



**FEMA**

**NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT  
COOPERATING TECHNICAL PARTNERS  
MAPPING ACTIVITY STATEMENT**

**Mapping Activity Statement No. FY09. 06 – Digital Flood Insurance  
Rate Map Production and Development of Updated Flood Data**

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated December 25, 2002 between the Northwest Florida Water Management District (NFWFMD) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 6 is as follows:

**SECTION 1—OBJECTIVE AND SCOPE**

The objective of the Flood Map Project documented in this MAS is to update Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for Escambia, Santa Rosa, Okaloosa, Walton, Bay, and Gulf counties. Updated coastal flood hazard data will be developed for all six counties. In addition, Escambia, Santa Rosa, Okaloosa, Bay, and Gulf will be updated to reflect new/revised riverine flood hazard information. All processes and deliverables shall be completed in accordance to the Federal Emergency Management Agency's (FEMA's) *Guidelines and Specifications for Flood Hazard Mapping Partners* (G&S) and effective Procedure Memoranda (PMs). These documents can be found on FEMA's website at [http://www.fema.gov/plan/prevent/fhm/gs\\_main.shtm](http://www.fema.gov/plan/prevent/fhm/gs_main.shtm) and [http://www.fema.gov/plan/prevent/fhm/gs\\_memos.shtm](http://www.fema.gov/plan/prevent/fhm/gs_memos.shtm).

The DFIRM and FIS report will be produced in the FEMA Countywide format in the North American Vertical Datum of 1988 (NAVD88). (Refer to PM 41 for exceptions.)

In addition, the Mapping Partners involved in this project will develop new and/or updated flood hazard data, as summarized in Table 1.1, Flooding Source(s) to be Studied.

**Table 1.1 Flooding Source(s) to be Studied**

Flooding Source	Reach Limits	Reach Length	Hydrology		Hydraulics		Erosion				Redelineation of SFHAs Using Effective Profiles and New Topography									
			Detailed Riverine	Detailed Riverine	Detailed Coastal	Detailed Coastal	Setup	Wave Height	Wave Runup	Detailed Coastal		Limited Detail Study								
Gulf of Mexico (and associate sounds and bays)	Entire coastline from Escambia County to Gulf County	TBD					X	X	X	X	X									
Inland Riverine	Escambia, Santa Rosa, Okaloosa, Bay, and Gulf Counties	TBD	X			X									X					X

The flooding sources and reach limits to be studied in Table 1.1 above will be identified during the scoping process and documented in the scoping reports for Escambia, Santa Rosa, Okaloosa, Walton, Bay, and Gulf Counties.

This Flood Map Project will be completed by the following Mapping Partners:

- NWFWMMD;
- Qualified contractors selected by the NWFWMMD.

The Mapping Partner shall notify FEMA and all applicable parties of all meetings with community officials at least two weeks prior to the meeting (with as much notice as possible). FEMA and/or its contractor may or may not attend the community meetings.

The Mapping Partner shall maintain an archive of all data submitted. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA.)

The activities for this Flood Map Project, including any required Quality Control Requirements as outlined in PM 42, and the Mapping Partners that will complete them are summarized in Table 1.2, Flood Mapping Project Activities. The sections of this MAS that follow the table below describe the specific mapping activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map deliverables.

Table 1.2 Flood Mapping Project Activities.

TASK ASSIGNMENTS

State	FL	FL	FL	FL	FL	FL	All States
County	Escambia	Santa Rosa	Okaloosa	Walton	Bay	Gulf	All Counties
Partner Name	NWFWMD	NWFWMD	NWFWMD	NWFWMD	NWFWMD	NWFWMD	Core TO
Partner Type	CTP	CTP	CTP	CTP	CTP	CTP	Core TO
Program Management	X	X	X	X	X	X	
Scoping	X	X	X	X	X	X	
Perform Field Survey	X	X	X	X	X	X	
Develop Topographic Data							
Perform Independent QA/QC of Topographic Data							
Acquire Base map	X	X	X		X	X	
Perform Hydrologic Analyses	X	X	X		X	X	
Perform Independent QA/QC of Hydrologic Analyses	X	X	X		X	X	
Perform Hydraulic Analyses	X	X	X		X	X	
Perform Independent QA/QC of Hydraulic Analyses	X	X	X		X	X	
Perform Floodplain Mapping	X	X	X	X	X	X	
Perform Independent QA/QC of Perform Floodplain Mapping	X	X	X	X	X	X	
Develop DFIRM Database	X	X	X	X	X	X	
Quality Review (QR)1 Auto Validation of Draft DFIRM Database	X	X	X	X	X	X	X
Produce Preliminary Map Products	X	X	X	X	X	X	
Perform Independent QA/QC of Preliminary Map Products	X	X	X	X	X	X	
QR2 Auto Validation of Preliminary Database	X	X	X	X	X	X	X
QR3 10% Visual Check	X	X	X	X	X	X	X
Distribute Preliminary Map Products	X	X	X	X	X	X	
Post Preliminary Processing	X	X	X	X	X	X	
QR4 Validate BFE Notice and CEO Letters	X	X	X	X	X	X	X
QR5 Validate Final DFIRM Database and Map Panels	X	X	X	X	X	X	X
QR6 Check LFD	X	X	X	X	X	X	X

NWFWMD is responsible for the implementation of an independent Quality Assurance/Quality Control (QA/QC) plan for all assigned activities. The NWFWMD will submit a Summary Report that describes and provides the results of all automated or manual QA/QC review steps. The report should include the process for all assigned activities.

Independent QC review activities may be performed by the NWFWMD and/or its contractors or FEMA's contractor at the discretion of FEMA. If the NWFWMD will be utilizing its contractors to do the QC review, this should be identified during scoping. The NWFWMD will need to submit its QC plan to the Regional Project Officer for approval. Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. The NWFWMD will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

Metadata is required for all activities. Metadata profiles should be obtained from FEMA or its contractors to assure compliance. Mapping Partners are required to comply with Appendix N (Data Capture Standards, or DCS) and Appendix M (TSDN) of Guidelines and Specifications for Flood Hazard Mapping Partners to completely document the work performed. On July 9, 2008, FEMA provisionally released a revised version of the DCS. FEMA recommends that the new DCS be implemented, in lieu of the current DCS (Appendix N), on any project where it is expected to save time and/or money. The ultimate goal of the new DCS is to consolidate the DCS deliverables and the TSDN to reduce the overlapping requirements for Mapping Partners. Because the newly released revised DCS is not yet complete and the necessary MIP changes have not yet been implemented, in order to ensure that FEMA retains complete documentation of studies, FEMA requires that all FEMA-contracted studies must comply with either the existing or the revised DCS and a complete TSDN be submitted as a final deliverable by the effective date of the project (in addition to uploads to the MIP). Mapping Partners are required to certify their TSDNs by signing the certification of project page to ensure that TSDNs submitted represent the final version of all required documentation or that all MIP uploads represent a complete set of required documentation. The submittal of the TSDN requirement will continue until the revised DCS is finalized.

DFIRM-related tasks require a passing QC Report from FEMA's National DFIRM database auto-validation tool for Quality Review (QR) #1, #2, and #5 as described in PM 42. Training materials for this step are available on the Mapping Information Platform (MIP) at MIP User Care>Training Materials.

FEMA will provide download/upload capability for data submittals through the MIP located at <https://hazards.fema.gov>. As each activity is completed, the data must be submitted to the MIP.

The NWFWMD and/or its contractor will respond to any comments generated as a result of the mandatory quality control checks by FEMA's Contractor as described in PM 42. FEMA's Contractor QC process is nationally funded and required on each FIS. The QC process includes the following activities:

- **Validate Content Submission.** Automatic metadata and visual RMC validation of submitted data for Perform Field Survey, Develop Topographic Data, Develop Hydrologic Data, Develop Hydraulic Data, Perform Coastal Analysis, Acquire Base Map Data, Perform Floodplain Mapping, Develop DFIRM Database, Produce Preliminary Map Products and Final Map Products tasks.
- **QR #1.** Performed after the Develop DFIRM Database task.
- **QR #s 2 and 3.** Performed after the Produce Preliminary Map Products task.
- **QR #4.** Performed after the Create Base Flood Elevation (BFE) Notices step in the MIP workflow during Post Preliminary Processing.

- **QR #5.** Performed after the Produce Final Map Products task during Post Preliminary Processing.
- **QR #6.** Performed after the Prepare LFD Docket step in the MIP workflow during Post Preliminary Processing.
- **QR #7.** Performed after the Submit MSC Deliverable step in the MIP workflow during Post Preliminary Processing.

In cooperation with the FEMA Project Officer, a Project Management Team (PMT) will be established by the NFWFMD consisting of representatives from the NFWFMD, FEMA's regional engineer, FEMA's contractor, and other appropriate parties. The PMT will be responsible for coordinating the activities identified in this MAS. The FEMA Region will be provided with documentation identifying the established PMT.

The MIP shall be updated for status reporting of each of the data development activities within the Manage Data Development task, not less than every thirty days, when the activity is complete, and also include leverage data. At minimum, the "As of" date must be updated not less than every thirty days even if the reported percent complete and money spent have not changed from previous month. Similarly the Manage Preliminary Map Production and Manage Post Preliminary Processing tasks shall be updated monthly when the producer is performing work on a task in those modules. The "Manage" tasks will be open and accepting updates for up to 90 days after the completion of the last producer task in each module. The MIP shall also be populated with appropriate leverage information regarding who paid for the data provided and the amount of data used by the Flood Map Project.

## Scoping

Responsible Mapping Partner: NFWFMD

**Scope:** The Project Scoping phase typically begins once some level of a community's mapping needs have been identified and FEMA and the community have decided to initiate a Flood Map Project to create or update the FIRM. The scoping process is divided into three main parts – Pre-Scoping Meeting Activities, the Scoping Meeting Activities, and the Post-Scoping Meeting Activities.

### Pre-Scoping Meeting Activities

- Initiate the Pre-Scoping activities by identifying the PMT, determining the community contacts, and collecting pertinent information about the community. Conduct background research to collect current mapping needs and begin available geospatial data search.
- Obtain spatial data to be used during the meeting preparation effort.
- Acquire the current effective data for the community, such as the flood hazard data shown in effective FIS reports and on effective FIRMs and Flood Boundary and Floodway Maps (FBFMs), and pertinent flood structure data.
- If pre-scoping steps are performed by a separate Contractor, submit a report summarizing the data collection efforts and deliverables.

