MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION COOPERATING TECHNICAL PARTNERS MAPPING ACTIVITY STATEMENT

Mapping Activity Statement No. 2005-01 – Digital Flood Insurance Rate Map Production and Development of Updated Flood Data for Missoula County, Montana.

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated March 18, 2005, between the Montana Department of Natural Resources and Conservation (DNRC) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 2005-01.

Section 1: Objective and Scope

Missoula County, Montana, will be converted into a Digital Flood Insurance Rate Map (DFIRM) as described in this MAS starting in federal fiscal year 2005. The NSP prepared pre-scoping report and the DNRC's Contractor (PBS&J) prepared preliminary cost estimate will be included as appendices. This MAS describes general procedures that will be used for the county-wide conversion. The DNRC is responsible for all efforts in the conversion of the FIRM into a DFIRM up to and including the post-preliminary processing and map adoption. DNRC's Contractor will prepare a scope of work (forthcoming as Appendix B) that will be used to support this MAS. The schedule is expected to start in August 2005 and a preliminary DFIRM is expected to be published by July 2006.

The DFIRM Conversion effort will include datum conversion to North American Vertical Datum of 1988 (NAVD88), one effective FIS conversion, DFIRM conversion including new H&H work on Lolo Creek, Butler/LaValle Creek, and the Clark Fork River. The objective of the Flood Map Project documented in this MAS is to develop a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for Missoula County and Incorporated Areas including the City of Missoula. The DFIRM and FIS report will be produced in the FEMA Countywide Format which is based on the USGS 7.5 minute quadrangle paneling scheme.

The following Mapping Partners will complete this Flood Map Project:

- Montana Department of Natural Resources and Conservation (DNRC), (CTP);
- Post, Buckley, Schuh, &Jernigan (PBS&J); the CTP contractor;
- Michael Baker, Jr., Inc., the FEMA National Service Provider (NSP); and
- FEMA Region VIII

Products identified in the activities of this MAS and outlined in the G&S shall be uploaded to the Mapping Information Platform (MIP). The Mapping Partners involved in this project will develop new and/or updated flood hazard data, as summarized in Table 1-1 and described in Appendix B.

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

Priority	Flooding Source	Reach Limits	Comments
1	Clark Fork River	15.4 miles	Refer to Appendix B
2	Butler/LaValle Creeks	5.7	Refer to Appendix B
3	Lolo Creek	6	Refer to Appendix B

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 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 1-2. All activities that are to be accomplished by DNRC or contractors to DNRC, 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 Guidelines and Specification standards that must be met, and resultant map components.

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. It has been determined that DFIRMs that do not meet the quality standards stated above may not be considered toward meeting the Map Mod metrics. 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.

Table 1-2. Summary of Project Activities and Assignments

Activities	CTP	FEMA /NSP
Activity 1: Pre-Scoping		X
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 10A: Floodplain Mapping (Detailed Riverine or Coastal Analysis)	X	
Activity 10B: Floodplain Mapping (Limited Detail Analysis)	X	
Activity 10C: Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	X	
Activity 10D: Floodplain Mapping (Refinement/Redelineation or Creation of Zone A)	X	
Activity 11: Independent QA/QC Review of Floodplain Mapping (Revised Areas)		X
Activity 12: Base Map Acquisition	X	
Activity 13: DFIRM Production (Non-Revised Areas)	X	
Activity 13A: Independent QA/QC Review of DFIRM Production (Non-Revised Areas)		X
Activity 14: DFIRM Production (Merging Revised and Non-Revised Information)	X	
Activity 14A: DFIRM Production (Application of FEMA Graphics and Database Specifications)	X	
Activity 14B: Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications		X
Activity 15: Preliminary DFIRM and FIS Report Distribution	X	X

Activities	CTP	FEMA /NSP
Activity 16: Post-Preliminary Processing	X	X
Activity 17: Outreach	X	X

FEMA has developed tools to assist in the development of the flood hazard data studies and the Digital Flood Insurance Rate Maps (DFIRMs). FEMA, through the NSP, will provide the CTP and their contractor 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. The tools available at this time include WISE software and the DFIRM production tools. Access to WISE software and DFIRM tools can be found on the Multihazard Information Platform (MIP) website at **http://www.hazards.fema.gov**.

