

North Carolina Cooperating Technical State Mapping Program

Issue 70: NCFMP Map Maintenance Base Data Procedures

Background

In 2008, the North Carolina Floodplain Mapping Program (NCFMP) transferred the role of the base map data collection from another State agency, the North Carolina Center for Geographic Information and Analysis (CGIA), to the NCFMP. The Quality Assurance/Quality Control (QA/QC) review was also transferred from CGIA to the NCFMP Program Support and QA/QC contractor, Dewberry. The role of the Program Support and QA/QC contractor is to perform quality assurance and quality control checks during each phase of flood hazard production, which now includes the base data review, to ensure that all products meet or exceed NCFMP and Federal Emergency Management Agency (FEMA) standards and requirements. Base map data includes information such as, but not limited to, aerial imagery, road networks, military boundaries, railroad networks, and hydrology files.

The base data process begins with the collection of the base data. In the first quarter of every calendar year, the NCFMP sends a request for newly-collected base data to various federal agencies, state agencies, and local communities as outlined in the State's Pre- and Post-Disaster Data Collection Manual. Since the NCFMP contracts DFIRM production activities at the beginning of each Federal Fiscal Year, the base data collected will be 6 to 9 months old at contracting time. For a majority of the map maintenance counties, the data collected for the pre- and post- disaster program will be used for DFIRM production. However, the NCFMP will identify map maintenance counties each year that experience frequent base map data updates. For counties with frequent base map data updates, the NCFMP will contact the jurisdictions within 2 weeks of the DFIRM kick-off meetings to obtain the most up-to-date base data as possible.

The NCFMP has signed a Memoranda of Agreement (MOA) with each of the agencies and organizations to partner in a data-sharing relationship for DFIRM and emergency management activities. The NCFMP works closely with various U.S. military organizations and the National Geodetic Survey (NGS); state agencies, such as the North Carolina Department of Transportation (DOT), the North Carolina Geodetic Survey (NCGS), and the North Carolina Geographic Information Coordinating Council; and local communities. Stakeholders who have signed MOAs with the NCFMP have committed to providing the most-recent data available to the NCFMP as part of the data-sharing agreement. During the map maintenance scoping meetings, the NCFMP also discusses the advantages of data sharing with the local officials and explains that communities can start to share their base data with the NCFMP as part of the scoping process.

As the newly-submitted base data is received by the NCFMP, an organization and evaluation process occurs to determine accuracy, completeness, and age of the base data received. When the NCFMP determines that a county is eligible for map maintenance, the NCFMP uses the newly-collected base data for incorporation into the map maintenance Digital Flood Insurance Rate Maps (DFIRMs). Up-to-date base map information is important because it strengthens the integrity of the maps and helps

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stakeholders and home and business owners locate floodprone areas in their jurisdictions. It is important that all data is thoroughly verified because the base data plays a vital role in the DFIRM mapping process.

Issue

Prepare documentation of the processes and procedures, along with an outline of the roles and responsibilities and schedules, for all involved in the base data collection, map production and review, and incorporation into the preliminary DFIRMs.

Recommendations

Roles and Responsibilities – NCFMP

The NCFMP collects, categorizes, and ensures completeness for all newly-submitted base data for the map maintenance counties, as it is available. New base data is collected from various federal agencies, state agencies, and local communities. The categories below specify the new base data that is requested by the NCFMP:

- a. Aerial Imagery – The NCFMP obtains the most-recent aerial imagery available from each county to serve as the raster base map for all DFIRM panels, except in Mecklenburg County (for which a vector base map is utilized per an agreement with FEMA and the NCFMP). The NCFMP requires that aerial imagery used in DFIRM mapping is not more than 5 years old (which is more conservative than the FEMA requirement of 7 years). The NCFMP is in partnership with various state agencies (NCGS, CGIA, DOT, and the Secretary of State's office) to collect new aerial imagery for the entire state (all 100 counties) through an E-911 funding grant. The imagery will be flown in the first quarter of 2010. This new imagery will be used as the base for map maintenance DFIRMs.
- b. Corporate limits (including Extraterritorial Jurisdiction (ETJ) boundaries) – The NCFMP obtains the newest corporate limit data from NC communities prior to the establishment of the DFIRM production schedule to ensure that the most-recent data is used during the DFIRM production process.
- c. Roads – This data is obtained from the community and/or the North Carolina DOT.
- d. Railroads – The NCFMP obtains this data via www.nconemap.com, which is the State Clearinghouse for geospatial information and is directed by the North Carolina Geographic Information Coordinating Council. This data should not be obtained from the community since DOT collects this information.
- e. Intracoastal Waterway and Ferry Routes – This data is obtained from the community and/or the North Carolina DOT.
- f. Benchmarks – The NCFMP downloads the bench marks for each county and supplies it to the Engineering and Mapping Contractors (EMCs) and the Program Support and QA/QC contractor, along with the rest of the base