Preliminary Research Activities can be separated into three categories—researching selected needs, effective information and researching available data for the Flood Map Project. The selected needs data identified during the Mapping Needs Assessment process can be obtained through the FEMA Region/RMC and plotted on the scoping map for discussion during the scoping meeting. The following

tasks shall be completed to research effective information: inventory the FEMA's archives and/or information management systems for effective FIRM panels, FBFM panels, FIS reports, and other flood hazard data or existing study data; summarize the information in the effective streams file and effective coastal study; summarize contiguous community agreement checks; review Community Assistance Visit (CAV) and Community Assistance Contact files; and develop a "scoping map" and an overview of the results of the research. Other data collected during preliminary research activities will include obtaining community information and the best readily available base map materials (political areas, transportation, hydrology, shorelines orthoimagery, and topography data). Stream centerlines should be populated with the limits of the effective FEMA studies and selected needs attributes.

#### Scoping Meeting

- Coordinate, setup, and hold the Scoping Meeting to inform the community of the upcoming flood study and of their responsibilities related to it; this includes identifying a time, place, and participants. The purpose of this meeting is to present the information gathered during the preliminary research activities to the local officials (State, county, and municipal) and coordinate on prioritization and identification of study areas. NFWFMD shall be responsible for compiling the necessary information for the meeting.
- Review list of selected needs and capture additional community needs and/or wants in order to determine the level of effort and the extent of any new/updated studies. Review the selected needs list, effective and other data research findings, and make selections of proposed methods for obtaining/producing flood data.
- Compile the information prepared for and recorded during the Scoping Meeting

During the Scoping Meeting, the PMT shall review the needs list. Any additions or changes to the selected needs list shall be discussed with all members.

The NFWFMD will be acting as the Consultation Coordination Officer (CCO) for this flood study as identified in 44 CFR Part 66. During the Scoping Meeting, the NFWFMD must inform the communities of their responsibilities as described under the above-referenced regulation. Following initial contact with the communities, the CTP will prepare and setup the Community Case File and Flood Elevation Determination Docket for the maintenance of all communication and coordination throughout the project as outlined in 44CFR Parts 66 and 67.

#### Post-Scoping Meeting Activities

- Select available and needed geospatial data to be used in the study and update FEMA's geospatial data tracking systems, National Digital Elevation Program (NDEP) and National Digital Orthophoto Program (NDOP) located at <http://hazards.fema.gov/metadata/NDEP> and <http://hazards.fema.gov/metadata/NDOP>.

- Evaluate selected needs and community requests and/or wants to determine the community's unmet needs and develop the final Scope of Project document for delivery to FEMA and the community
- Update FEMA's needs management tracking and other geospatial tracking systems (Mapping Needs Update Support System (MNUSS), CNMS, NDEP, and NDOP).
- Supply a copy of the approved Scoping Report back to the communities in order to ensure they are aware of which needs were selected to be updated during the flood study.

Based on the discussion of flood data update and base map update requests, NFWFMD and the FEMA Project Officer will finalize the areas to be included in the final scope of project (based on recommendations provided by the PMT). Areas to be studied by detailed, limited detailed, redelineation, and approximate methods shall be identified. The following issues will be discussed and refined: Review and Refinement of Flood Hazard Identification Methodologies, Review of Proposed Paneling Scheme, Review and Refinement of Base and Topographic Map Source, and Finalization of Map Production and Database Options.

Identify all stream/coastal reaches where levees are shown as providing protection against the 1-percent-annual-chance flood. NFWFMD should work with the FEMA Regional Office to request the information specified in Title 44 Code of Federal Regulations (CFR) 65.10, mapping of areas protected by levee systems, from the community or other party seeking continued recognition of the levee and provide this information to the FEMA Regional Office and/or PMT.

Many of the activities at each phase can take place concurrently and are not contingent on the completion of previous tasks. The FEMA Project Officer, working in close coordination with the PMT, has the flexibility of tailoring the Scoping process to best fit the needs of the project. NFWFMD will evaluate the effective flood data, available base data and selected needs to determine the scope of project to be approved by FEMA.

Standards: All Scoping work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: NFWFMD shall make the following products available to FEMA by uploading the digital data to the MIP.

- Final Scope of Project documented in MAS or SOW will be delivered in accordance with the schedule outlined in Section 6 - Schedule to the Regional Project Officer for approval.
- QA/QC Plan for the review of the mapping project outlined in this MAS. This will include the checklists developed for that review in accordance with the schedule included in Section 6 - Schedule.
- Updated list of CEO or local FPA contacts or a report from CIS showing this information has been updated.
- Unmet needs should be documented in a geospatial format so they can be input to FEMA's needs management system. If there are not any unmet needs for the study area, this fact should be documented in the scoping report.
- Report showing that, if obtained from non-Federal sources, information on available terrain and ortho-imagery data has been entered into the NDEP and NDOP project tracking Web sites, respectively.

- Other deliverables including reports, correspondence, agenda, meeting summaries, tabular data, and geospatial files to be submitted throughout the scoping process as specified in FEMA's G&S, Appendix I and Appendix M.

## Outreach

The outreach activities for a Flood Map Project can best be understood as a process that begins during the Project Scoping phase and continues through the map production and post-preliminary phases.

The overarching goal for conducting outreach is to create a climate of understanding and ownership of the mapping process at the State and local levels. Well-planned outreach activities can reduce political stress, confrontation in the media, and public controversy, which can arise from lack of information, misunderstanding, or misinformation. These outreach activities also can assist FEMA and other members of the PMT in responding to congressional inquiries.

The NFWFMD will work with the Regional Office during the initiation of this activity to determine an Outreach Plan for implementation throughout the mapping project. The Regional Office will have access to many outreach tools that have been developed for this process that can be utilized or customized. Volume 1 of the G&S provides specific outreach goals that can be considered.

A key element of detailed coastal restudy will be to take advantage of the relationships the NFWFMD has with local communities and the fostering of those relationships through the most recent role the NFWFMD have had as the CTP for the FEMA Map Modernization program. Continuation of the outreach program developed through Map Modernization will allow for a familiar face approach to be taken and allow for outreach to be tailored according to the voice and specific needs of the coastal communities involved in this study. The project team will conduct several regional kickoff meetings with the coastal counties and cities within the study area. New specific points of contact, along with those already established, will be used to expedite communications during the project.

All communication with local governments will be done in accordance with 44 CFR Part 66.

Deliverables:

- Upon determination of an Outreach and Coordination Approach, the NFWFMD shall deliver the following to the FEMA Regional Project Officer in accordance with the schedule outlined in Section 6 - Schedule:
  - A report detailing outreach and coordination activities
  - Backup or supplemental information used in writing this report

## **Field Survey**

Responsible Mapping Partner: NFWFMD

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this project, NFWFMD and/or its contractors shall conduct a detailed field reconnaissance of the specific study area to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance or lack thereof of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses.

NFWFMD and/or its contractors shall conduct field surveys, including obtaining channel and floodplain cross sections, identifying or establishing temporary or permanent bench marks, and obtaining the physical dimensions of hydraulic and flood-control structures. If appropriate, NFWFMD and/or its contractors shall also identify items needed for coastal analyses including land cover, vegetation types, housing, dunes, beach nourishment, and coastal structures. NFWFMD and/or its contractors also shall coordinate with other Mapping Partners that are involved in the Topographic Data Development process regarding ongoing activities and deliverables.

In the case of Limited Detail Study (LDS), no field surveying of bridges, culverts, or channel cross-sections are performed. Digital Elevation Data (LiDAR) collected will be utilized to obtain channel cross-sections. NFWFMD and/or its contractors shall utilize Digital Elevation Data (LiDAR) to obtain channel cross-sections. For bridge and culvert geometry data, bridge or culvert data readily available from the Florida Department of Transportation (FDOT) or other sources will be collected. If these structural data are not readily available, field measurements of these structures will be made to approximate their geometry for use in the hydraulic models.

Standards: All Field Survey work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the G&S compliant digital data. Additionally, the Technical Support Data Notebook (TSDN) format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

- A report summarizing the findings of the field reconnaissance;
- Maps and drawings that provide the detailed survey results;
- Survey notebook containing cross section and structure data;
- Documentation of the horizontal and vertical datum;
- Digital versions of draft text for inclusion in the FIS report;
- Digital survey data consistent with the DCS as described in the G&S, and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

## Topographic Data Development

Responsible Mapping Partner: NFWFMD

Scope: NFWFMD and/or its contractors shall utilize existing topographic data of the overbank areas of the flooding sources and coastal floodplains studied. These data will be used for hydrologic analysis, hydraulic analysis, floodplain boundary delineation and/or testing of floodplain boundary standard compliance. NFWFMD shall gather information on what topographic data is available for the given community and what accuracy and currency it meets. NFWFMD and/or its contractors shall use this topographic data that is better than or equal to that of the original study. In coordination with the partner who performed scoping, ensure that the FEMA Geospatial Data Coordination Policy and Implementation Guide is followed and the data obtained or to be produced are documented properly.

For this activity, NFWFMD and/or its contractors also shall generate the data collected under this Topographic Data Development task and via field surveys to create a best available digital elevation model for the subject flooding sources. In addition, NFWFMD and/or its contractors shall address all concerns or questions regarding the topographic data development and processing that are raised during the independent QA/QC review. NFWFMD and/or its contractors should confirm with the FEMA Project Officer the automated appropriate data model(s) (i.e. contours, Digital Elevation Models (DEMs), TIN, mass points and breaklines) for the intended use of the data

NFWFMD and/or its contractors shall use topographic data for the areas described in the Table 1.4 Summary of Topographic Data table. The source of the topographic data should be indicated as well. NFWFMD and/or its contractors also shall coordinate with other team members conducting field surveys. Contour interval and/or accuracy for the topographic data shall be selected based on the current FEMA requirements as documented in the G&S.

