



## COLORADO WATER CONSERVATION BOARD COOPERATING TECHNICAL PARTNERS MAPPING ACTIVITY STATEMENT

### Mapping Activity Statement No. 13 – Restudy of Flood Hazard Areas

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated July 15, 2002, between the Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 13 is as follows.

#### Section 1: Objective and Scope

The objective of the Flood Map Project documented in this MAS is *to restudy flood hazard areas and develop a Flood Insurance Study (FIS) for Clear Creek County and Incorporated Areas including the Town of Empire, City of Georgetown, Town of Silver Plume, and City of Idaho Springs.*

If the Flood Map Project includes only DFIRM conversion, then Table 1-1 does not apply.

**Table 1-1. Summary of Flood Hazard Data to be Created or Updated**

Priority	Flooding Source	Reach Limits	Hydrologic Analyses	Hydraulic Analyses	Floodplain Mapping	Redelineation Using Effective Flood Profiles and Updated Topographic Data	Refinement or Creation of Zone A	Estimated Cost
1	Clear Creek	Approx. 1.6 miles within Georgetown corporate limits		x	x			
2	South Fork Clear Creek	Approx. 0.5 miles from confluence with Clear Creek to corporate limits		x	x			\$
3	Bear Creek	Approx. 2.1 miles from confluence with Corral Creek to county line	x	x	x			\$
4	Witter Gulch	Approx. 3.5 miles within the county			x		x	\$

Within 30 days of this agreement, the CWCB shall input the scope of work into the FEMA Scoping Tool. This includes information concerning community ordinance data, local GIS data availability, and the flood reach data for existing and proposed conditions. The FEMA Scoping Tool documentation can be found at <http://www.hazards.gov/resources/scoping.htm>.

The CTP shall notify FEMA and the NSP by e-mail of all meetings with community officials at least one week prior to the meeting. FEMA and/or the NSP may or may not attend the community meetings.

The following will complete this Flood Map Project:

- CWCB;
- PBS&J; and
- Michael Baker, Jr., Inc., FEMA NSP.

The activities for this Flood Map Project, including required Quality Assurance/Quality Control (QA/QC) reviews, and the Mapping Partners that will complete them are summarized in Table 1-1. All activities that are to be accomplished by CWCB or contractors to CWCB, including contractors that may be selected after the project startup, are included in the "CTP" column. All activities that are to be accomplished by FEMA or FEMA's NSP are included in the FEMA/NSP column. The sections of this MAS that follow Table 1-2 describe the specific activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map components.

**Table 1-2. Summary of Project Activities and Assignments**

<b>Activities</b>	<b>CTP</b>	<b>FEMA /NSP</b>
Activity 1: Pre-Scoping		
Activity 2: Scoping	X	X
Activity 3: Field Surveys and Reconnaissance	X	
Activity 4: Topographic Data Development	X	
Activity 5: Independent QA/QC Review of Topographic Data		X
Activity 6: Hydrologic Analyses	X	
Activity 7: Independent QA/QC Review of Hydrologic Analyses		X
Activity 8: Hydraulic Analyses	X	
Activity 9: Independent QA/QC Review of Hydraulic Analyses		X
Activity 10: Floodplain Mapping (Detailed Riverine or Coastal Analysis)	X	
Activity 10A: Floodplain Mapping (Redelimitation Using Effective Flood Profiles and Updated Topographic Data)		
Activity 10B: Floodplain Mapping (Refinement or Creation of Zone A)		
Activity 11: Independent QA/QC Review of Floodplain Mapping (Revised Areas)		X
Activity 12: Base Map Acquisition		
Activity 13: DFIRM Production (Non-Revised Areas)		
Activity 13A: Independent QA/QC Review of DFIRM Production (Non-Revised Areas)		
Activity 14: DFIRM Production (Merging Revised and Non-Revised Information)		X
Activity 14A: DFIRM Production (Application of FEMA Graphics and Database Specifications)		
Activity 14B: Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications		
Activity 15: Preliminary DFIRM and FIS Report Distribution		
Activity 16: Post-Preliminary Processing		
Activity 17: Outreach	X	

**Compliance with Floodplain Boundary Data Quality Standards:** The data quality standards documented in Section 7 of the Multi-Year Flood Hazard Identification Plan (MHIP) for Fiscal Year 2004-2008 (Version 1, November 2004) should be used as the basis for producing DFIRMs. The MIP utilities available at the time of study submittals should be run to verify compliance with these data quality standards. Compliance with these standards will help FEMA achieve a Map Modernization goal of providing a reliable, web-based national flood layer in digital GIS format.

The floodplain boundary data quality standards outlined in Table 7-1 of the MHIP should be followed in addition to existing standards specified for floodplain mapping in the Guidelines, including Volume I, Section 1.4 and Appendices C, D, E, F, G, H, K, L, M, and N. Table 7-1 shall be applied to all approximate, existing detailed and new detailed studies for riverine and coastal flooding sources.

FEMA has developed tools to assist in the development of the flood hazard data studies and the Digital Flood Insurance Rate Maps (DFIRMs). FEMA will, through the NSP, provide all CTPs access to and training in these tools. The use of these tools will assist in the Map Modernization effort and the efficiency of mapping partners.

If the CTP chooses not to use these production tools, then the CTP will be required to submit project data at major milestones in each Mapping Project in accordance with data capture standards. Submitting data in these standards will aid in more efficient quality control reviews, data storage, archiving, and for future study updates.

The Data Capture Specifications submittals will be required at the following study milestones:

- Project Scoping (as specified);
- Terrain Data Processing Completed;
- Field Survey Completed;
- Hydrology Completed (draft and final);
- Hydraulics Completed (draft and final);
- Coastal Analysis Completed (draft and final); and
- DFIRM Mapping (draft and preliminary).

Although the scoping activity is not specifically included in this table, CTPs performing scoping activities will be required to submit scoping-related data in accordance with the data capture standards.

QA/QC review activities may be performed by CTPs or the NSP at the discretion of FEMA. Please note the NSP will also be performing periodic audits and overall study/project management to monitor study quality.

FEMA will be providing download/upload capability for data capture submittals through the MIP. Data submittals uploaded via the MIP will include the same data required prior to the existence of the MIP.