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 1 – Pre-Scoping

Responsible Mapping Partner: This activity has been previously completed by FEMA/NSP.

Scope: Pre-Scoping or Mapping Needs Assessment forms the building block for the Scoping Phase. This task involves collecting data from a variety of sources including community surveys, other Federal and State Agencies, NFIP State Coordinators, Community Assistance Visits (CAVs) and FEMA archives. *FEMA/NSP* will collect and compile are such data and evaluate the effective FIS report and FIRM maps to see if they need to be updated. *FEMA/NSP* will compile lists of mapping needs from the MNUSS database, community surveys, the Scoping Tool, and CAVs if available.

Data collection will include obtaining the best available base map materials (e.g., corporate limits, roads, orthophotos) along with stream centerline files. The acquired data will be imported into the scoping tool and used during the Scoping Task. In the Scoping Tool, all streams should have unique names, the limits of the effective FEMA studies should be identified, LOMC areas should be identified, and community requests should be identified. This task also includes populating the streamlines with existing pipeline and scoped studies currently underway.

The DNRC led the effort to contact and coordinate with the communities in pre-scoping (meetings held the week of March 7th) and FEMA/NSP was responsible for efforts related to existing data collection and the Scoping Tool.

Standards: All work under Activity 1 was performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: FEMA/NSP shall make the following products available to FEMA Regional Office and the DNRC:

- A Pre-Scoping Report including all data compiled from the described research is available as Appendix A;

Information on the Scoping Tool can be downloaded from
http://www.hazards.gov/resources/scoping.htm.

Activity 2 – Scoping

The Scoping Activity has been broken down into 22 tasks to approximately correspond with the *Guidelines and Specifications for Flood Hazard Mapping Partners* and are listed in the table below. The tasks identified below may be necessary in order to complete activities included under Activity 2 – Scoping.

Scoping Tasks			
TASK	TITLE	TASK	TITLE
1	Project Management Team Participation	12	Scoping Meeting Activities
2	Initial Community Contact	13	Mapping Needs List Prioritization and Finalization
3	Preliminary Project Management Plan	14	Refinement of Draft Scope of Project
4	Initial Project Team Conference Call	15	Assignment of Project Team Member Tasks
5	Project Team Formation	16	Community Partnership Agreements
6	Preliminary Research Activities	17	Scoping Meeting Documentation
7	Potential Obstacles	18	Statement of Work or Mapping Activity Statement Revision
8	Draft Project Scope	19	Time and Cost Estimate Preparation
9	Draft Project Scope Conference Call	20	Finalization of Project Management Plan
10	Revised Draft Project Scope	21	MNUSS Database or It's Successor
11	Distribution of Background Information	22	Outreach Coordination & Consultation

Responsible Mapping Partner: DNRC and FEMA/NSP

Scope: This activity involves collecting data from a variety of sources including community surveys, other Federal and State Agencies, NFIP State Coordinators, Community Assistance Visits (CAVs) and FEMA archives. The DNRC has evaluated the effective FIS report and FIRM maps in coordination with local community officials and stakeholders to determine the need for updates to flood hazard data in the communities. Lists of mapping needs were obtained form the MNUSS database, community surveys and CAV's if available.

Preliminary research activities can be separated into two categories – researching effective information and researching available data for the Flood Map Project. The following activities shall be completed to research effective information: 1) Inventory the FEMA archives for effective Flood Insurance Rate Map (FIRM) panels, Flood Boundary and Floodway Map (FBFM) panels, FIS reports, and other flood hazard data or existing study data; 2) Summarize the information in the MNUSS database; 3) Summarize contiguous community agreement checks; 4) Review CAV files; and 5) Develop a "scoping map", and an overview of the results of the research.

The DNRC has facilitated a Scoping Meeting in Missoula County and with other agencies who may become stakeholders during the project. The purpose of these meetings was to present the current information to the local officials (state, county and municipal) and coordinate identification and prioritization of study areas and sources of topographic and basemap data. The DNRC and their Contractor have compiled background information for the meetings including: effective FIS reports and FIRM panels for the affected communities; a summary of the effective FIRMs; and inventory of available data that had been identified; a preliminary Scoping Map; Scoping Meeting Agenda, Sign-In Sheet, and Meeting Minutes forms.