For this activity, NFWFMD and/or its contractors also shall develop topographic maps and/or DEMs for the subject flooding sources using the data collected under this Topographic Data Development process

and via field surveys. In addition, NFWFMD and/or its contractors shall address all concerns or questions regarding the topographic data development that are raised by NFWFMD contractors during the independent QC review, or during the PM 42 defined Validation Process.

**Table 1.4 Summary of currently available Topographic Data**

<b>County</b>	<b>Description</b>	<b>Source</b>
Escambia	LiDAR data for the entire county.	NFWFMD/FDEM
Santa Rosa	LiDAR data for the entire county.	NFWFMD/FDEM
Okaloosa	LiDAR data for the entire county.	NFWFMD/FDEM
Walton	LiDAR data for the entire county.	NFWFMD/FDEM
Bay	LiDAR data for the entire county.	NFWFMD/FDEM
Gulf	LiDAR data for the entire county.	NFWFMD/FDEM

Standards: All Topographic Data Development work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP and submitting in Technical Support Data Notebook (TSDN) format so that NFWFMD contractors can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded G&S compliant digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

- Digital contour data;
- Report summarizing methodology and results;
- Mass points and breaklines data;
- Gridded digital elevation model data
- Checkpoint analyses to assess the accuracy of data, including Root Mean Square Error calculations to support vertical accuracy;
- Identification of data voids and methods used to supplement data voids;

- National Geodetic Survey data sheets for Network Control Points used to control remote-sensing and ground surveys;
- Other supporting files consistent with the DCS in the G&S; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

## **Independent QA/QC Review of Topographic Data**

Responsible Mapping Partner: NFWWMD

Scope: NFWWMD and/or its contractors shall perform an impartial review of the mapping data generated by the contractors under Topographic Data Development to ensure that these data are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. NFWWMD and/or its contractors, if applicable must ensure that independent QA/QC is performed and that organizational conflict of interest issues do not exist with respect to independent QA/QC processes. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. NFWWMD and/or its contractors will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

Standards: All Topographic Data Development work shall be reviewed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWWMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that are identified during the independent QA/QC review.

## **Base Map Acquisition and Preparation**

Responsible Mapping Partner: NFWWMD

Scope: Base Map Acquisition consists of obtaining the digital base map, the Florida Department of Revenue Digital true color Orthophotography, for the project and as necessary, preparing the base map for use. NFWWMD shall provide the digital base map. The required activities are as follows:

- Obtain digital files (raster or vector) of the base map. In coordination with the partner who performed scoping, ensure that the FEMA Geospatial Data Coordination Policy and Implementation Guide is followed.
- Secure necessary permissions from the map source to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge.
- Review and supplement the content of the acquired base map to comply with the requirements of the G&S.
- For the base map components that have a mandatory data structure, convert the base map data to the format required in the G&S.
- Certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.

In addition, NFWFMD and/or its contractors shall address all concerns or questions regarding the base map that are raised during the Independent QC review performed by NFWFMD contractors, or during the FEMA's Contractor's Validate Content Submission Process. NFWFMD shall summarize the base map that will be used for each county in optional Table 1.5 Summary of Base Map

**Table 1.5 Summary of Planned Base Map (if known): Update Scoping Report**

County	Description	Source
Escambia	2007 FL-DOR 1:2400 Digital Color Orthophotography	Florida Department of Revenue
Santa Rosa	2007 FL-DOR 1:2400 Digital Color Orthophotography	Florida Department of Revenue
Okaloosa	2007 FL-DOR 1:2400 Digital Color Orthophotography	Florida Department of Revenue
Walton	2007 FL-DOR 1:2400 Digital Color Orthophotography	Florida Department of Revenue
Bay	2007 FL-DOR 1:2400 Digital Color Orthophotography	Florida Department of Revenue
Gulf	2007 FL-DOR 1:2400 Digital Color Orthophotography	Florida Department of Revenue

Standards: All Base Map Acquisition work shall be performed in accordance with the standards specified in Section 5 - Standards. The DCS must be met for this deliverable to be acceptable.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP so that NFWFMD contractors can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- Digital base map files that comply with the G&S requirements
- Written certification that the digital data meet the minimum standards and specifications;
- Digital versions of draft text for inclusion in the FIS report;
- Documentation that FEMA can use the digital base map; and
- Documentation of the Datum, if appropriate.

### **Independent QA/QC Review of Base Map**

Responsible Mapping Partner: NFWWMD

Scope: NFWWMD and/or its contractors shall perform an impartial review of the base map acquired by NFWWMD to ensure it includes data consistent with FEMA standards and sufficient to include on the DFIRM. Any needed edits should be made to the product to comply with FEMA standards. NFWWMD and/or its contractors, if applicable must ensure that independent QA/QC is performed and that organizational conflict of interest issues do not exist with respect to independent QA/QC processes.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. NFWWMD and/or its contractors will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

Standards: All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWWMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review;
- Recommendations to resolve any problems that are identified during the independent QA/QC review; and
- If the data is changed during review, then updated deliverables from previous tasks will be submitted at this time.

### **Hydrologic Analyses**

Responsible Mapping Partner: NFWWMD

Scope: NFWFMD and/or its contractors shall perform hydrologic analyses for the flooding sources identified in the Scoping Reports for Escambia, Santa Rosa, Okaloosa, Bay, and Gulf counties. NFWFMD and/or its contractors shall calculate peak flood discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events using the HEC-HMS, AdICPR, or other FEMA approved computer program. These flood discharges will be the basis for subsequent Hydraulic Analyses performed under this MAS. In addition, NFWFMD and/or its contractors shall address all concerns or questions regarding the hydrologic analyses that are raised during the independent QA/QC review performed by NFWFMD contractors during the QA/QC review.

If GIS-based modeling is used, NFWFMD and/or its contractors shall document automated data processing and modeling algorithms, and provide the data to FEMA to ensure these are consistent with FEMA standards. Digital datasets (such as elevation, basin, or land use data) are to be documented and provided to FEMA for approval before performing the hydrologic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analysis, then NFWFMD and/or its contractors shall provide full user documentation, technical algorithm documentation, and the software to FEMA for review before performing the hydrologic analyses.

In the case of Limited Detail Study (LDS), NFWFMD and/or its contractors shall use approximate hydrologic methods including USGS Regression Equations, USGS Stream Gage information (if applicable), etc. to calculate the peak flood discharges for the 1-percent-annual-chance storm event.

Standards: All Hydrologic Analyses work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP so that NFWFMD contractors can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- Digital copies of all hydrologic modeling (input and output) files for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events;
- Digital Summary of Discharges Tables presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital versions of draft text for inclusion in the FIS report;
- Digital versions of all backup data used in the analysis including work maps;
- Format Hydrology Database or Data Delivery consistent with the DCS—in the G&S; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.
- For GIS-based modeling, deliverables shall include all input and output data, intermediate data processing products, and GIS data layers.
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

## Independent QA/QC Review of Hydrologic Analyses

Responsible Mapping Partner: NFWFMD

Scope: NFWFMD and/or its contractors shall perform an impartial review of the technical, scientific, and other information submitted by NFWFMD contractors specific to the hydrologic analyses to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. NFWFMD and/or its contractors, if applicable must ensure that independent QA/QC is performed and that organizational conflict of interest issues do not exist with respect to independent QA/QC processes. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. NFWFMD will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
  - Use of acceptable models;
  - Use of appropriate methodology(ies);
  - Correctly applied methodology(ies)/model(s), including QC of input parameters;
  - Comparison with gage data and/or regression equations, if appropriate; and
  - Comparison with discharges for contiguous reaches or flooding sources.
- Maintain records of all contacts, reviews, recommendations, and actions and make the data readily available to FEMA; and
- If data changed during review, then updated deliverables for previous tasks will be submitted at this time.

Standards: All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review and
- Recommendations to resolve any problems that are identified during the independent QA/QC review.
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

## Hydraulic Analyses

Responsible Mapping Partner: NFWFMD

Scope: NFWFMD and/or its contractors shall perform hydraulic analyses for the flooding sources identified in the Scoping Reports for Escambia, Santa Rosa, Okaloosa, Bay, and Gulf counties. The modeling will include the 10-, 2-, 1-, and 0.2-percent-annual-chance events based on peak discharges computed under Hydrologic Analyses. The hydraulic methods used for this analysis will include HEC-RAS, XP-SWMM, or AdICPR.

NFWFMD and/or its contractors shall use the cross-section and field data collected during Field Survey and the topographic data collected during the Topographic Data Collection, when appropriate, to perform the hydraulic analyses. The hydraulic analyses will be used to establish flood elevations and regulatory floodways for the subject flooding sources.

NFWFMD and/or its contractors shall use the FEMA CHECK-2 or CHECK-RAS checking program to verify the reasonableness of the hydraulic analyses. To facilitate the independent QA/QC review, NFWFMD and/or its contractors shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, NFWFMD and/or its contractors shall address all concerns or questions regarding the hydraulic analyses that are raised by NFWFMD contractors during the independent QA/QC review.

NFWFMD and/or its contractors shall document automated data processing and modeling algorithms for GIS-based modeling and provide the data to FEMA for review to ensure these are consistent with the standards outlined above. Digital datasets are to be documented and provided to FEMA for approval before performing the hydraulic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analyses, then NFWFMD and/or its contractors shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses

In the case of Limited Detail Study (LDS), NFWFMD and/or its contractors shall perform hydraulic analyses for the flooding sources identified in the Scoping Reports for Escambia, Santa Rosa, Okaloosa, Walton, Bay, and Gulf counties. The modeling will include the 1-percent-annual-chance event based on peak discharges computed under Hydrologic Analyses. The hydraulic methods used for this analysis will include HEC-RAS, XP-SWMM, or AdICPR. Cross sections for the flooding sources identified in the Scoping Reports for Escambia, Santa Rosa, Okaloosa, Bay, and Gulf counties will utilize digital elevation data obtained with LiDAR technology developed as part of the Topographic Data Collection. The hydraulic model selected will use this digital elevation data, without surveying bathymetric or structural data. Where bridge or culvert data are readily available, these data will be reflected in the hydraulic

model. If these structural data are not readily available, field measurements of these structures will be made to approximate their geometry in the hydraulic models.