## Activity 2 – Scoping

### Task 2-1 Project Management Team Participation

Responsible Mapping Partner: CWCB and FEMA/NSP

Scope: In cooperation with the FEMA Region, a Project Management Team will be established consisting of the CWCB, FEMA's Regional Engineer, Fremont County, and other appropriate officials. The Project Management Team will be responsible for coordinating the activities of this project and completing all tasks identified in this Statement of Work.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables:

- CWCB will provide a document listing the project management team along with their full contact information.
- CWCB will update the Scoping Tool files to include the project management team and contact information.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/fhm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/fhm_gsai.pdf).

### Task 2-2 Initial Community Contact

Responsible Mapping Partner: CWCB

Scope: Coordinate with the FEMA Regional Project Officer to contact *the county and communities (listed in Section 1)* and notify them that FEMA and the CWCB have selected them for a map update, and they will be working with the communities to develop the project scope. Topics to be reviewed with the communities include:

- Purpose of the Flood Map Project (i.e., the update needs that have prompted the map update);
- The community's perception of its mapping needs;
- Target schedule for completing the project;
- Possibility of the community participating as a CTP (if it isn't already); and
- The community's engineering, planning, and Geographic Information System (GIS) capabilities.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: A digital document reporting the results of the contact.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

### **Task 2-3 Management Plan**

Responsible Partner: CWCB

Scope: The coordination protocol and general management objectives of the entire project will be addressed in *the State's Business Case Plan, which will be updated regularly*. This plan identifies the *general* Project, Project Team, the lines and protocols of communication between the communities and the Team members, protocols for internal flow of information among the members of the Team, the project objectives, general milestones of the Flood Map Project, QA/QC review requirements, record keeping, and project completion goals. The CWCB will communicate this information to Project Team members on an ongoing basis, and will provide additional documentation as needed.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverable: The State's Business Case Plan is available upon request.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

### **Task 2-4 Initial Project Team Coordination**

Responsible Partner: CWCB

Scope: Following the completion of the Project Management Plan, *coordination will take place with the Project Management Team members and the appropriate representatives of the county and communities listed in Section 1*. The communities will be asked to provide input for its assessment of the flood mapping needs, available data for base maps, any existing studies or ongoing projects that may have an influence on flood mapping, the community's potential as a CTP, and the involvement of other regional or state agencies that may have an input for the map development process.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverable: A digital document summarizing coordination activities.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

### **Task 2-5 Project Team Formation**

Responsible Partner: CWCB and FEMA/NSP

Scope: The composition of the Project Team will be based on the needs of the project. The selected Project Team members will consist of the Project Management Team plus other mapping partners and NFIP stakeholders whose collective capabilities will provide all the necessary resources to successfully complete the Flood Map Project.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: *The CWCB will provide a document listing the project team along with their full contact information. The CWCB will update the Scoping Tool files to include the project team and contact information.*

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/firm_gsai.pdf).

### **Task 2 –6 Preliminary Research Activities**

Responsible Partner: CWCB

Scope: Preliminary Research Activities can be separated into two categories—researching effective information and researching available data for the Flood Map Project. The following tasks shall be completed to research effective information: conduct a thorough Mapping Needs Assessment (unless one has already been conducted); inventory the FEMA archives for effective FIRM panels, FIRM panels, FIS reports, and other flood hazard data or existing study data, including data for adjacent counties including those located within states that border Colorado; summarize the information in the MNUSS database; summarize contiguous community agreement checks; review CAV and CAC files; and develop a “scoping map” and an overview of the results of the research.

The following tasks shall be completed to research available data for Flood Map Project: identify available base map information; identify available topographic data; identify available flood hazard data; and identify other available hydrologic and hydraulic information and data.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS. An Available Data Inventory template is provided in Appendix I, Subsection I.1.6 of the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Deliverables: An Available Data Inventory digital document.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/firm_gsai.pdf).

### **Task 2-7 Potential Obstacles**

Responsible Partner: CWCB

Scope: The Project Management Team shall identify potential obstacles in an effort to learn of any issues that could delay or prohibit the Flood Map Project. Some examples of potential obstacles to completing the project in a timely fashion include the following: inability to address mapping needs adequately with available funding; difficulty coordinating community funding with FEMA funding; lack of an available base map meeting FEMA minimum specifications (described in Appendix K of the *Guidelines and Specifications for Flood Hazard Mapping Partners*); hydrologic and/or hydraulic issues; community concerns; reliance on other studies or data (e.g., topographic mapping) that will not be available within the project's scheduling constraints; needs not having as high a priority as originally identified; and other considerations (Federal/State/non-governmental organizations, programmatic, disaster-related, legal).

The Project Management Team shall explore potential issues on an ongoing basis. If potential obstacles are identified that could halt or significantly hinder the completion of the project, the Project Management Team shall evaluate all possible alternatives and develop an appropriate course of action as soon as practicable. *When identified, the issue will be communicated to the Project Team by CWCB, who will also initiate discussion toward resolution of the issue.*

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS. A Potential Obstacle to Project Completion Checklist template is provided in Appendix I, Subsection I.1.7 of the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Deliverables: *Emails to Project Team on an ongoing basis as needed on relevant issues.*

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/flm/frm\\_gsai.pdf](http://www.fema.gov/pdf/flm/frm_gsai.pdf).

### **Task 2-8 Project Scope**

Responsible Partner: CWCB

Scope: Based on the collected information, CWCB will develop a Project Scope of the identified mapping needs of *the county and communities (listed in Section 1)*. Input received from the FEMA Regional Project Officer and other involved community agencies will be used in the development of the Draft Project Scope. The following items will be addressed in the Project Scope: review available information; determine if and how effective FIS data can be used in new project; identify other data needed to complete the Project and its source; and the DFIRM format. *This scope will be coordinated with members of the Project Team and the communities and county involved with the project.*

The Project Scope will establish priority levels for flooding sources to be analyzed and mapped, and estimate schedules and associated costs for completion of the components of flood mapping.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: CWCB will provide a Project Scope document in digital form and FEMA/NSP will update the Scoping Tool files to include the draft scope.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/flm/frm\\_gsai.pdf](http://www.fema.gov/pdf/flm/frm_gsai.pdf).

