tax base losses.

The interviews also provided each business owner an opportunity to discuss issues of concern such as availability of relocation properties, loss of customer base and infrastructure limitations. Frequently repeated concerns are addressed in this report, as appropriate.

A summary report on the results of the Business Impact Survey, and other background materials, are included as Appendix I.



### 2.3.2 Agriculture Business Sector

The agricultural business sector includes agricultural production, forestry, commercial fisheries, and related services. The sector includes businesses that produce agricultural commodities and sell them directly to the public.

The survey described in Section 2.3.1 may have obtained information from larger agricultural businesses, such as equipment dealers, agricultural consultants or pork processors. However, individual

farmers were not surveyed. As a result, an alternative approach was used to gather agricultural damage information.

The main source of damage data to agriculture are damage reports filed by North Carolina County Offices of the USDA FSA. The FSA staff, along with staff from the USDA Natural Resource Conservation Service (NRCS) and the North Carolina Cooperative Extension Service (NC CES), provided details of estimated losses to livestock, crops, and farm facilities and equipment. The damage estimates were based on “windshield” surveys of the flooded areas and conversations with farmers and local residents. The goal of these damage reports was to produce a timely loss estimate that can be used to guide USDA disaster assistance programs. The information contained in the FSA damage report from each county is compiled, summarized into regional statistics, and provided to the public on the North Carolina State Agricultural Statistics Service (NCASS) website. The FSA damage reports include two counties, Granville and Hoke, that are not included in the 44-county area; these two counties account for less than 0.2 percent of the total agricultural loss. The most recent county-by-county estimates of damage provided by the FSA were dated October 19, 1999. While the overall State estimates of damage were finalized on October 29, 1999, there appear to be minimal differences between the damage estimates on these two dates.

In addition to the above-described FSA damage reports, other information sources were used to supplement the FSA data as follows:

- Crop damage was estimated from weather data, satellite images, and crop growth models by the Earth Satellite Corporation (EarthSat).<sup>2</sup>
- Loss of livestock can be evaluated by disposal of dead animals. Several agencies track the extensive dead animal disposal efforts:
  - The North Carolina Department of Agriculture and Consumer Services (NCDA&CS) requires most animals to be either incinerated or buried using approved methods. Poultry can also be composted.
  - The NRCS tracks carcass disposal through applications for financial support through their Emergency Watershed Protection Program.
  - The NCDA&CS Veterinary Division and the USDA Animal and Plant Health Inspection Service (APHIS) also maintain records concerning animal disposal.
- Fisheries damage assessments are divided into freshwater and saltwater fisheries. The freshwater fisheries responsibilities fall under

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<sup>2</sup> Earth Satellite Corporation (<http://www.earthsat.com/>)

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the NCDA&CS Division of Aquaculture and Natural Resources. Damage to the aquaculture industry from Hurricane Floyd was assessed for the State through conversations with producers throughout the affected regions. The North Carolina Department of Environment and Natural Resource (NCDENR) Division of Marine Fisheries manages saltwater fisheries. Initial estimates of commercial losses are based on estimates of reduced landings from last year. These damage estimates are estimated for white shrimp, blue crab, oysters and scallops, inshore flounder, and snapper and grouper. Losses are also estimated for lost or destroyed crab traps and lost charter boat trips.

- Forest resource damages are projected by the NCDENR Division of Forest Resources (DFR). The DFR breaks their damage assessment into timber blown down, flood damage, and destruction of young reforestation projects. Blown down estimates are determined through aerial assessments. Water damage from flooding is derived by looking at flood levels in stands of different tree species and accounting for the water tolerance of that species. The destruction of reforestation projects is estimated in a similar manner, with the analysis constrained to young stands of trees.

### 2.4 Summary

While the current damage assessments are based on the best available knowledge, all of the loss estimates are likely to change over time, as more information becomes known about damages. For example, forestry damages will not be fully known for many months, because weakened trees may not die until next spring or summer. Estimates of crop losses will also change as harvest is completed and actual yields are recorded. Livestock losses due to stress of the event may occur as well. Additionally, once the monthly and quarterly situation reports for different sectors of the economy covering the time period around Hurricane Floyd are published, these reports can be compared with previous years' reports to assess how each economic sector was affected by Hurricane Floyd and how each sector is recovering. For example, commercial fisheries losses will be better known once the trip ticket totals from Hurricane Floyd-impacted months can be compared with totals from previous years.

Analysis of the data described above provides the basis for the conclusions and recommendations that follow.