Standards: All Hydraulic Analyses work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP so that NFWMD contractors can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded compliant digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- Digital Floodway Data Tables for each flooding source that is compatible with the DFIRM database;
- Digital hydraulic modeling (input and output) files;
- Digital tables with range of Manning's "n" values;
- Explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate;
- Digital versions of all backup data used in the analyses;
- Digital versions of draft text for inclusion in the FIS report;
- Format Hydraulic Database or Data Delivery consistent with the Data Capture Standards—in the G&S; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.
- For GIS-based modeling, deliverables include all input and output data, intermediate data processing products, GIS data layers, and final products in the format of the DFIRM database structure;
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record. Appropriate leverage information includes who paid for the data and the amount of data used by the Flood Map Project.

## **Independent QA/QC Review of Hydraulic Analyses**

Responsible Mapping Partner: NFWMD

Scope: NFWMD and/or its contractors shall perform an impartial review of the technical, scientific, and other information submitted by NFWMD contractors under Hydraulic Analysis to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are sufficient to revise the FIRM. NFWMD and/or its contractors, if applicable must ensure that independent QA/QC is performed and that organizational conflict of interest issues do not exist with respect to independent QA/QC processes. FEMA may audit or assist in these activities if deemed to be

necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. NFWFMD will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
  - Use of acceptable model(s);
  - Starting water-surface elevations;
  - Cross-section geometry;
  - Manning's "n" values and expansion/contraction coefficients;
  - Bridge and culvert modeling;
  - Flood discharges;
  - Regulatory floodway computation methods; and
  - Tie-in to upstream and downstream non-revised Flood Profiles.
- Use the CHECK-2 or CHECK-RAS program, as appropriate, to flag potential problems and focus review efforts.
- Maintain records of all contacts, reviews, recommendations, and actions and make the data readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA, and once the study is effective all associated data should be submitted to the FEMA library); and
- If data changed during review, then updated deliverables for previous tasks will be submitted at this time.

Standards: All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review;
- Recommendations to resolve any problems that are identified during the independent QA/QC review; and
- If the data changed during the Hydrologic and/or Hydraulic Analyses QA/QC process, then the updated and verified deliverables from these activities will be resubmitted at this time.

## Coastal Flood Hazard Analyses

Responsible Mapping Partner: NFWFMD

Scope: NFWFMD and/or its contractors shall perform coastal flood hazard analyses for an as yet undetermined number of transects along approximately 630+/- miles of shoreline in Escambia, Santa Rosa, Okaloosa, Walton, Bay, and Gulf Counties including the following coastal flooding sources: Gulf of Mexico and all associated bays, sounds and intracoastal waterways. These analyses are to include: Stillwater Elevations (SWEL) determination, wave setup, wave height analyses, erosion analyses, wave runup analyses, and Primary Frontal Dune (PFD) analyses. The NFWFMD and its contractors plan to use the coastal methodologies and analyses FEMA applied to the Mississippi Study for the Gulf Coast and will take any new guidance subsequent to the Mississippi study from FEMA under consideration. In addition, the NFWFMD and/or its contractors shall address all concerns or questions regarding the Coastal Flood Hazard Analyses that are raised during the independent QA/QC review.

To determine revised Stillwater elevations, the NFWFMD will conduct hurricane storm surge modeling using the Advanced CIRCulation model (ADCIRC), a 2-D hydrodynamic model for storm surge generation. This study will rely on hurricane wind and pressure field data, 2-D wave modeling and a statistical analysis of the model results using the appropriate Joint Probability Method (JPM).

The storm surge study will include the following sub-tasks:

### Storm Selection

The NFWFMD and its contractors will review the NOAA/NWS and HURDAT database that lists all the tropical events that have impacted the study area and shall identify the most significant ones. The storm selection shall be based on track location, intensity, and flooding history of the storms. Effective FISs shall be reviewed in order to identify the most destructive storms. Based upon this review and utilizing an approved methodology, the NFWFMD and its contractors will select historical storms that shall be used to determine the statistical hurricane key parameters.

### Terrain and Bathymetric Data Processing

Existing LIDAR data and NOAA bathymetric surveys will primarily be collected for each county in the study area from FL DEM and Alabama. The NFWFMD contractors will evaluate the terrain and bathymetric data and correct them, if necessary, to a set of standardized datum. Bathymetry and topographic data shall be then merged together with the shoreline, to produce separate seamless digital elevation models (DEMs) for the study area to be modeled. The NFWFMD will evaluate the shoreline to determine if it represents the most update information and is accurate enough for the purpose of a FEMA storm surge study.

### Develop/Refine ADCIRC Mesh

As a starting point, the NFWFMD and its contractors will utilize an ADCIRC model mesh developed by NOAA for the NFWFMD from Cape San Blas in Gulf County, FL and extending to Mississippi. The University of Central Florida (UCF) will be contracted to refine this mesh for overland flow and

computational efficiency for future production runs. Once completed, the mesh will be interpolated to the seamless DEM mass points in order to be applicable for the storm surge modeling. The NWFMD and its contractors shall ensure that the mesh reasonably interpolates the terrain and bathymetric data providing a representation of the morphological features represented in the data set. Once the mesh is developed, it will be provided to FEMA for review and comment. FEMA will provide any comments to the NWFMD within 2 weeks.

#### Tidal calibration

The NWFMD and its contractors will perform additional tidal calibrations as necessary for initial storm surge calibration. The Gulf of Mexico Tidal Constituent Database shall be utilized to determine the tidal constituent to be used to force the tide at the mesh boundaries. The NWFMD and its contractors shall determine the friction factors to apply to the bathymetry areas of the mesh. Simulated tidal constituents and hydrographs shall be compared versus the predicted ones in order to ensure that the tidal calibration results meet the standards for a FEMA flood study.

#### Wind and Pressure Field Determination

Synthetic wind and pressure fields shall be developed using the statistical hurricane key parameters for each modeled storm. Historical tracks will be used to determine a suite of hurricane tracks whose spacing will be a function of the storm size. Sensitivity studies to the key parameters shall be performed before the final generation of the synthetic wind and pressure fields.

#### 2-Dimensional Wave Modeling

The NWFMD and its contractors will work with the University of Florida (UF), who will develop a 2-D wave modeling using the SWAN (Simulating Waves Nearshore) model developed by Delft Hydraulics. Previous SWAN model grids using dated topo/bathy data set up for the NWFMD by the UF will be used as a starting point. Offshore boundary conditions shall be developed to use as forcing for the nearshore wave modeling. The 2-D wave modeling will determine radiation stresses that will be input into ADCIRC model in order to provide stillwater elevations accounting for wave setup. A procedure that accounts for the generation of the boundary conditions, the runs of the 2-D wave model, the validation of the results, and the coupling process between the wave and the storm surge models shall be used.

#### Storms Hindcasts and Verification

A set of storms shall be identified from the storms selected from the NOAA database to be run for hindcasts and verification for both surge and wave modeling. Three storms shall be run over the study areas in order to verify that the mesh and the models simulate water elevations and wave heights associated with the selected historical events. Once the storms have been selected, these will be provided to FEMA for review and comment. FEMA will provide all comments within 2 weeks.

Any flooding sources associated with a levee (if any) that are mapped as providing protection on effective FIRMs, but will not meet certification requirements for the new FIRMs, will require revised hydraulic analysis. This revised analysis should be done in accordance with Appendix H of the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

#### Production Runs

The 2-D wave model shall be run for the set of storms selected for final productions. The radiation stresses obtained through the modeling shall be input into ADCIRC. ADCIRC shall be run for the set of selected storms for final production in order to provide stillwater elevations that are inclusive of wave setup. ADCIRC shall also be run "solo" in order to produce a set of results that do not include wave setup. The NFWFMD shall produce a station grid layout where the results of the storm surge modeling will be extracted in order to perform the frequency analysis.

#### Statistical Analysis

The maximum surge elevations generated by each storm at each station will be analyzed using an appropriate and approved probability method in order to determine return periods for the 10%, 2%, 1%, and 0.2% stillwater elevations. Results from the 2-D wave model will also be extracted in order to obtain the 1% starting wave conditions for the overland wave height analysis.

Coastal GeoFIRM, a GIS-based environment, will be used to automate several of the flood hazard analysis inputs, such as identifying the transect layout, processing stillwater elevations, performing dune erosions, and running WHAFIS 3.0 and Runup 2.0. Specifically, the coastal flood hazard analysis will include the following subtasks:

#### Erosion and PFD Determination

Dune assessment and erosion will be performed following the 540 sq ft rule, as computed by FEMA's Coastal Hazard and Mapping Program (CHAMP). The primary frontal dune will be identified and assessed, using the LIDAR data, in order to determine the inland extent of the VE Zones at the landward toe of the dunes.

#### Overland Wave Height Analysis

The obstruction types identified during the Field Survey activity will be used as input in WHAFIS 3.0 to determine wave decay overland.

#### Wave Runup 2%

FEMA's Procedure Memorandum 37 (2005) establishes the need for higher wave runup elevations. The concept of the 2% wave runup (versus the mean wave runup previously calculated for FEMA studies) is introduced as the highest 2% of wave runups affecting the shoreline during the 100-year event. If high dunes or bluffs exist, their steeper profiles may cause wave runup to be greater than the calculated wave crest. RUNUP 2.0, TAW method and the SPM method will be used to calculate runup.

Any flooding sources associated with a levee that are mapped as providing protection on effective FIRMs, but will not meet certification requirements for the new FIRMs, will require revised hydraulic analysis. This revised analysis should be done in accordance with the G&S, PMs 34, 43 and others that may be appropriate.

While NFWFMD completes its QA/QC activities, copies of all data identified will be provided to FEMA for a concurrent review and comment as determined to be necessary by the Regional Project Officer.

Standards: All Coastal Flood Hazard Analyses work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make available to FEMA the following products by uploading the digital data to the MIP so that NFWFMD contractors can access it for an independent QA/QC review in accordance with the schedule outlined in Section 6 - Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the uploaded compliant digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- All interim data submittals for FEMA review per the Standards specified in Section 5.
- Draft digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundaries, BFEs, and flood insurance risk zones;
- Digital wave envelope profiles for each transect representing the 1-percent-annual-chance stillwater elevation including setup wave crest or runup elevations, location of the heel of the PFD, and ground profile conditions including eroded dune profile;
- Digital versions of draft text for inclusion in the FIS report;
- Draft work maps showing each transect located accordingly;
- Digital coastal modeling (input and output files);
- Digital versions of any other supporting computations;
- All backup data used in the analyses;
- Coastal Hydrology Database or Data Delivery consistent with the G&S; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

In addition, NFWFMD and/or its contractors shall submit a coastal study technical documentation notebook with all backup data, description of methodology, and input and output files used in the analyses and mapping as discussed in the G&S.