### **Task 2-9 Distribution of Background Information**

Responsible Partner: CWCB

Scope: In preparation for the Scoping Meeting (Task 12), a detailed meeting agenda and scoping presentation will be prepared in accordance with the template provided in Appendix I, Subsection I.2.4 of the *Guidelines and Specifications for Flood Hazard Mapping Partners*. The CWCB will distribute the Scoping Meeting agenda and present the project scope to all meeting attendees at the Scoping Meeting.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Copies of the Scoping Meeting Agenda will be distributed to the Project Team before the Scoping Meeting.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/firm_gsai.pdf).

### **Task 2-10 Scoping Meeting Activities**

Responsible Partner: CWCB and FEMA/NSP

Scope: The CWCB will coordinate, set up, and conduct the Scoping Meeting. This includes identifying a time, location, and all participants. The purpose of this meeting is to present the draft Scope of Project to the local officials (state, county and municipal) and coordinate the prioritization of proposed study areas. FEMA/NSP shall be responsible for compiling the necessary information for the meeting as contained on the Scoping Meeting Item Checklist. These items may include: FIS and FIRM for affected communities; USGS quads for the study area(s); best available community base map(s); effective FIRM summary; Available Data Inventory; Scoping Map; aerial photos/topographic mapping if available; existing drainage studies or other Hydrology & Hydraulics (H&H) data; Community master plan(s)/Drainage Master Plan(s); Zoning Maps; Street Maps; As-built plans; and Floodplain Ordinance(s).

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: A completed Scoping Meeting Package with all necessary forms will be *compiled cooperatively and distributed* to the CWCB, the FEMA Regional Project Officer, and the NSP one week after the Scoping Meeting.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/firm_gsai.pdf).

### **Task 2-11 Mapping Needs List Prioritization and Finalization**

Responsible Partner: CWCB

Scope: The Project Management Team shall review the mapping needs list, review the research findings, and make selections of proposed methods for obtaining/producing flood data. Any additions or changes to the needs list shall be discussed with all members. All needs shall be prioritized. In general, highest priority shall be given to the following areas: areas of dense existing or anticipated development, including areas where new road crossings have been constructed over stream(s); areas affected by flood-control structures and/or channelization; areas where natural physical changes in the floodplain have been

significant (due to subsidence or extreme erosion, for example); areas that were studied by approximate methods and unmapped areas, especially those subject to development pressure; areas where the community has experienced flooding outside mapped floodplains, with severe damage to buildings and/or infrastructure; areas where mapped flood hazards do not match those shown on contiguous FIRMs (unless those FIRMs are not considered to be accurate); and areas where flood data (BFEs, floodplains, and regulatory floodways) are likely to be changed the most by a restudy.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: The CWCB will prepare the final mapping needs list along with priorities.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

### **Task 2-12 Refinement of Project Scope**

Responsible Partner: CWCB

Scope: Based on the discussion of mapping needs, CWCB and FEMA Project Officer will finalize the areas to be included in the project (based on recommendations provided by the Project Team). Areas to be studied by detailed and approximate methods shall be identified. The following issues will be discussed and refined:

#### *Review and Refinement of Flood Hazard Identification Methodologies:*

The Project Team shall discuss the extent of riverine or coastal modeling required for the project. The research completed during the pre-Scoping Meeting phase shall be reviewed to determine the extent and applicability of previous modeling. Issues to be discussed include the following: models to be used from FEMA's approved models list; requirements for tie-ins to adjacent NFIP maps; areas where complex models might be required; and coordination on Coastal Issues.

#### *Review of Proposed Paneling Scheme:*

The scoping map shall be used to review the proposed paneling and scale scheme.

#### *Review and Refinement of Base and Topographic Map Sources:*

FEMA's base map specifications will be discussed. The discussion shall include the following topics: Base map source (i.e., locally developed data or DOQs meeting FEMA's minimum specifications) to be used for the project; Topographic and planimetric data sources; Coordination of countywide issues, if necessary; horizontal and vertical datums; and acquisition of the base map, if digital files are not available.

#### *Finalization of Map Production and Database Options:*

The proposed DFIRM format and optional features and data for the enhanced DFIRM Database (e.g., GIS data for watershed boundaries, stream reach hydrologic network structure, land use data, soil data, digital elevation certificates, photographs of structures) from the draft Scope of Project shall be reviewed, refined, and finalized.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: A digital Project Scope document (*FEMA/NSP will update the Scoping Tool files accordingly*).

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

#### **Task 2-14 Community Partnership Agreements**

Responsible Partner: CWCB

Scope: *The county and communities (as listed in Section 1)* will be contacted and given the opportunity to sign a Memorandum of Agreement (MOA). MOAs will be obtained from as many affected communities as possible, within the Period of Performance of this Task Order. MOAs document the good faith efforts to collaboratively assess the community's needs, develop an appropriate Project Scope, and develop and adopt the resulting maps.

If these agreements cannot be signed at the Scoping meeting (for example, if they require city council approval), they are to be processed as soon as possible after the Scoping Meeting. MOA templates are provided in Appendix I, Subsections I.2.7 and I.2.8.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Signed Community Partner MOAs.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

#### **Task 2-16 Scoping Meeting Documentation**

Responsible Partner: CWCB

Scope: CWCB shall prepare and distribute the meeting minutes, which shall include a list of all the participants and their respective assignments for the project, as well as the overall schedule for the project as discussed at the Scoping Meeting. The overall project schedule shall establish the basis for each Project Team member's assignment(s). Project Team members shall review their task assignments and provide feedback or comments. All changes to the proposed scope, schedule, and task assignments shall be coordinated with CWCB and the other team members.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Scoping Meeting documents including attendees sign-in list, scoping meeting minutes, and the project schedule summarizing prioritized needs within the community. Priorities are established so that areas of greatest need can be addressed with the available funding. Backup or supplemental information used in writing this report should also be included.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

#### **Task 2-18 Statement of Work or Mapping Activity Statement Revision**

Responsible Partner: CWCB

Scope: CWCB shall work closely with *their consultant* to develop or revise the Mapping Activity Statement (MAS) based on task assignments made during the Scoping Meeting and any subsequent changes. FEMA Regional Project Officer, FEMA Regional Contracting Officer, and FEMA HQ Program Manager shall review and approve the SOW or MAS before it is distributed to the Project Team members. The MAS shall follow the template provided in Appendix I, Subsection I.3.1 of the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: The deliverable shall be the revised Mapping Activity Statement or Statement of Work.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

#### **Task 2-19 Time and Cost Estimate Preparation**

Responsible Partner: CWCB

Scope: CWCB shall be responsible for preparing time and cost estimates for all assigned tasks as well as coordinating and compiling time and cost estimates from other mapping partners. Based on the SOW or MAS, each mapping partner participating in the flood map project shall develop a time and cost estimate for assigned tasks. As part of these estimates, Project Team members also shall establish a schedule for their portion of the work within the schedule from the Scoping Meeting.

