



**State of North Carolina
Cooperating Technical State
Mapping Activity Statement**

Agreement E—Updated Flood Hazard Data and Digital FIRM Production for Six Eastern River Basins

In accordance with the Cooperating Technical State (CTS) Memorandum of Agreement dated September 15, 2000, between the State of North Carolina and the Federal Emergency Management Agency (FEMA), Agreement E is as follows:

- 1. Objective and Scope:** The objective of this Mapping Activity is for the State of North Carolina to develop updated flood hazard data for the six eastern river basins (Lumber, Cape Fear, White Oak, Neuse, Tar-Pamlico, and Pasquotank) and use those data to produce Digital Flood Insurance Rate Maps (DFIRMs) for the affected counties and communities.

As a result of the "Project Scoping for Six Eastern Basins" conducted under Mapping Activity Statement A, Basin Plans documenting the flooding sources to be updated and methodologies to be used will be developed. The Basin Plans will also document the countywide DFIRMs to be produced using these updated flood data. As such, the final Basin Plans issued by the State and FEMA to the affected counties and communities will become official attachments to this Mapping Activity Statement.

Additionally, DEMs developed as part of Mapping Activity Statement D, "Digital Elevation Data Development," will be used for modeling coastal and riverine hazards and delineating floodplains under this Agreement. Further, field surveys will be conducted as part of this Agreement for flooding sources to be studied in detail to obtain channel and structure geometry and bathymetry and integrated into the DEMs for engineering modeling. All topographic and flood elevations will be referenced to North American Vertical Datum of 1988 (NAVD88).

Base maps identified as meeting FEMA's DFIRM specifications under Mapping Activity Statement C, "Digital Base Map Data," will be used for DFIRM production under this Agreement. The DFIRMs will be produced in countywide format whereby the unincorporated areas of the county and incorporated communities within the county are shown on the same set of maps.

For flooding sources that will be redelineated, cross sections and floodway boundaries will be digitized from the currently effective FIRMs and merged with the new flood hazard data for updated flooding sources. BFEs for such areas will be referenced to National Geodetic Vertical Datum of 1929 will be converted to NAVD88. Additionally, effective Letters of Map Change (LOMCs) will be reflected in the DFIRMs, as appropriate.

- 2. Period of Performance:** This Mapping Activity will begin in January 2001 and be completed by August 2003. It is anticipated that preliminary countywide DFIRMs will be issued for counties in the Lumber, White Oak, and Tar-Pamlico River basins around September 2001 and for the Cape Fear, Neuse, and Pasquotank River basins around September 2002. Further, it is planned that post-preliminary processing (community review, statutory 90-day appeal period,

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and a compliance period) will be completed and final effective DFIRMs printed and distributed for counties in the Lumber, White Oak, and Tar-Pamlico River basins by September 2002 and for the Cape Fear, Neuse, and Pasquotank River basins by September 2003.

This Mapping Activity may be terminated at the option of FEMA or the State of North Carolina in accordance with the provisions of the September 15, 2000, CTS Memorandum of Agreement.

3. **Funding/Cost-Sharing:** Funding will be in accordance with CTS Funding Agreement No. 1.
4. **Standards:** Unless otherwise indicated in a specific final Basin Plan, the following standards will be met in completing this Mapping Activity:
 - Elevation data for surveys, engineering analyses, and DFIRM production will be referenced to the NAVD88.
 - Field surveys of structure geometry and bathymetry will be conducted in accordance with Appendix 4 of FEMA 37, *Guidelines and Specifications for Study Contractors* (January 1995). (FEMA 37 is available at FEMA's Web site at http://www.fema.gov/mit/tsd/EN_reg.htm).
 - Detailed hydrologic and hydraulic analyses and floodplain mapping will follow the standards set forth in Chapters 4 and 5 of FEMA 37 and Title 44 of the Code of Federal Regulations (CFR), Part 65.
 - The floodway will be established in accordance with 44 CFR 65.7, as well as any applicable state and local requirements.
 - Riverine flood elevations and floodplain and floodway delineations will reasonably tie in to non-revised information in accordance with 44 CFR 65.6(a)(6). Flood elevations and floodplain and floodway delineations will also reasonably tie in between adjacent flooding sources and contiguous counties.
 - Detailed coastal analyses and floodplain mapping will follow the standards set forth in Appendices 1, 1A, 1B, and 1C of FEMA 37 (as applicable) and FEMA's *Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping* (final draft March 1995).
 - Computer models used for hydrologic, hydraulic, and/or coastal analyses will meet the requirements of 44 CFR 65.6(a)(6) and be on FEMA's *Numerical Models Accepted by FEMA for NFIP Usage* (http://www.fema.gov/mit/tsd/EN_modl.htm).
 - Coastal flood elevations and floodplain delineations will reasonably tie in to non-revised information in accordance with 44 CFR 65.6(a)(6). Flood elevations and floodplain delineations will also reasonably tie in between adjacent flooding sources and contiguous counties.
 - Any levee or dike systems to be shown on the community's FIRM as providing protection from the 1% annual chance flood will comply with the requirements of 44 CFR 65.10. Chapter 7 of FEMA 37 provides guidelines for evaluating levee systems.
 - Digital Elevation Models based on LIDAR data obtained under Mapping Activity Statement D, "Digital Elevation Data Development," and field surveys conducted under this Agreement will be used for delineating the floodplains and will comply with the requirements of Appendix 4 of FEMA 37.
 - DFIRM production will comply with *Digital Flood Insurance Rate Map (DFIRM) Graphic Specifications* and the standard DFIRM spatial database product description. Modifications to these specifications that are specific to the North Carolina Flood Mapping Program will

also be provided by or approved by FEMA. Any modifications will not need to be applied retroactively.