## **Independent QA/QC Review of Coastal Hazard Analyses**

Responsible Mapping Partner: NFWFMD

Scope: NFWFMD and/or its contractors shall perform an impartial review of the technical, scientific, and other information submitted by NFWFMD contractors under Coastal Flood Hazard Analyses to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. NFWFMD and/or its contractors, if applicable must ensure that independent QA/QC is performed and that organizational conflict of interest issues do not exist with respect to independent QA/QC processes. FEMA may audit or assist in these activities if deemed to be

necessary by the Regional Project Officer. This work is to include, at a minimum, the activities listed below.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. NFWFMD will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
  - Use of acceptable models;
  - Use of appropriate methodology(ies);
  - Correctly applied methodology(ies)/model(s) including QC of input parameters.
  - Comparison with gage data, if appropriate; and
  - Comparison with contiguous reaches or flooding sources.
- Maintain records of all contacts, reviews, recommendations, and actions and make the data readily available to FEMA.
- Maintain an archive of all data submitted for coastal modeling review. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA, and once the study is effective all associated data should be submitted to the FEMA library).

**Standards:** All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

**Deliverables:** In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the independent QA/QC review.
- Recommendations to resolve any problems that are identified during the independent QA/QC review.
- If the data changed during the QA/QC process, then the updated deliverables from the Coastal Flood Hazard Analyses will be resubmitted at this time.

## **Floodplain Mapping**

**Responsible Mapping Partner:** NFWFMD

**Scope for Detailed Riverine or Coastal Analysis:** NFWFMD and/or its contractors shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if

required) and any other applicable elements for the flooding sources for which detailed hydrologic, hydraulic, and/or coastal analyses were performed. NFWFMD and/or its contractors shall incorporate all new or revised hydrologic, hydraulic, and/or coastal modeling and shall use the topographic data acquired under Topographic Data Development to delineate the floodplain and regulatory floodway boundaries on a digital work map.

**Scope of Redelineation of Detailed Floodplain Boundaries Using Updated Topographic Data:**

NFWFMD and/or its contractors shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries, regulatory floodway boundaries, and coastal high hazard zones (if required) for the flooding sources listed earlier in Table 1.1. NFWFMD and/or contractors shall use the topographic data acquired under Topographic Data Development to delineate the floodplain and regulatory floodway boundaries, as appropriate, on a digital work map. If the new topographic data do not reflect the same hydraulic characteristics as in the effective study, NFWFMD and/or its contractors shall evaluate the topographic data to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If so, NFWFMD and/or its contractors shall contact the FEMA Regional Project Officer, identified in Section 12 – Points of Contact, with a recommendation.

Coastal redelineation involves the following steps: redelineate the landward extent of the coastal flooding based on existing Stillwater elevations and the new topography. All gutters (elevation change lines between open water and the landward extent of the coastal flooding) need to be digitized (these lines are not directly related to the topography so should be digitized directly). If converting between National Geodetic Vertical Datum (NGVD) and NAVD and the difference is close to 1.0 foot, the elevation can be changed on the map and the gutters will stay at the same location. If the difference between NGVD and NAVD is between 0.1 and 0.9 foot, or greater than 1.1 feet, contact FEMA and the RMC for guidance on how to move the gutters.

If the PFD VE Zone has not been mapped this must also be done during redelineation. PFD involves using the best available topographic data and mapping the heel or landward side of the PFD. The VE zone shall then be extended landward to that line.

**Scope for Limited Detail Study:** NFWFMD and/or its contractors shall delineate the 1-percent-annual-chance floodplain boundaries (AE zone designations, but with no floodways determined) and identify Base Flood Elevations (BFEs) for the flooding sources for which limited detail hydrologic and hydraulic analyses were performed. The 0.2-percent-annual-chance floodplain boundaries will not be shown even though the models will include the 0.2% hydraulic results. NFWFMD and/or its contractors shall incorporate all new or revised hydrologic and hydraulic modeling and shall use the topographic data acquired under Topographic Data Development to delineate the floodplain boundaries and identify Base Flood Elevations (BFEs) on a digital work map. In lieu of profiles, a table will be included in the FIS that will include the 1-percent-annual-chance flows and peak stages for the limited detail study areas. Discussions will occur with the communities regarding the requirements under 44CFR60.3c(10) for the limited detail study areas. Community concurrence from the discussions will be documented and put into the Community Case File.

**Scope for Refinement or Creation of Zone A:** NFWFMD and/or its contractors shall delineate the 1-percent-annual-chance floodplain boundaries for the flooding sources listed earlier in Table 1.1 or in the subsequent Scoping Report. NFWFMD and/or its contractors shall use existing topographic data or the topographic data acquired under Topographic Data Development to delineate the floodplain boundaries on a digital work map. NFWFMD and/or its contractors may expand on the approaches for analyzing Zone A areas outlined in G&S and in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas* (April 1995), and/or develop new approaches. Such approaches must be coordinated with

and approved by the FEMA Regional Project Officer identified in Section 12 – Points of Contact, before analysis and mapping begin.

**Scope for Non-revised Areas:** For all flooding sources except those segments for which updated flood data will be developed, NFWFMD and/or its contractors shall convert the information shown on the effective FIRM and FBFM panels for all incorporated and unincorporated areas of Escambia, Santa Rosa, Okaloosa, Walton, Bay, and Gulf Counties to digital format in conformance with FEMA DFIRM specifications. NFWFMD and/or its contractors shall use the acquired base map for the conversion. NFWFMD and/or its contractors shall digitize all FIRM panels and all FBFM panels, except those which contain flooding sources with updated flood data being developed. NFWFMD and/or its contractors shall not digitize the flood theme for those segments of flooding sources for which updated flood data will be developed. It is estimated that up to 692 county-wide DFIRM panels will be produced by NFWFMD and/or its contractors. The actual number of county-wide DFIRM panels produced will depend on the scope of work developed for each of the counties.

**Scope for Merging Revised and Non-Revised Information:** Upon completion of the floodplain mapping activities for the revised and non-revised areas, NFWFMD and/or its contractors shall merge the digital floodplain data into a single, updated DFIRM. This work is to include tie-in of flood hazard information for areas that were not studied as part of the Flood Map Project documented in this MAS. NFWFMD and/or its contractors also shall tie in the revised and non-revised Flood Profiles, floodplain boundaries, coastal gutters, and regulatory floodway boundaries with contiguous communities that were not studied as part of the Flood Map Project documented in this MAS. NFWFMD and/or its contractors shall coordinate with FEMA and any additional Mapping Partners responsible for other components of Floodplain Mapping, as necessary, to resolve any potential tie-in issues.

NFWFMD and/or its contractors shall incorporate the results of all effective Letters of Map Change (LOMCs) for all affected communities on the DFIRM. Also, NFWFMD and/or its contractors shall address all concerns or questions regarding Floodplain Mapping that are raised by NFWFMD contractors during the independent QA/QC review.

**Standards:** All Floodplain Mapping work shall be performed in accordance with the standards specified in Section 5 - Standards. Mapping quality standards must be consistent with PM 38, dated October 17, 2007. NFWFMD and/or its contractors will perform self-certification audits for the Floodplain Boundary Standards, as described in PM 38 and all subsequent revisions, for all flood hazard areas. NFWFMD and/or its contractors may expand on the approaches for analyzing Zone A areas outlined in G&S and in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas* (April 1995), and/or develop new approaches. Such approaches must be coordinated with and approved by the FEMA Regional Project Officer before analysis and mapping begin.

The NFWFMD and/or its contractors assigned the floodplain mapping task will complete all activities pertaining to levees in accordance with the G&S, PMs 34, 43 and others that may be appropriate.

**Deliverables:** In accordance with the G&S, and upon completion of floodplain mapping for the flooding sources identified in the Scoping phase, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP so that NFWFMD contractors can access it for the independent QA/QC review in accordance with the schedule outlined in Section 6 – Schedule. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the compliant digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal. The mapping for the

remaining flooding sources including any non-revised digital panels and all merged revised and non-revised floodplain mapping data is to be submitted for the Independent QA/QC review at the completion of this activity.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- Digital work map showing the Coastal High Hazard Area (V zone) delineated along Gulf of Mexico shorelines, transect locations, 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone designation labels, gutters, PFD, and all applicable base map features;
- Draft DFIRM database prepared in accordance with the requirements in G&S;
- Digital versions of input and output for any computer programs that were used consistent with the DCS—in the G&S;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan;
- Any backup or supplemental information including supporting calculations and assumptions used in the mapping required for the independent QA/QC review of Hydrologic, Coastal and /or Hydraulic Analyses and Floodplain Mapping consistent with the DCS—in the G&S;
- An explanation for the use of existing topography for the studied reaches, if appropriate.
  
- Written summary of the analysis methodologies;
  
- Digital versions of draft FIS report, Floodway Data Tables and updated profiles including all profiles and tables converted appropriate datum, as well as any other necessary items for the finalization of the preliminary FIS;
- If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted consistent with the DCS—in the G&S;
- Where paper documentation is required by State Law for Professional certifications, you may submit the paper in addition to a scanned version of the paper for the digital record.