The time and cost estimates shall be prepared in accordance with the template for preparing time and cost estimates is provided in Appendix I, Subsection I.3.2 of the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: *Documentation of time and cost estimate for the project.* Any backup or supplemental information will also be included upon request.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

## **Task 2-21 Updates to Mapping Needs Update Support System (MNUSS) Database or its successor**

Responsible Partner: CWCB

Scope: Once the SOW or MAS is finalized, CWCB shall update the MNUSS database to indicate that the needs included in the SOW or MAS are being addressed in an ongoing Flood Map Project. They shall also update the MNUSS database to add any new needs or revise existing needs identified during the scoping activities that will not be addressed by the current project. Additionally, they shall flag the needs that could not be verified during the research and community coordination activities as “not verified.”

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Email from the MNUSS administrator stating that the MNUSS update was successful.

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

## **Task 2-22 Outreach, Coordination & Consultation**

Responsible Partner: CWCB

Scope: By proactively reaching out to all key stakeholders as early in the Flood Map Project as possible, the maps can be used to their full potential. The likelihood of appeals may also be reduced or eliminated. *CWCB has developed an outreach plan (located in the State Business Plan) to accomplish the following:* establishing two-way communication to address the needs of, inform and obtain feedback from, the stakeholders; ensuring compliance with due process requirements; interacting with technical representatives to ensure production of accurate and up-to-date maps; enhancing ownership by communities; tracking, monitoring, and evaluating outreach activities and adjusting efforts according to ongoing feedback and evolving project needs.

CWCB shall also assist FEMA’s Consultation Coordination Officer (CCO) in consultation and coordination efforts to address outreach activities to educate stakeholders about this Flood Map Project.

CWCB shall also assist FEMA in the coordination and outreach with local officials by helping them contact the local officials and the State NFIP Coordinator and inform them that their community has been selected for a possible study. They shall also work with FEMA and local officials to inform the community and request information through meetings and other consultation activities.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: *The State’s Business Case Plan is available upon request.*

Appendix I may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsai.pdf](http://www.fema.gov/pdf/fhm/frm_gsai.pdf).

## **Activity 3 - Field Surveys and Reconnaissance**

Responsible Mapping Partner: CWCB

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this project, CWCB shall conduct *an appropriate and necessary level of 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.

In addition to the initial field reconnaissance, CWCB shall conduct field surveys *as needed*, including obtaining channel and floodplain cross sections, identifying or establishing Temporary Bench Marks, and obtaining the physical dimensions of hydraulic and flood-control structures. CWCB also shall coordinate with other Mapping Partners that are collecting topographic data under Activity 4.

Standards: All work under Activity 3 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the CWCB shall make the following products available to FEMA:

- A summary of the findings of the field reconnaissance;
- Maps and drawings that provide the detailed survey results, if applicable;
- Survey notebook containing cross sections and structural data, if applicable; and
- NSP Format Survey Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards, if applicable.

Data Capture Standards can be downloaded from [http://www.fema.gov/pdf/fhm/firm\\_gsana.pdf](http://www.fema.gov/pdf/fhm/firm_gsana.pdf).

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsana.pdf](http://www.fema.gov/pdf/fhm/firm_gsana.pdf).

## Activity 4 - Topographic Data Development

Responsible Mapping Partner: CWCB

Scope: To supplement the field surveys conducted under Activity 3, the CWCB shall obtain additional topographic data of the overbank areas of the flooding sources studied to delineate floodplain boundaries. Specifically, the CWCB ~~shall collect the best available existing topographic data for flooding sources as listed in Table 1-1.~~ CWCB also shall coordinate with other team members conducting field surveys under Activity 3. The contour interval and/or accuracy for the topographic data shall be compared to the current FEMA requirements as documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

If automated H&H is used, CWCB also shall develop topographic maps and/or Digital Elevation Models for the subject flooding sources using the data collected under Activities 3 and 4. In addition, CWCB shall address all concerns or questions regarding Activity 4 that are identified by FEMA/NSP during the independent QA/QC review under Activity 5.

Standards: All work under Activity 4 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverable: Upon completion of topographic data collection and processing for *the flooding sources listed in Table 1-1*, CWCB shall submit these data to FEMA/NSP for an independent QA/QC review

under Activity 5. CWCB shall submit the data for the remaining flooding sources for a final QA/QC review at the completion of this activity. In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, CWCB shall make the following products available to FEMA:

- Hardcopy topographic maps;
- Documentation of methodology and results;
- Mass points and breaklines data on CD-ROM;
- Digital work maps with contours;
- Checkpoint analyses to assess the accuracy of data, including Root Mean Square Error calculations to support vertical accuracy;
- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey (NGS) data sheets for Network Control Points used to control remote- sensing and ground surveys; and
- Metadata compliant with Federal Geographic Data Committee standards; and
- NSP Format Terrain Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsana.pdf](http://www.fema.gov/pdf/fhm/firm_gsana.pdf).

### **Activity 5 - Independent QA/QC Review of Topographic Data**

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the mapping data generated by CWCB under Activity 4 to ensure that these data are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM.

*This review will be performed in a timely manner so as to eliminate impact to the project schedule.*

Standards: All work under Activity 5 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, FEMA/NSP shall make the following products available to FEMA and the CWCB:

- 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/firm_gsam.pdf).

## Activity 6 – Hydrologic Analyses

Responsible Mapping Partner: CWCB

Scope: The CWCB shall perform hydrologic analyses as necessary for the detailed flooding source(s) identified in Table 1-1. The CWCB shall calculate peak flood discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events. These flood discharges will be the basis for subsequent hydraulic analyses under Activity 8. In addition, the CWCB shall address all concerns or questions regarding Activity 6 that are identified by FEMA/NSP during the independent QA/QC review under Activity 7.