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- data. The Program Support and QA/QC contractor downloads the bench mark data again when each pre-preliminary DFIRM submittal is received and bench marks are reviewed at that time. This process is defined in Issue Paper #30: Depicting Benchmarks on DFIRMs. The qualifying criteria for setting benchmarks established by other government agencies and the NCFMP EMCs for use on the North Carolina DFIRMs is outlined in Issue Paper 67: Criteria for Benchmarks Shown on the North Carolina Digital Flood Insurance Rate Maps ("DFIRMS").
- g. County boundaries – The NCFMP obtains this data from NCGS, who coordinates directly with North Carolina DOT to obtain the statewide county boundary data.
 - h. Schools and airports – This data is obtained from the community and/or the North Carolina Geographic Information Coordinating Council, via www.nconemap.com.
 - i. Military base boundaries – The NCFMP obtains this data directly from the military organizations.
 - j. Zoning information – This data is obtained for communities for which future conditions studies are performed and mapped on the DFIRM panels and included in the Flood Insurance Study (FIS) Reports.
 - k. Building footprint and parcel data – This data will be necessary for meeting major objectives of the NCFMP Integrated Hazard Risk Management (IHRM) initiative. IHRM is the NCFMP's pilot program for identifying, assessing, communicating and mitigating multiple natural hazards in North Carolina. Parcel data is obtained from the Department of Agriculture, which collects updated parcel data on an annual basis. Building footprint data are originally a combination of data collected from the communities and data generated by NCFMP contractors as part of the IHRM pilot. The NCFMP will collect future building footprint updates from the communities. Footprint and parcel data will be available on the Floodplain Mapping Information Systems (FMIS) (the NCFMP DFIRM viewer on www.ncfloodmaps.com) in the near future.
 - l. New topographic data – If new topographic data is available for a county, the NCFMP obtains it and mandates that their EMCs use the new topographic data for modeling and mapping production in a county. If no new topographic data is available, the existing statewide LiDAR dataset is used for modeling and mapping. The NCFMP monitors the age and quality of the topographic data through their Elevation Data Maintenance Program, which is currently in development. This program ensures data accuracy and determines the length of time elevation data stays accurate.
 - m. Surface water features (i.e., man-made lakes, streamlines, ponds, washes, lagoons, wetlands or other features) – This data is obtained from the most-current version of the DFIRM database. However, if new LiDAR is obtained, then new waterline features are developed from the breaklines in the LiDAR.

The NCFMP ensures the consistency of the projections and the completeness of all base data shapefiles for use in DFIRM mapping. Once the collection and review process is complete, and the five NCFMP EMCs and one Program Support and QA/QC contractor

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have notice to proceed on engineering and mapping production, the NCFMP distributes the base data to all contractors. Once the DFIRM Kick-off Meetings are held with all EMCs, the NCFMP sends the base data via DVD, portable hard drive, or ftp site (depending on the size of the data) to the appropriate EMC and the Program Support and QA/QC contractor no later than two months prior to the first EMC base data submission for quality review. This timeline is determined before or during the DFIRM Kick-off Meetings and documented in the master MS Project production schedules. The NCFMP also prepares the base data metadata source citations in Word format that is sent to the Program Support and QA/QC contractor and EMCs in the same delivery as the base data. After the base map panels prepared by the EMCs are reviewed by the Program Support and QA/QC contractor, the base map comments memorandum is developed. The base map comments memorandum is the foundation for the pre-preliminary and preliminary-ready comments memorandum, which is approved and signed by the NCFMP when the DFIRM panels are approved for preliminary issuance.

Roles and Responsibilities – EMCs

The EMCs incorporate the base data provided by the NCFMP into the DFIRM panels. The EMCs first develop initial drafts of each new base map panel using only the new base data, and not including the flood hazard information. This work occurs within the timeframe in which the engineering modeling for the stream restudies is developed and reviewed. These base map panels are submitted in PDF format to the Program Support and QA/QC contractor via DVD or ftp site for review.

It is preferred that contractor-established benchmarks are included with the base map panel PDFs, however these benchmarks must be included in the DFIRMs submitted for the pre-preliminary review. The NCFMP is encouraging the development and incorporation of contractor benchmarks on the DFIRMs in areas where vertical control marks are sparse or absent. The qualifying criteria for setting benchmarks established by other government agencies and the NCFMP's EMCs for use on the North Carolina DFIRMs is outlined in Issue Paper 67: Criteria for Benchmarks Shown on the North Carolina Digital Flood Insurance Rate Maps ("DFIRMS"). This issue paper also provides examples of these qualifying benchmarks.