## **Independent QA/QC Review of Floodplain Mapping**

Responsible Mapping Partner: NFWFMD

Scope: NFWFMD and/or its contractors shall perform an impartial review of the floodplain mapping submitted by NFWFMD under Floodplain Mapping to ensure that the results of the analyses performed are accurately represented, the redelineation of existing data on new, updated topography is appropriate, and to ensure that the new DFIRM panels accurately represent the information shown on the effective FIRMs and FBFMs for the unrevised areas that are mapped. NFWFMD and/or its contractors, if applicable must ensure that independent QA/QC is performed and that organizational conflict of interest issues do not exist with respect to independent QA/QC processes. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. NFWFMD will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

- Review the Summary of Stillwater Elevations and Transect Data tables for agreement with the coastal modeling results.
- Review the coastal transects for proper location and orientation on the work maps and agreement with the Transect Descriptions table. Ensure that the transects on the work maps extend to the inland limit of the coastal modeling results used for mapping.
- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFEs and coastal flood zones (both Zones VE and Zones AE) shown on the work map for proper location and agreement with the results of the coastal modeling.
- Review the regulatory floodway widths for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the PFD and Zone VE/Zone AE boundary delineations to ensure that the PFD delineation is coincident with, or seaward of, the Zone VE/Zone AE boundary.
- Review the floodplain widths at cross sections as shown on the work maps to ensure the data matches the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure the data matches the Flood Profiles.
- For non-revised floodplain areas, the 1- and 0.2-percent-annual-chance floodplain boundaries agree with the floodplain boundaries shown on the FIRM, the contour lines, other topographic information, and planimetric information shown on the DFIRM base.
- Road and floodplain relationships are maintained for all unrevised areas.
- Review the flood insurance risk zones as shown on the work maps to ensure the data are labeled properly.
- Review the DFIRM mapping files to ensure the data were prepared in accordance with the requirements in G&S.
- Review the metadata files to ensure the data includes all required information shown in the NFIP Metadata Profiles Specifications.

**Standards:** All Independent QA/QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

**Deliverables:** In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- A Summary Report that describes the findings of the QA/QC review, noting any deficiencies in or agreeing with the mapping results;

- Recommendations to resolve any problems that are identified during the independent QA/QC review;
- An annotated work map with all questions and/or concerns indicated, if necessary; and
- If data changed during review, then updated deliverables for previous tasks will be submitted at this time.

## **Develop Draft DFIRM Database**

Responsible Mapping Partner: NFWFMD

Scope: NFWFMD and/or its contractors shall prepare the enhanced database in accordance with G&S, for upload to the MIP. NFWFMD and/or its contractors shall coordinate with appropriate Mapping Partners, as necessary, to resolve any problems that are identified during development of the DFIRM Database.

Standards: All DFIRM Database work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the Technical Support Data Notebook format described in G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- DFIRM database files prepared in accordance with the requirements in G&S and in the required format(s) and
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications.

## **Produce Preliminary Map Products**

Responsible Mapping Partner: NFWFMD

Scope: NFWFMD and/or its contractors shall apply the final FEMA DFIRM graphic and database specifications to the DFIRM files produced under Floodplain Mapping. This work shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user). NFWFMD and/or its contractors will be preparing the database for this project in the Enhanced format. The database shall be produced in accordance with the G&S. NFWFMD and/or its contractors shall coordinate with those Mapping Partners responsible for Floodplain Mapping and/or Redelineation, as necessary, to resolve any problems that are identified during development of the DFIRM Database and graphics.

*Preliminary Summary of Map Actions (SOMA) Preparation:* The NFWFMD and/or its contractors shall prepare Preliminary SOMAs for all affected communities, if appropriate. The SOMA shall list pertinent

information regarding LOMCs that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Standards: All DFIRM Database work shall be performed in accordance with the standards specified in Section 5 - Standards. All work must pass the automated and visual "National QA/QC" reviews prior to the distribution of the preliminary copies of the DFIRM and FIS report and the Preliminary SOMA.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the compliant digital data. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- Preliminary DFIRM database or revised Preliminary DFIRM database prepared in accordance with the requirements in G&S;
- FIS Report and the Preliminary SOMA prepared using the SOMA Tool on the MIP.
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in approved QA/QC Plan.
- Passing Quality Review report

### **Independent QA/QC Review of Produce Preliminary Map Products**

Responsible Mapping Partner: NFWFMD

Scope: Upon completion of the floodplain mapping and redelineation activities, NFWFMD and/or its contractors shall perform an impartial review of the DFIRM spatial database to determine if it meets current FEMA database specifications. In addition, NFWFMD and/or its contractors shall review the DFIRM to ensure it meets current FEMA graphic specifications. NFWFMD and/or its contractors shall coordinate with other Mapping Partners, as necessary, to resolve any problems identified during this QA/QC review. NFWFMD and/or its contractors, if applicable must ensure that independent QA/QC is performed and that organizational conflict of interest issues do not exist with respect to independent QA/QC processes. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer.

Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality. NFWFMD will be responsible for addressing any and all comments resulting from independent QC, including re-submittal of deliverables as needed to pass technical review.

This work shall ensure that the requirements below are met.

- All required DFIRM features are accurately and legibly labeled and following the examples shown in the FEMA DFIRM specifications. This includes all flood insurance risk zones, BFEs,

gutters, cross sections, transects, studied streams and shorelines, mapped political entities, and all roads within and adjacent to the 1-percent-annual-chance floodplains.

- All DFIRM features are correctly symbolized with the appropriate symbol, line pattern, or area shading and follow the requirements in G&S.
- All map collar information is complete, correct, and follows the requirements specified in G&S.
- Preliminary DFIRM database is in a GIS file and database format as specified in FEMA's G&S, and conform to those specifications for content and attribution.
- DFIRM database files are in one of the database formats specified in FEMA's G&S, and conform to those specifications for content and attribution.

Standards: All DFIRM Database Development work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 – Schedule.

- A Summary Report that describes the findings of the QA/QC review noting any deficiencies in or agreeing with the mapping results and the results of all automated or manual QA/QC steps taken during the independent QA/QC review;
- Recommendations to resolve any problems that are identified during the independent QA/QC review; and
- An annotated copy of the DFIRM with all questions and/or concerns indicated, if necessary.
- If the data changed during the QA/QC process, then the updated deliverables from Floodplain Mapping and Redelineation will be resubmitted at this time.

## **Distribute Preliminary Map Products**

Responsible Mapping Partners: NFWFMD

Scope: Preliminary Map Products consists of the final preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report and the Preliminary SOMA for community officials and the general public review and comment. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. The activities to be performed are summarized below.

*Preliminary Transmittal Letter Preparation:* The NFWFMD and/or its contractors shall prepare letters and transmit the Preliminary copies of the DFIRM and FIS report and related enclosures to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA. This letter may be prepared for FEMA only or for signature by FEMA and NFWFMD.

*Distribution of Preliminary DFIRM and FIS Report:* The NFWWMD and/or its contractors shall distribute the Preliminary copies of the DFIRM and FIS report to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

*News Release Preparation:* The NFWWMD and/or its contractors shall use the BFEs on the Web tool in accordance with PM 44 to create BFE notices for studies that result in new or modified BFEs. The NFWWMD and/or its contractors shall prepare the BFE determination letters as well as the news release notifications of BFE changes for all affected communities. The NFWWMD and/or its contractors shall perform QA/QC reviews of the notices for accuracy and compliance with FEMA format requirements. The NFWWMD and/or its contractors shall file the notifications for later submittal to FEMA for review.

Standards: All Preliminary Map Products work shall be performed in accordance with the standards specified in Section 5 - Standards. Mapping quality standards must be consistent with PM 38, dated October 17, 2007. Preliminary DFIRM Maps shall pass the QRs, as outlined in PM 42, before this activity is completed and the maps are issued Preliminary.

Deliverables: In accordance with the G&S, NFWWMD and/or its contractors shall make the appropriate deliverables available to FEMA by uploading the digital data to the MIP. Additionally, the TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule. Preliminary transmittal letters shall be prepared and transmitted. These letters and any additional letters requested by FEMA shall be prepared in accordance with the current version of the FEMA *Document Control Procedures Manual* and in conjunction with Guidance provided by the Region and/or its contractor.

- Preliminary copies of the DFIRM and FIS report, including all updated data tables and Flood Profiles shall be mailed to the Chief Executive Officer (CEO) and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.
- Preliminary SOMAs, prepared in accordance with FEMA requirements, shall be provided as appropriate.
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the final preparation of the preliminary DFIRM shall be provided as outlined in the approved QA/QC Plan.
- NFWWMD and/or its contractors will submit a summary of outreach activities and any changes made in the outreach approach based on the actual implementation.

## **Post-Preliminary Processing**

Responsible Mapping Partners: NFWWMD and FEMA

Scope: Post-Preliminary Processing includes coordination with FEMA and the Community to schedule a Community Meeting(s) for review of the Preliminary DFIRM, if required. This activity consists of

finalizing the DFIRM and FIS report after the Preliminary copies of the DFIRM and FIS report have been issued to community officials and the public for review and comment. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. The activities to be performed are summarized below.

*Community Coordination Meeting:* If a community coordination meeting is required it is recommended that it be held within 60 days of the issuance of the Preliminary DFIRM and, NFWFMD and/or its contractors shall arrange for and verify that the following activities are completed:

- Establish invitee list,
- Schedule meeting date and place,
- Complete and Distribute Meeting Notice/Letter,
- Record Meeting Minutes,
- Record follow ups with communities not in attendance, and
- Identify any/all communities with BFE changes for required appeal period.

*Initiation of Statutory 90-Day Appeal Period:* When required, upon completion of a 30-day community comment period and/or final coordination meeting with the affected communities, FEMA and/or NFWFMD and/or its contractors shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA G&S, appropriate PMs and Document Control Procedures Manual:

- Proposed BFE determination letters are sent to the community CEOs and floodplain administrators.
- Ensure that news release notifications of BFE changes are published in prominent newspapers with local circulation in accordance with 44 CFR.
- The NFWFMD and/or its contractors shall prepare the appropriate notices (Proposed Rules) that are to be published in the *Federal Register*. The NFWFMD and/or its contractors shall then deliver those notices to FEMA for publication.
- When NFWFMD and/or its contractors hold public meetings to present and discuss the results of this Flood Map Project, FEMA may attend the meetings and assist where possible, if requested.

*Resolution of Appeals and Protests:* NFWFMD and/or its contractors shall review and resolve appeals and protests received during the 90-day appeal period. For each appeal and protest, the following activities shall be conducted as appropriate:

- Initial processing and acknowledgment of submittal;
- Technical review of submittal;
- Preparation of letter(s) requesting additional supporting data;
- Performance of revised analyses; and
- Preparation of a draft resolution letter for signature with FEMA and revised DFIRM and FIS report materials for FEMA review.

NFWFMD and/or its contractors shall mail all associated correspondence upon authorization by FEMA.