*CWCB shall perform approximate hydrologic analyses as necessary for the approximate flooding sources identified in Table 1-1, if applicable. The CWCB shall calculate peak flood discharges for the 1-percent-annual-chance storm events.*

If Geographic Information System (GIS)-based modeling is used, the CWCB shall document the automated data processing and modeling algorithms and provide them to FEMA to ensure they are consistent with the standards outlined above. The CWCB shall document digital datasets (such as elevation, basin, or land use data) and provide them 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 the CWCB shall provide full user documentation, technical algorithm documentation, and the software to FEMA for review before performing the hydrologic analyses.

Standards: All work under Activity 6 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of the hydrologic modeling the flooding sources as listed in Table 1-1, CWCB shall submit the results to FEMA/NSP for an independent QA/QC review under Activity 7. CWCB shall submit the results of the hydrologic analyses for the remaining flooding sources for a final QA/QC review at the completion of this activity. In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, CWCB shall make the following products available to FEMA:

- Digital copies of all hydrologic modeling (input and output) files for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events;
- *Digital copies of approximate hydrology results;*
- Digital and hardcopy versions of the Summary of Discharges Table presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital and hardcopy versions of draft text for Section 3.1, Hydrologic Analyses, of the FIS report; and
- Digital and hardcopy versions of all backup data used in the analysis, including work maps.

For GIS-based modeling, deliverables shall include all input and output data, intermediate data processing products, and GIS data layers.

- NSP Format Hydrology Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsana.pdf](http://www.fema.gov/pdf/fhm/frm_gsana.pdf).

## Activity 7 - Independent QA/QC Review of Hydrologic Analyses

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the technical, scientific, and other information submitted by CWCB under Activity 6 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. This work shall include, at a minimum, the activities listed below.

- 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 them readily available to FEMA.
- Maintain an archive of all data submitted for hydrologic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

*This review will be performed in a timely manner so as to eliminate impact to the project schedule.*

Standards: All work under Activity 7 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, FEMA/NSP shall make the following products available to FEMA and the CWCB:

- 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/fhm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/fhm_gsam.pdf)

## Activity 8 – Hydraulic Analyses

Responsible Mapping Partner: CWCB

Scope: CWCB shall perform hydraulic analyses as necessary for the detailed flooding sources identified in Table 1-1. The modeling will include the 10-, 2-, 1-, and 0.2-percent-annual-chance events based on peak discharges computed under Activity 6.

Hydraulic analyses for approximate floodplains as listed in Table 1-1, if applicable, will be performed using automated routines or other methods as approved by the CWCB. The analyses will be performed for the 1-percent-annual-chance events.

CWCB shall use the cross-section and field data collected under Activity 3 to perform the hydraulic analyses. The hydraulic analyses shall be used to establish flood elevations and regulatory floodways for the subject flooding sources.

CWCB shall use the FEMA CHECK-2 or CHECK-RAS checking program to check the reasonableness of the hydraulic analyses. To facilitate the independent QA/QC review under Activity 9, the CWCB shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, CWCB shall address all concerns or questions regarding Activity 8 that are identified by FEMA/NSP during the independent QA/QC review under Activity 9.

If GIS-based modeling is used, CWCB shall document automated data processing and modeling algorithms for GIS-based modeling and provide them to FEMA for review to ensure they are consistent with the standards outlined above. CWCB shall document the digital datasets and provide them to FEMA for approval before performing the hydraulic analyses to ensure that the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analyses, then CWCB shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses.

Standards: All work under Activity 8 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of hydraulic modeling for the flooding sources listed above (See Activity 8: Scope), CWCB shall submit the results to FEMA/NSP for an independent QA/QC review under Activity 9. CWCB shall submit the results of the hydraulic analyses for the remaining flooding sources for a final QA/QC review at the completion of this activity. In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, CWCB shall make the following products available to FEMA:

- Digital profiles of the 10-, 2-, 1- and 0.2-percent-annual-chance water-surface elevations representing existing conditions using the FEMA RASLOT program or similar software, if applicable;
- Digital results of the approximate hydraulic analyses, if applicable;
- Digital and hardcopy versions of the Floodway Data Table for each flooding source that is compatible with the DFIRM database;
- Digital and hardcopy versions of all hydraulic modeling (input and output) files;
- Digital and hardcopy versions of a table showing ranges of Manning's "n" values;
- Explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate;
- Digital and hardcopy versions of all backup data used in the analyses; and
- Digital and hardcopy versions of draft text for inclusion in the FIS report.

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.

- NSP Format Hydraulic Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsana.pdf](http://www.fema.gov/pdf/fhm/frm_gsana.pdf)

## Activity 9 - Independent QA/QC Review of Hydraulic Analyses

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the technical, scientific, and other information submitted by CWCB under Activity 8 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. This work shall include, at a minimum, the activities listed below.

- 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-ins 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 them readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

*This review will be performed in a timely manner so as to eliminate impact to the project schedule.*

Standards: All work under Activity 9 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, NSP/FEMA shall make the following products available to FEMA and the CWCB:

- 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/frm_gsam.pdf).

## Activity 10 - Floodplain Mapping (Detailed Riverine Analysis)

Responsible Mapping Partner: CWCB

Scope: CWCB shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for the flooding sources for which detailed analyses were performed as shown in Table 1-1. CWCB shall incorporate all new or revised modeling and shall use the topographic data acquired under Activity 4 to delineate the floodplain and regulatory floodway boundaries on a digital work map. In addition, CWCB shall incorporate the results of all effective Letters of Map Change (LOMCs) within the revised areas as appropriate. Also, CWCB shall address all concerns or questions regarding Activity 10 that are identified by FEMA/NSP during the independent QA/QC review under Activity 11.

Standards: All work under Activity 10 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of floodplain mapping for the flooding sources as listed in Table 1-1, CWCB shall submit the mapping to FEMA/NSP for an independent QA/QC review under Activity 11. CWCB shall submit the mapping for the remaining flooding sources for a final QA/QC review at the completion of this activity. In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, CWCB shall make the following products available to FEMA:

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale;
- Documentation that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM;
- Any backup or supplemental information used in the mapping required for the independent QA/QC review outlined under Activity 11;
- An explanation for the use of existing topography for the studied reaches, if appropriate; and
- Intermediate Format Mapping Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/frm\\_gsana.pdf](http://www.fema.gov/pdf/fhm/frm_gsana.pdf).