If new base map data is not available for a county, the current effective base data layer is used for the map maintenance revision (except in the case of aerial imagery, as outlined previously in this document). In the event an EMC finds an issue with the quality of the base data provided by the NCFMP, a joint meeting between the NCFMP, the EMC, and the Program Support and QA/QC contractor is held to discuss the resolution. Once the Program Support and QA/QC contractor reviews the base map panel PDFs, the PDFs (and any comments) are sent back to the EMCs for their incorporation. Flood hazard information is added at this time, and the DFIRMs are resubmitted to the Program Support and QA/QC contractor for the pre-preliminary review.

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Roles and Responsibilities – Program Support and QA/QC Contractor

The Program Support and QA/QC contractor receives base map data and metadata source citations from the NCFMP via portable hard drive approximately two months prior to the receipt of the first base map review submittal from the EMCs. The Program Support and QA/QC contractor performs a review of the base data for accuracy and completeness. Although DFIRM pre-preliminary and preliminary-ready reviews are performed on both hardcopy DFIRM panels and GIS files, base data reviews are performed on raster PDF images only. This allows for a more streamlined and efficient base data review and reduces the amount of hardcopy panels printed and shipped. Once the base map panel PDFs are received from the EMCs, a side-by-side review is performed using the PDFs and the original source base map shapefiles using ArcGIS. The panel numbering system on the base map PDFs matches the existing effective DFIRM panel numbering unless a new detailed study requires a 1000-scale panel to be replaced with four 500-scale panels. More information about the panel numbering scheme for North Carolina can be found in [Issue Paper 21: North Carolina Digital Flood Insurance Rate Map \(FIRM\) Panel Numbering Scheme/Count](#).

All base map PDFs are reviewed against the [NCFMP DFIRM Graphic Specifications](#), [FEMA Procedure Memorandum No. 49: Revisions to Appendix K of Guidelines and Specifications for Flood Hazard Mapping Partners](#), and these other requirements:

- The aerial imagery used is reviewed to ensure the base map meets or exceeds NCFMP and FEMA age and quality standards.
- Stream naming is reviewed against the NCFMP standards set forth in [Issue Paper 19: Handling of Surface-Water Features for the Printed Digital Flood Insurance Rate Map \(DFIRM\) and the Digital DFIRM Database](#). This issue paper also outlines standards for mapping one dimensional (single line) streams and two dimensional (double line) streams, minimal criteria for hydrographic and drainage features that are to be included in the DFIRM database and on the mapped DFIRM panels, and more.
- Corporate limits, county boundaries, ETJ limits, road names, school locations, military boundaries, and benchmarks are reviewed to ensure that the most recent, accurate data is displayed on the DFIRMs.
- Panel-to-panel matching is performed on all base map panels. The Lat Long Tic Marks, State Plan Tic Marks, and Universal Transverse Mercator (UTM) Grid Tic Marks are also reviewed for accuracy and consistency.

The base map panel review comments are compiled in a formal memorandum that is emailed to the NCFMP and the appropriate EMC for review and these comments are incorporated before the flood hazard data is added to the DFIRMs. The DFIRMs are then submitted to the Program Support and QA/QC contractor for the pre-preliminary review. A corrections check review is performed during the pre-preliminary DFIRM panel review. This review is done to ensure all previous base map comments were addressed. The standard base map review duration for the Program Support and QA/QC contractor is 13 business days for counties impacted by coastal restudy and 10 business days for counties with only riverine restudy. The final comments memorandum is a compilation of issues documented and addressed during the base map review, the pre-preliminary review, and the preliminary-ready review. The NCFMP GIS Manager reviews the

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comments memorandum to ensure that all comments have been addressed and signs the comments memorandum, which is archived by the Program Support and QA/QC contractor with the archived Engineering Study Data Package.

Discussion Summary

Date Discussed: 3/28/08

Discussion Attendees: Hope Morgan, Ken Ashe, Tara Aims, Colleen Bailey

Final Guidelines

See Above

References

NCFMP Issue Paper 19: Handling of Surface-Water Features for the Printed Digital Flood Insurance Rate Map (DFIRM) and the Digital DFIRM Database

NCFMP Issue Paper 21: North Carolina Digital Flood Insurance Rate Map (FIRM) Panel Numbering Scheme/Count

NCFMP Issuer Paper 30: Depicting Benchmarks on DFIRMs

NCFMP Issue Paper 67: Criteria for Benchmarks Shown on the North Carolina Digital Flood Insurance Rate Maps ("DFIRMS").

NCMFP DFIRM Graphic Specifications (May 2009)

FEMA Procedure Memorandum No. 49: Revisions to Appendix K of Guidelines and Specifications for Flood Hazard Mapping Partners

Points of Contact

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