- FEMA and the State of North Carolina are using digital procedures to determine and show BFEs in Zone A areas on the DFIRMs. BFEs that have been determined based on these digital procedures will be shown on the FIRM as Zone AE BFEs.
- Data development will comply with *Standards for Digital Orthophotos* (U.S. Geological Survey, National Mapping Program, December 1996).
- Data development will comply with *Content Standards for Digital Geospatial Metadata* (Federal Geographic Data Committee, 1998).

5. Products: The State of North Carolina will make the following products available to FEMA:

- Updated flood hazard data and modeling in accordance with Chapter 11 of FEMA 37 in the Technical Support Data Notebook (TSDN) format. These include:
 - Digital 1% and 0.2% annual chance floodplain boundaries and floodway;
 - Digital profiles of the 10%, 2%, 1%, and 0.2% annual chance water-surface elevations, representing existing conditions, for riverine flooding sources studied by detailed methods of analysis;
 - Floodway data tables and summary of discharges tables for riverine flooding sources studied by detailed methods of analysis;
 - Transect summary tables for coastal flooding sources studied by detailed methods of analysis;
 - Digital copies of all hydrologic, hydraulic, and coastal modeling (input and output files); and
 - Any other back-up computations and data used in the analyses or mapping.
- Draft preliminary DFIRMs (including base maps) for each affected county for community review and comment and to provide the basis for the statutory appeal period as per Part 67 of 44 CFR.
- Final DFIRM mapping files in one of the GIS file formats specified in FEMA's *Digital Flood Insurance Rate Map (DFIRM) Graphic Specifications*.
- Final DFIRM database files. These files will include the required information and follow the examples shown in FEMA's standard DFIRM spatial database product description. Metadata files will be provided describing the DFIRM data; these files will comply with *Content Standards for Digital Geospatial Metadata* (Federal Geographic Data Committee, 1998).

Additionally, after peer review has been performed, FEMA will provide the State with a summary report that includes a description and the results of all reviews. This report will contain suggested resolutions to any problems detected during the reviews.

- 6. Schedule and Milestones:** The development of updated flood hazard data and production of DFIRMs will follow the process in Attachment A, "North Carolina Floodplain Mapping Program Production Process." As shown in the flowchart, many of the steps will be completed concurrently. The State and FEMA will continually evaluate and optimize the process with the goal of reducing turnaround times to complete engineering studies and produce updated DFIRMs. The specific schedules for each milestone for each river basin and county will be specified in the final Basin Plans.

- 7. Certification:** The following certifications apply to this Mapping Activity:
- A Professional Engineer or Licensed Land Surveyor will certify the TSDN and all hydrologic, hydraulic, and coastal analyses and data, in accordance with the North Carolina General Statute (NCGS) 89C and 44 CFR 65.6(f).
 - A Professional Engineer or Licensed Land Surveyor will certify topographic information in accordance with NCGS 89C and 44 CFR 65.5(c).
 - Any levee systems to be accredited as discussed in Section 4 of this Mapping Activity Statement will be certified in accordance with NCGS 89C and 44 CFR 65.10(e).
- 8. Technical Assistance and Resources:** FEMA, as part of its in-kind contribution, will provide independent review of intermediate data, analyses, and products through its Mapping Coordination Contractor, Dewberry & Davis LLC (MCC-D&D). Additionally, FEMA will be responsible for post-preliminary processing, including resolution of appeals and protests. Additionally, FEMA and the MCC-D&D will provide ongoing technical support, as needed, to the State of North Carolina in completion of this activity.
- FEMA will provide the State of North Carolina any new or updated guidelines, standards, and requirements associated with both contract work and programmatic direction.
- 9. Contractors:** Contractors will be used by the State of North Carolina to assist in the completion of the activity associated with this Agreement. Contractors will be licensed to practice in the State of North Carolina as required by NCGS 89C. Procurement of subcontractors using Federal funds provided as part of this Mapping Activity will comply with the requirements of 44 CFR 13.36.
- 10. QA/QC Procedures:** The State of North Carolina will be responsible for ensuring that its contractors perform adequate review for quality assurance and quality control to ensure that products submitted to FEMA comply with the standards listed above. Additionally, as part of FEMA's in-kind contribution to the State's mapping program, the flood data and modeling and DFIRM data prepared for this Mapping Activity will be peer reviewed by FEMA and/or the MCC-D&D. Any anomalies or concerns will be brought to the State's attention for discussion and resolution. These peer reviews will occur at intermediate points during production, as shown on the flow chart included as Attachment A.
- 11. Reporting:** Periodic reporting will be provided to the CTS Committee by the State of North Carolina for review and feedback.
- 12. Points of Contact:** The FEMA Project Manager is Laura Algeo, and the CTS Program Director is John Dorman, or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities.

Each party has caused this Mapping Activity Statement to be executed by its duly authorized representatives.

John K. Dorman

John K. Dorman, Program Director
North Carolina Office of State Budget, Planning and Management

07/25/01
Date

Laura Algeo

Laura Algeo, Project Manager
Federal Emergency Management Agency

7/27/01
Date

Doug Bellomo

Doug Bellomo, Project Officer
Federal Emergency Management Agency

07/20/01
Date