## Activity 11 - Independent QA/QC Review of Floodplain Mapping (Revised Areas)

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the floodplain mapping submitted by CWCB under Activities 10, 10A, and 10B to ensure that the results of the analyses performed are accurately represented, the work maps are consistent with current FEMA standards, and the work maps are sufficient to prepare the DFIRM. This work shall include, at a minimum, the activities listed below.

- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table;
- Review the BFEs shown on the work maps for proper location and agreement with the results of the hydraulic modeling;
- Review the regulatory floodway widths shown on the work maps for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling;
- Review the floodplain boundaries shown on the work maps or agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps;
- Review the floodplain widths at cross sections as shown on the work maps to ensure they match the Floodway Data Table;
- Review the floodplain boundaries as shown on the work maps to ensure they match the Flood Profiles;
- Review the flood insurance risk zones as shown on the work maps to ensure they are labeled properly;
- Review the DFIRM mapping files to ensure they were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- Review the metadata files to ensure they include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

*This review will be performed in a timely manner so as to eliminate impact to the project schedule.*

Standards: All work under Activity 11 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, FEMA/NSP shall make the following products available to FEMA and the CWCB:

- 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; and

- An annotated work map with all questions and/or concerns indicated, if necessary.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/fhm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/fhm_gsam.pdf).

## **Activity 14 – DFIRM Production (Merging Revised and Non-Revised Information)**

Responsible Mapping Partner: FEMA/NSP

Scope: Upon completion of the floodplain mapping activities for the revised areas *which include the areas noted in Table 1-1*, FEMA/NSP shall merge the digital floodplain data into *the effective DFIRM panels that are affected by this project*. This work includes the tie-in of flood hazard information for areas that were not studied as part of the Flood Map Project documented in this MAS. FEMA/NSP also shall tie in the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries with contiguous communities that were not studied as part of the Flood Map Project documented in this MAS. FEMA/NSP shall coordinate with FEMA and those Mapping Partners responsible for Activities 10, 10A, 10B, and 13, as necessary, to resolve any potential tie-in issues.

Standards: All work under Activity 14 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, CWCB shall make the following products available to FEMA:

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- Documentation that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/pdf/fhm/fhm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/fhm_gsam.pdf).

## **Activity 17—Outreach**

Task 17 – Outreach and Coordination

Responsible Entity: CWCB

Scope: 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.

A regulatory overview of required activities is followed by a description of tools that can be used in working with stakeholders to keep them informed and to solicit their input.

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 Project Team in responding to congressional inquiries.

By proactively reaching out to all key stakeholders as early in the Flood Map Project as possible, the maps can be used to their full potential. The likelihood of appeals may also be reduced or eliminated. Specific responsible Mapping Partner activities shall include, but are not limited to:

- Establishing two-way communication to address the needs of, inform and obtain feedback from, the stakeholders;
- Ensuring compliance with due process requirements;
- Interacting with technical representatives to ensure production of accurate and up-to-date maps;
- Enhancing ownership by communities; and
- Tracking, monitoring, and evaluating outreach activities and adjusting efforts according to ongoing feedback and evolving project needs.

Standards: All work conducted under this task shall conform to the standards specified for this task in Section 5, "Applicable Standards" of this MAS. In the event of any contradictions between the MAS and the standards, the standards shall control.

Deliverables: Upon Completion of Outreach and Coordination the responsible Mapping Partner shall deliver the following to the FEMA Regional Project Officer in accordance with the delivery dates specified in task orders:

- Documentation detailing the outreach and coordination activities; and
- Backup or supplemental information used in writing this report.

## **SECTION 2—Technical and Administrative Support Data Submittals and special problem reports**

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 shall be submitted in the TSDN format in accordance with Appendix M of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners*, dated April 2003. Appendix M is available for viewing or download on the FEMA Web site at [http://www.fema.gov/pdf/fhm/firm\\_gsam.pdf](http://www.fema.gov/pdf/fhm/firm_gsam.pdf). Table 2-1 indicates the sections of the TSDN that apply to each mapping activity.

**Table 2-1. Mapping Activities and Applicable TSDN Sections**

Mapping Activities	
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TSDN Section	Mapping Activities															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
General Documentation																
Special Problem Reports	X	X	X	X	X	X	X	X	X	10 B	X	X	X	X	X	X
Telephone Conversation Reports	X	X	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	X	X
General Correspondence	X	X	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					
Hydraulic Analyses			X			X	X	X	X	X	X					
Key to Cross-Section Labeling			X			X	X	X	X	X	X					
Key to Transect Labeling			X			X	X	X	X	X	X					
Draft FIS Report						X	X	X	X							
Mapping Information	X	X		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	X	X

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 Appendix M, Subsection M.2.1.1 of *Guidelines and Specifications for Flood Hazard Mapping Partners*.)

Additionally, the NSP shall collect and maintain a set of products for all Activities and shall compile a comprehensive TSDN for the entire project.

### Section 3—Period of Performance

The mapping activities documented in this MAS will begin on August 1, 2005, and will be completed no later than ~~September 30, 2008~~. The mapping activities may be terminated at the option of FEMA or CWCB in accordance with the provisions of the Partnership Agreement dated July 15, 2002.

### Section 4—Funding/Cost-Sharing

FEMA is providing funding, in the amount of \_\_\_\_\_ to CWCB for the completion of the Flood Map Project documented in this MAS. CWCB shall provide \_\_\_\_\_ and any additional resources required to complete the assigned activities for this Flood Map Project. The County will share and make available to the project all GIS data and existing study data as an in-kind contribution. The total project cost is \_\_\_\_\_.

### Section 5—Standards

The standards relevant to this MAS are provided in Tables 5-1 and 5-2. Information on the correct volume, appendix, section, or subsection of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* to be referenced for each mapping activity are summarized in Table 5-2. These Guidelines are available for viewing or download from the FEMA Flood Hazard Mapping Web site at [http://www.fema.gov/fhm/dl\\_cgs.shtm](http://www.fema.gov/fhm/dl_cgs.shtm).