*Preparation of Special Correspondence:* NFWFMD and/or its contractors shall support FEMA in responding to comments not received within the 90-day appeal period (referred to as "special

correspondence”) including drafting responses for FEMA review when appropriate and finalizing responses for co-signature. NFWFMD and/or its contractors also shall mail the final correspondence (and enclosures, if appropriate) and distribute appropriate copies of the correspondence and enclosures upon receipt of authorization from FEMA.

*Revision of FIRM and FIS Report:* If necessary, NFWFMD and/or its contractors shall work together with FEMA to revise the DFIRM and FIS report and shall distribute revised Preliminary copies of the DFIRM and FIS report to the CEO and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

*Final SOMA Preparation:* NFWFMD and/or its contractors shall prepare Final SOMAs for the affected communities with assistance from FEMA, as appropriate.

*Processing of Letter of Final Determination:* The NFWFMD and/or its contractors shall work with FEMA to establish the effective date for the DFIRM and FIS report, and shall prepare Letters of Final Determination (LFDs) for each affected community for FEMA review in coordination with the Region and its contractor, and in accordance with the FEMA *Document Control Procedures Manual*. FEMA or its designated contractor shall mail the final signed LFDs and enclosures and distribute appropriate copies of the signed LFDs. All work must pass the automated and visual “National QA/QC” reviews and review of LFD prior to the distribution of the LFD.

- The NFWFMD and/or its contractors shall prepare the appropriate notices (Final Rules) that are to be published in the *Federal Register*. The NFWFMD and/or its contractors shall then deliver those notices to FEMA for publication.

*Processing of Final DFIRM and FIS Report for Printing:* NFWFMD and/or its contractors shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to FEMA in accordance with PM 42 for printing by the United States Government Printing Office. NFWFMD and/or its contractors shall also prepare the appropriate paperwork to accompany the DFIRM and FIS report (including Print Processing Worksheet, Printing Requisition Forms, and Community Map Actions Form) and transmittal letters to the community CEOs.

*Revalidation Letter Processing:* NFWFMD and/or its contractors shall prepare and distribute letters for FEMA signature to the community CEOs and floodplain administrators to notify the affected communities about LOMCs for which determinations will remain in effect after the DFIRM and FIS report become effective.

*Archiving Data:* NFWFMD and/or its contractors shall ensure that technical and administrative support data are packaged in the FEMA required format and stored properly in the library archives until transmitted to the FEMA Engineering Study Data Package Facility. In addition, the NFWFMD will maintain copies of all data for a period of no less than three years.

Standards: All Post Preliminary DFIRM work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the G&S, NFWFMD and/or its contractors shall make the following products available to FEMA by uploading the digital data to the MIP. A metadata file complying with the NFIP Metadata Profiles Specifications, must accompany the compliant digital data. Additionally, the

TSDN format described in the G&S must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

This submittal will occur in accordance with the schedule outlined in Section 6 - Schedule.

- Documentation that the news releases were published in accordance with FEMA requirements;
- Documentation that the appropriate *Federal Register* notices (Proposed and Final Rules) were published in accordance with FEMA requirements;
- Draft and final Special Correspondence (and all associated enclosures, backup data, and other related information) for FEMA review and signature, as appropriate;
- Draft and final Appeal and Protest acknowledgment, additional data, and resolution letters (and all associated enclosures, backup data, and other related information) for FEMA review and signature, as appropriate;
- Draft and final LFDs (and all associated enclosures, backup data, and other related information) for FEMA review and signature;
- DFIRM negatives (if applicable) and final FIS report materials including all updated data tables and Flood Profiles;
- Paperwork for the final DFIRM and FIS report materials;
- Transmittal letters for the printed DFIRM and FIS report;
- LOMC Revalidation Letters, if appropriate;
- Completed, organized, and archived technical and administrative support data; and
- Completed, organized, and archived case files and flood elevation docket.

## **SECTION 2—TECHNICAL AND ADMINISTRATIVE SUPPORT DATA SUBMITTAL**

The Project Team members for this Flood Map Project that have responsibilities for activities included in this MAS shall comply with the data submittal requirements summarized below.

All supporting documentation for the activities in this MAS/SOW shall be submitted in the TSDN format in accordance with the FEMA G&S. Table 2.1 Mapping Activities and Applicable TSDN Sections indicates the sections of the TSDN that apply to each mapping activity.

If any issues arise that could affect the completion of an activity within the proposed scope or budget, the responsible Mapping Partner shall complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR is to describe the issue and propose possible resolutions. (For additional information on SPRs, refer to the G&S.)

**Table 2.1- Mapping Activities and Applicable TSDN Sections**

TSDN Section	Mapping Activities													
	Scoping	Field Survey	Topo Data	QA/QC of Topo	Base Map	Hydrology/Coastal	QA/QC of Hydrology/Coastal	Hydraulic Analysis	QA/QC of Hydraulics	Flood-plain Mapping (and Re-delineation)	QA/QC of FP Mapping	DFIRM Database	Preliminary Map Products	Post-Preliminary
General Documentation														
Special Problem Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Telephone Conversation Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Meeting Minutes/Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X
General Correspondence	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engineering Analyses														
Hydrologic Analyses		X		X	X	X	X	X	X	X	X			
Hydraulic Analyses		X			X	X	X	X	X	X	X			
Key to Cross-Section Labeling		X			X	X	X	X	X	X	X			
Key to Transect Labeling		X			X	X	X	X	X	X	X			
Draft FIS Report					X	X	X	X	X					
Mapping Information	X		X	X	X					X	X	X	X	X
Miscellaneous Reference Information	X	X	X	X	X	X	X	X	X	X	X	X	X	X

### SECTION 3—PERIOD OF PERFORMANCE

The mapping activities outlined in this MAS will be completed as specified in the Agreement Articles of the Cooperative Agreement. The Mapping Activities may be terminated at the option of FEMA or NFWFMD in accordance with the provisions of the Partnership Agreement dated December 25, 2002. If these mapping activities are terminated, all products produced to date must be returned and updated into the MIP and the remaining funds from uncompleted activities, provided by FEMA for this MAS, will be returned to FEMA.

### SECTION 4—FUNDING/LEVERAGE

FEMA is providing funding, in the amount of [REDACTED] to NFWFMD for the completion of this Flood Map Project. NFWFMD shall provide any additional resources required to complete the assigned activities for this Flood Map Project. During the scoping process, additional needs may be identified. Activities associated with any additional needs would be performed based on availability of additional funds. The leverage listed below includes in-kind services and blue book values for acquired information (i.e. base map data, hydrologic and hydraulic analyses, etc.). These values should also be reported in the MIP by the appropriate task owner. The draft Blue Book version 2.0 dated January 2009 was used to estimate leverage. NFWFMD shall complete Table 4.1 Contribution and Leverage.

Table 4.1 Contribution and Leverage (Leverage estimates will be updated after the Scoping Phase)

Project Task	FEMA Contribution	Partner Contribution	% Partner Leverage	Total Project Cost
TOTAL FUNDING AMOUNTS	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Leverage dollars or units shall be entered as applicable within the Manage Data Development task in the MIP workflow.

### SECTION 5—STANDARDS

The standards relevant to this MAS are provided in Tables 5-1 Applicable Standards for Project Activities and 5-2 Project Activities and Applicable Portions of FEMA Guidelines and Specifications. Information on the correct volume and appendix of the G&S to be referenced for each mapping activity are summarized in Table 5-2 for convenience. However, all mapping partners working on a Flood Map Project are responsible for complying with all appropriate requirements in FEMA’s G&S including the Final Draft Guidelines for Coastal Flood Hazard Analysis and Mapping for the Pacific Coast of the United States and Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update Final Draft, collectively referred to as “Coastal Guidelines Updates”; and related PMs published by FEMA as of the date of this agreement.

These guidelines may be downloaded from the FEMA Flood Hazard Mapping website at [http://www.fema.gov/plan/prevent/fhm/dl\\_cgs.shtm](http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm). The Geospatial Data Coordination Policy and the Geospatial Data Coordination Implementation Guide are located at <https://hazards.fema.gov> under “Tools & Links.”

**Table 5-1. Applicable Standards for Project Activities**

Applicable Standards	Activities																
	Scoping	Field Survey	Topo Data	QA/QC Topo Data	Base Map	Coastal	QA/QC Coastal	Hydrology	QA/QC Hydrology	Hydraulic Analysis	QA/QC of Hydraulic Analysis	Floodplain Mapping (inc. Redelineation)	QA/QC Flood-plain Mapping	DFIRM Dbase	QA/QC DFIRM Database	Preliminary Map Products	Post-Preliminary Processing
<i>Guidelines and Specifications for Flood Hazard Mapping Partners and Procedure Memorandums</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Final Draft Guidelines for Coastal Flood Hazard Analysis and Mapping for the Pacific Coast of the United States</i>						X	X				X	X	X	X	X		
<i>Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update Final Draft</i>						X	X				X	X	X	X	X		
FEMA's Geospatial Data Coordination Policy	X		X		X												
FEMA's Geospatial Data Coordination Implementation Guide	X		X		X												
Engineer Manual 1110-2-1003, <i>Hydrographic Surveys (USACE)</i> , January 1, 2002	X	X															
"Numerical Models Accepted by FEMA for NFIP Usage," Updated April 2003	X					X	X	X	X	X							
NFIP Metadata Profile Specifications	X		X													X	X
<i>Document Control Procedures Manual</i>	X															X	X
<i>44 Code of Federal Regulations Parts 65, 66 and 67</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

**Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications**

Activity Description	Applicable Volume, Section/Subsection, and Appendix
Scoping	Volume 1 Appendix I Scoping Report document 44 Code of Federal Regulations Part 66 and 67
Outreach	Volume 1 Appendix I
Field Survey	Volume 1 Appendices A, B, C, F, and M
Topographic Data Development and Independent QA/QC Review of Topographic Data	Volume 1, Appendices A and M
Base Map Acquisition and Preparation And Independent QA/QC Review of Base Map	Volume 1 Appendices A, K, L, and M
Hydrologic Analyses and Independent QA/QC Review of Hydrologic Analyses	Volume 1 Appendices A, C, E, F, G, H, and M
Hydraulic Analyses and Independent QA/QC Review of Hydraulic Analyses	Volume 1 Appendices A, B, C, E, F, G, H, and M
Coastal Hazard Analyses and Independent QA/QC of Coastal Hazard Analyses	Volume 1 Appendices A, B, C, D, H, and M Coastal Guidelines Updates”
Floodplain Mapping and Independent QA/QC Floodplain Mapping (including Redelineation/Digitization)	Volume 1 Appendices C, D, E, F, G, H, K, L, and M
Produce Preliminary Map Products and Independent QA/QC Review of Produce Preliminary Map Products	Volume 1 Appendices K, L, and M
Distribute Preliminary Map Products and Independent QA/QC Review of Distribute Preliminary Map Products	Volume 1 Appendices J, K, L, and M
Post-Preliminary Processing	Volume 1 Appendices J, K, L, and M

## SECTION 6— SCHEDULE

The activities documented in this MAS shall be completed in accordance with Table 6.1 Mapping Activities Schedule. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner. Please also identify to whom the products associated with each task are to be submitted to (i.e. the MIP, FEMA Regional Office, etc.)