In addition, Data Capture Standards referenced in the previous sections are to be applied to the project for the data formats to be submitted to FEMA.

Table 5-1. Applicable Standards for Project Activities

Applicable Standards	Activities															
	1	2	3	4	5	6 6A	7 7A	8	9	10 10A 10B	11	12	13 13A	14 14A	15	16
<i>Guidelines and Specifications for Flood Hazard Mapping Partners</i> April 2003	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American Congress on Surveying and Mapping Procedures	X	X	X	X	X											
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-510), "Guidelines for Establishing GPS-Derived Ellipsoid Heights" November 1997	X	X	X	X	X											
Engineer Manual 1110-1-1000 <i>Photogrammetric Mapping</i> (USACE), July 1, 2002	X	X	X	X	X											
Engineer Manual 1110-2-1003 <i>Hydrographic Surveys</i> (USACE), January 1, 2002	X	X	X													
Numerical Models Accepted by FEMA for NFIP Usage Updated April 2003	X	X				X	X	X	X							
<i>Content Standard for Digital Geospatial Metadata</i> (Federal Geographic Data Committee) 1998	X	X		X	X					X	X	X	X	X	X	X
<i>Document Control Procedures Manual</i> December 2000	X	X													X	X

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

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
1	Pre-Scoping	Volume 1, and Appendix I
2	Scoping	Volume 1, and Appendix I
3	Field Surveys and Reconnaissance	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.4, A.5, A.6, A.7, and A.8 Appendix F, Section F.3 Appendices B, C, M, and N
4	Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.2, A.3, A.7, and A.8 Appendix M and N
5	Independent QA/QC Review of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1) Appendix A, Sections A.2, A.3, A.7 (specifically Subsection A.7.5), and A.8 (specifically Subsection A.8.6) Appendix M
6	Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 Appendix C, Sections C.1 and C.7 Appendices E, F, G, H, M, and N
6A	Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.2.2) Appendix A, Section A.4 Appendices B, D, M, and N

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
7	Independent QA/QC Review of Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 Appendix C, Section C.2 Appendices E, F, G, H, and M
7A	Independent QA/QC Review of Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 Appendices B, D, and M
8	Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Sections C.3 and C.7 Appendices B, E, F, G, H, M, and N
9	Independent QA/QC Review of Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Section C.5 Appendices B, E, F, G, H, and M
10	Floodplain Mapping (Detailed Riverine or Coastal Analysis)	MHIP, Volume 1, Chapter 7 (specifically Table 7-1) Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendix C, Sections C.4 and C.6 and Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendices E, F, G, H, K, L, M, and N

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
10A	Floodplain Mapping (Redelimitation Using Effective Flood Profiles and Updated Topographic Data)	MHIP, Volume 1, Chapter 7 (specifically Table 7-1) Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.3) Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.3) Appendix C, Section C-6 (specifically Subsection C-6.1.3) Appendix C, Section C.6 (specifically Subsection C.6.1.3) and Appendices K, L, M, and N Appendices K, L, M, and N
10B	Floodplain Mapping (Refinement or Creation of Zone A)	MHIP, Volume 1, Chapter 7 (specifically Table 7-1) Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendix C, Sections C.4 and C.6 and Appendices K, L, and M Appendices K, L, and M
11	Independent QA/QC Review of Floodplain Mapping (Revised Areas)	MHIP, Volume 1, Chapter 7 (specifically Table 7-1) Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3) Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendix C, Sections C.4 and C.6 and Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendices E, F, G, H, K, L, and M Appendices E, F, G, H, K, L, and M
12	Base Map Acquisition and Preparation	Volume 1, Section 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsections 1.4.3.1 and 1.4.3.2) Volume 1, Section 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsections 1.4.3.1 and 1.4.3.2) Appendix A, Section A.1 (specifically Subsection A.1.1) Appendix A, Section A.1 (specifically Subsection A.1.1)
13	DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) MHIP, Volume 1, Chapter 7 (specifically Table 7-1) and Appendices K, L, and M Appendices K, L, and M

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
13A	Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	<p>Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2)</p> <p>MHIP, Volume I, Chapter 7 (specifically Table 7-1) and Appendices K, L, and M</p>

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
14	DFIRM Production (Merging Revised and Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) MHIP, Volume 1, Chapter 7 (specifically Table 7-1) and Appendices K, L, and M Appendices K, L, and M
14A	DFIRM Production (Application of FEMA Graphics and Database Specifications)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Appendices K, L, and M Appendices K, L, and M
14B	Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Appendices K, L, M, and N Appendices K, L, M, and N
15	Preliminary DFIRM and FIS Report Distribution	Volume 1, Sections 1.4 (specifically Subsections 1.4.2 and 1.4.3) and 1.5 (specifically Subsection 1.5.1) Volume 1, Sections 1.4 (specifically Subsections 1.4.2 and 1.4.3) and 1.5 (specifically Subsection 1.5.1) Appendices J, K, L, and M Appendices J, K, L, and M
16	Post-Preliminary Processing	Volume 1, Section 1.5 (specifically Subsection 1.5.2) Volume 1, Section 1.5 (specifically Subsection 1.5.2) Appendices J, K, L, and M Appendices J, K, L, and M

## Section 6—Schedule

The activities documented in this MAS shall be completed in accordance with the project schedule shown in Table 6-1. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner.

**Table 6-1. Project Schedule**

ACTIVITIES	RESPONSIBLE PARTNER(S)	DATE DUE
Activity 1 – Pre-Scoping	CWCB, FEMA/NSP	
Activity 2 – Scoping	CWCB, FEMA/NSP	6/15/05
Activity 3 – Field Surveys and Reconnaissance	CWCB	9/30/05
Activity 4 – Topographic Data Development	CWCB	11/30/05
Activity 5 – Independent QA/QC Review of Topographic Data	FEMA/NSP	12/15/05
Activity 6 – Hydrologic Analyses	CWCB	3/30/06
Activity 7 – Independent QA/QC Review of Hydrologic Analyses	FEMA/NSP	4/30/06
Activity 8 – Hydraulic Analyses	CWCB	3/30/06
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	FEMA/NSP	4/30/06
Activity 10 – Floodplain Mapping (Detailed Riverine or Coastal Analysis)	CWCB	3/30/06
Activity 10A – Floodplain Mapping (Redelimitation Using Effective Flood Profiles and Updated Topographic Data)	CWCB	
Activity 10B – Floodplain Mapping (Refinement or Creation of Zone A)	CWCB	
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	FEMA/NSP	4/30/06
Activity 12 – Base Map Acquisition	CWCB	
Activity 13 – DFIRM Production (Non-Revised Areas)	CWCB	
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	FEMA/NSP	
Activity 14 – DFIRM Production (Merging Revised and Non-Revised Information)	FEMA/NSP	7/15/06
Activity 14A – DFIRM Production (Application of DFIRM Graphics)	CWCB	

ACTIVITIES	RESPONSIBLE PARTNER(S)	DATE DUE
and Database Specifications)		
Activity 14B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications	FEMA/NSP	
Activity 15 – Preliminary DFIRM and FIS Report Distribution	CWCB, FEMA/NSP	
Activity 16 – Post-Preliminary Processing	CWCB, FEMA/NSP	
Activity 17 – Outreach	CWCB	ongoing

### Section 7—Certifications

The following certifications apply to this MAS:

#### **Activity 3 (Field Surveys and Reconnaissance) and Activity 4 (Topographic Data Development)**

A Registered Professional Engineer or Licensed Land Surveyor shall certify topographic data, in accordance with 44 CFR 65.5(c). Certification of topographic data by the American Society for Photogrammetry and Remote Sensing is also acceptable.

#### **Activity 6 (Hydrologic Analyses), Activity 8 (Hydraulic Analyses), Activity 10 (Floodplain Mapping– Detailed Riverine or Coastal Analysis), Activity 10A (Floodplain Mapping {Redelineation Using Effective Flood Profiles and Updated Topographic Data}), and Activity 10B (Floodplain Mapping {Refinement or Creation of Zone A})**

- A Registered Professional Engineer shall certify hydrologic and hydraulic analyses and data in accordance with 44 CFR 65.6(f);
- A Registered Professional Engineer or Licensed Land Surveyor shall certify topographic information in accordance with 44 CFR 65.5(c); and
- Any levee systems to be accredited will be certified in accordance with 44 CFR 65.10(e).

#### **Activity 10 (Floodplain Mapping– Detailed Riverine or Coastal Analysis), Activity 10A (Floodplain Mapping {Redelineation Using Effective Flood Profiles and Updated Topographic Data}), and Activity 10B (Floodplain Mapping {Refinement or Creation of Zone A}), Activity 11 (Independent QA/QC Review of Floodplain Mapping {Revised Areas}), Activity 13 (DFIRM Production {Non-Revised Areas}), Activity 14 (DFIRM Production {Merging Revised and Non-Revised Information}), and Activity 14A (DFIRM Production {Application of FEMA Graphics and Database Specifications})**

The DFIRM metadata files shall include a description of the horizontal and vertical accuracy of the DFIRM base map and floodplain information.

#### **Activity 12 (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 will still be 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.

#### **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 FEMA Mapping Needs Assessment Process from the NSP, who may be contacted by telephone at 720-514-1110 or by facsimile at 720-514-1120.

General technical and programmatic information, such as FEMA 265 and the Quick-2 computer program, can be downloaded from the FEMA Web site (<http://www.fema.gov/fhm/>). Specific technical and programmatic support may be provided through the NSP; such assistance should be requested through the FEMA Project Officer specified in Section 11 of this MAS.

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.

#### **Section 9—Contractors**

CWCB intends to use the services of PBS&J as a contractor for the Flood Map Project documented in this MAS. CWCB 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 U.S. Government Printing Office Web site at [http://www.access.gpo.gov/nara/cfr/waisidx\\_02/44cfr13\\_02.html](http://www.access.gpo.gov/nara/cfr/waisidx_02/44cfr13_02.html).

#### **Section 10—Financial Reporting**

Because funding has been provided to CWCB by FEMA for the Flood Map Project documented in this MAS, financial reporting requirements for CWCB will be in accordance with Cooperative Agreement Articles V and VI.

CWCB will meet with the NSP and/or FEMA *as needed* to review the progress of the project. These meetings will alternate between FEMA's Regional Office and the CWCB office.

CWCB will provide to the NSP regular updates for each of the mapping activity statements. This may, at FEMA's discretion be a spreadsheet template to be completed or the Monitoring Information on Contracted Studies (MICS) system may be used. It may include dollars spent, hours spent, and percent complete of each major Flood Map Project activity (e.g., field survey, terrain, hydrology) on a county basis. Specific reporting requirements will be finalized as a part of the scoping meeting.

#### **Section 11—Points of Contact**

The points of contact for this Flood Map Project are Dan Carlson, the FEMA Regional Project Officer; Karen Price, the Colorado Map Mod Coordinator for the CWCB; or subsequent personnel of comparable

experience who are appointed to fulfill these responsibilities. When necessary, the assistance of the NSP should be requested through the FEMA Project Officer, Kevin Long.

In addition, the NSP is required to coordinate project issues with the responsible Mapping Partner that created the MAS deliverable or portions of the MAS deliverable product and will document all such coordination activities with the CTP and FEMA.

### **Section 12—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 may include:

- Meetings, teleconferences, and videoconferences with FEMA and other Project Team members *as needed*;
- Telephone conversations with FEMA and other Project Team members *as needed*;
- Updates to the MICS, MNUSS database, and other FEMA status information systems in accordance with requirements in Volumes 1 and 3 of *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- E-mail, facsimile transmissions, and letters, as required.

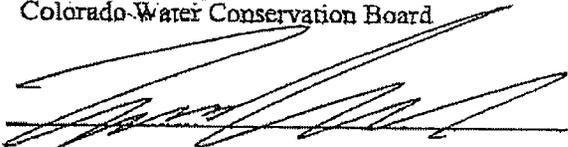
Each party has caused this MAS to be executed by its duly authorized representative.



Rod Kuharch  
Director  
Colorado Water Conservation Board

6.21.05

Date



for Karen Amrhein Price  
Colorado Map Mod Coordinator  
Project Manager  
Colorado Water Conservation Board

6/21/05

Date



Robert Ives  
HIRA Branch Chief  
Federal Emergency Management Agency, Region VII

6/10/05

Date



Dave Jula  
Michael Baker Jr., Inc.  
National Service Provider

6/10/05

Date