Table 6.1 Mapping Activities Schedule

ACTIVITIES	RESPONSIBLE PARTNER(S)	START DATE	END DATE (From NTP)	COST
Scoping	CTP		3 months	
Field Surveys	CTP		6 months	
Topographic Data Development	N/A			
Independent QA/QC Review of Topographic Data	N/A			
Base Map Acquisition	CTP		4 months	
Independent QA/QC Review of Base Map	CTP		5 months	
Hydrologic Analyses*	CTP		7 months	
Independent QA/QC Review of Hydrologic Analyses*	CTP		8 months	
Hydraulic Analyses*	CTP		9 months	
Independent QA/QC Review of Hydraulic Analyses*	CTP		10 months	
Coastal Flood Hazard Analyses	CTP		18 months	
Independent QA/QC Review of Coastal Hazard Analyses	CTP		19 months	
Floodplain Mapping: Detailed Riverine or Coastal Analysis	CTP		20 months	
Floodplain Mapping: Refinement or Creation of Zone A	CTP		20 months	
Floodplain Mapping: Merging Revised and Unrevised Areas	CTP		20 months	
Floodplain Mapping: Redelineation	CTP		20 months	
Independent QA/QC Review of Floodplain Mapping	CTP		21 months	
Develop Draft DFIRM Database	CTP		22 months	

ACTIVITIES	RESPONSIBLE PARTNER(S)	START DATE	END DATE (From NTP)	COST
Produce Preliminary Map Products (including Graphic Specifications)	CTP		23 months	
Independent QA/QC Review of Produce Preliminary Map Products	CTP		23.5 months	
Distribute Preliminary Map Products	CTP		24 months	
Post-Preliminary Processing	CTP		36 months	
<b>TOTAL COST</b>				

\* Some hydrologic and hydraulic analyses and corresponding independent QA/QC reviews in the coastal areas may need to occur after the coastal analysis is complete.

NWFWMD and/or its contractors shall update the MIP workflow tasks with schedule and cost information within 30 days once funds are awarded and on a monthly basis thereafter.

## SECTION 7—CERTIFICATIONS

### Data Capture Standards

- **DCS Certification Form** FEMA-funded data development tasks must be certified using the DCS Certification form provided in revised version of Appendix M. A PDF of the form with the signature, data, and seal affixed to the form must be submitted digitally. This form must be signed by a registered Professional Engineer (or Surveyor if appropriate) from the firm contracted to perform the work, or by the responsible official of a government agency. A digital version of this form is available at [www.fema.gov](http://www.fema.gov).

### Field Surveys and Topographic Data Development

A Registered Professional Engineer or Licensed Land Surveyor shall provide an accuracy statement for field surveys and/or topographic data used and shall certify these data meet the accuracy statement provided. Data accuracy should be stated used the Federal Geographic Data Committee National Standards for Spatial Data Accuracy, but the American Society for Photogrammetry and Remote Sensing accuracy reporting standards are acceptable.

### Base Map Acquisition and Preparation

- A community official or responsible party shall provide written certification that the digital data meet FEMA minimum standards and specifications.
- The responsible Mapping Partner shall provide documentation that the digital base map can be used by FEMA. Please note that uploading base map data to the MIP does not constitute agreement that the digital base map can be used by FEMA. Documentation that the digital base map can be used by FEMA is still required.
- Certifications must be made at the time the intermediate data is submitted. For example, if hydrologic data is submitted, certification will be required at the time it is submitted.

### Hydrologic Analyses, Hydraulic Analyses, Coastal Analyses, and Floodplain Mapping

- A Registered Professional Engineer shall certify hydrologic and hydraulic and coastal analyses and data in accordance with 44 CFR 65.6(f).
- Any levee systems to be accredited will be certified in accordance with 44 CFR 65.10.

## **SECTION 8—TECHNICAL ASSISTANCE AND RESOURCES**

Project Team members may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the Mapping Needs Assessment Process from FEMA and/or your Regional Project Officer.

General technical and programmatic information, such as FEMA 265 and the Quick-2 computer program, can be downloaded from the FEMA website at [http://www.fema.gov/plan/prevent/fhm/firm\\_soft.shtm](http://www.fema.gov/plan/prevent/fhm/firm_soft.shtm). Specific technical and programmatic support may be provided through FEMA and/or its contractor; such assistance should be requested through the FEMA Project Officer specified in Section 12 – Points of Contact.

Project Team members also may consult with the FEMA Regional Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or subcontractors, and GIS-based engineering and modeling training.

Assistance with the MIP may be requested at [miphelp@mapmodteam.com](mailto:miphelp@mapmodteam.com).

## **SECTION 9—CONTRACTORS (CTP)**

NWFWMD intends to use the services of qualified contractors selected under RFP 07-001 for this Flood Map Project. NWFWMD shall ensure that the procurement for all contractors used for this Flood Map Project complies with the requirements of 44 CFR 13.36.

Part 13 may be downloaded in PDF or text format from the United States Government Printing Office website at [http://www.access.gpo.gov/nara/cfr/waisidx\\_04/44cfr13\\_04.html](http://www.access.gpo.gov/nara/cfr/waisidx_04/44cfr13_04.html).

## SECTION 10—REPORTING

Financial Reporting: Because funding has been provided to NFWWMD by FEMA, financial reporting requirements for NFWWMD will be in accordance with Cooperative Agreement Articles. NFWWMD shall also refer to 44 CFR 13.41.

NFWWMD shall provide financial reports to the FEMA Regional Project Officer and Assistance Officer in accordance with the terms of the signed Cooperative Agreement for this MAS.

Status Reporting: Status reports will be submitted on a quarterly basis in accordance with the financial reporting submittals. NFWWMD shall refer to 44 CFR 13.4 to obtain minimum requirements for status reporting. The Project Officer, as needed, may request additional information on status.

NFWWMD may meet with FEMA and/or its contractor up to bi-weekly, or more frequently if needed, to review the progress of the project in addition to the quarterly financial and status submittals. These meetings will alternate between FEMA's Regional Office, the NFWWMD office, and conference calls, as necessary.

Earned Value Reporting: The MIP Workflow is designed to track the Earned Value of mapping projects. This information is automatically calculated by the MIP, using the Actual cost and schedule of work performed, or "actuals" and comparing them to the expected cost and schedule of work performed, or "baseline".

Once the FEMA Regional office has funded a project, FEMA will complete the "Obligate Project Funds" screen in the MIP. This step establishes the baseline for the project in the MIP, using the cost and schedule information for each task as outlined in this document and agreed to at the completion of the scoping process.

The MIP study workflow allows NFWWMD and/or its contractors to report on the status of these projects at a task level. The cost and schedule information, updated by the NFWWMD for each contracted task, is compared to the baseline established for those tasks. This information is rolled up to a project level and monitored by the FEMA Region to assess progress and Earned Value.

Earned Value reporting involves the reporting of cost, schedule and performance (physical percent complete) in the MIP by the NFWWMD.

Once the baseline has been established in the MIP, the NFWWMD shall input the performance and actual cost to date for each contracted task for each project. This must be completed at minimum every thirty days and at the completion of the task. The "As of" date must be updated not less than every thirty days even if the reported percent complete and money spent have not changed from previous month. When a task is completed, including all QA/QC activities in this MAS plus the Quality Control Reviews established in PM 42. The NFWWMD shall enter 100% complete, enter the actual completion cost, and the actual completion date within the Manage Data Development, Manage Preliminary Map Production, or Manage Post Preliminary Processing, as applicable.

The Project Officer, as needed, may request additional information on status on an ad hoc basis.

## Section 11—Project Coordination

Throughout the project, all members of the Project Team will coordinate, as necessary, to ensure the products meet the technical and format specifications required and contain accurate, up-to-date information. Coordination activities shall include:

- Meetings, teleconferences, and video conferences with FEMA and other Project Team members on an as needed basis;
- Telephone conversations with FEMA and other Project Team members on a scheduled basis and an ad hoc basis, as required;
- Updates to the MIP and other FEMA status information systems in accordance with requirements in Volumes 1 and 3 of G&S; and
- E-mail, facsimile transmissions, and letters, as required.

## SECTION 12—POINTS OF CONTACT (CTP)

The points of contact for this Flood Map Project are Laura Algeo, the FEMA Regional Project Officer; Ron Bartel, the Project Manager for NFWFMD; or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, any additional FEMA assistance should be requested through the FEMA Regional Project Officer.

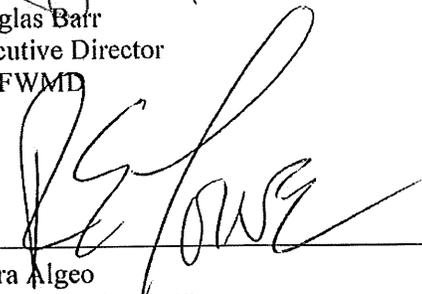
Each party has caused this MAS to be executed by its duly authorized representative.

  
\_\_\_\_\_  
Ron Bartel  
Project Manager  
NFWFMD

6/2/09  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Douglas Barr  
Executive Director  
NFWFMD

06/03/09  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Laura Algeo  
Regional Project Officer  
Federal Emergency Management Agency, Region 4

06/15/09  
\_\_\_\_\_  
Date