Data collection for the production phase of each project will include obtaining the best available base map materials (corporate limits, roads, ortho-photo, etc.) along with stream centerline files. Much of this data was obtained prior to the Scoping Meetings and development of this MAS for the purposes of performing a needs assessment and deriving anticipated project costs. In addition, the limits of the effective FEMA

studies were identified, LOMC areas were identified to the extent possible, and community requests were identified and prioritized during the Scoping Meetings in each community.

In cooperation with the FEMA Region, a Project Management Team will be established consisting of FEMA, NSP, the DNRC, the DNRC Contractor, officials from the community being studied, and other appropriate stakeholders. The Project Management Team will be responsible for coordinating the activities of this project and completing all activities identified in this Mapping Activity Statement

The Project Management Team shall review the initial 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 given to the following areas: 1) Areas of dense existing or anticipated development, including areas where new road crossings have been constructed over streams; 2) Areas affected by flood-control structures, and/or channelization and areas where natural physical changes in the floodplain have been significant; 3) Areas that were studied by approximate methods and unmapped areas, especially those with development pressure; 4) Areas where the community has experienced flooding outside mapped floodplains, with severe damage to buildings and/or infrastructure; 5) Areas where mapped flood hazards do not match those shown on contiguous FIRMs (unless those FIRMs are not considered accurate); and 6) Areas where flood data (BFEs, floodplains, and regulatory floodways) are likely to be changed the most by a restudy.

Based on the discussion of mapping needs, the DNRC and FEMA Project Officer will finalize the areas to be included in the project (based on recommendations by the Project Management Team). In addition to identifying the areas to be studied by detailed and approximate methods, the following issues will also be discussed and refined: 1) Review and Refinement of Flood Hazard Identification Methodologies; 2) Review of Proposed Paneling Scheme; 3) Review and Refinement of Base and Topographic Map Source; and 4) Finalization of Map Production and Database Options. Appendix B of the MAS will not be finalized until these items have been addressed jointly by the DNRC and FEMA.

The DNRC and NSP will be acting jointly as the Consultation Coordination Officer (CCO) for these flood studies as identified in Title 44 of the Code of Federal Regulations Part 66. At this point, the CTP will prepare and set up the Community Case File and Flood Elevation Docket for the maintenance of all communication and coordination as outlined in 44CFR Parts 66 and 67.

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

Deliverables:

- The Final Scoping for this project will be delivered as Appendix B of this MAS with components organized similar to the "Partner Flood Map Modernization Program Scoping Report" template provided to the CTP by FEMA. The Scoping Report will be delivered to the FEMA Regional Project Officer for approval in accordance with the schedule outlined in Section 6 of this MAS.

- The DNRC will prepare and submit a QA/QC plan for the review of specific project deliverables associated with Activities 5, 7, 9, 11, 13A, and 14B outlined in this MAS. That plan will include the sample checklists developed for each step of the review.

Activity 3 - Field Surveys and Reconnaissance

Responsible Mapping Partner: DNRC

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this project, DNRC 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, DNRC 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. DNRC also shall coordinate with other Mapping Partners that are collecting topographic data under Activity 4.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

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 DNRC 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/frm_gsana.pdf.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsana.pdf.

Activity 4 - Topographic Data Development

Responsible Mapping Partner: DNRC

Scope: To supplement the field surveys conducted under Activity 3, the DNRC shall obtain additional topographic data of the overbank areas of the flooding sources studied to delineate floodplain boundaries. Specifically, the DNRC shall collect the best available existing topographic data for flooding sources as listed in Table 1-1. DNRC 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, DNRC 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, DNRC shall address all concerns or questions regarding Activity 4 that are identified by FEMA/NSP during the independent QA/QC review under Activity 5.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

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 and Appendix B, DNRC shall submit these data to FEMA/NSP for an independent QA/QC review under Activity 5. DNRC 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*, DNRC 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/frm_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 DNRC under Activity 4 to ensure that these data are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. FEMA will fund this activity to the NSP through a Regional Task Order (RTO#).

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 DNRC*:

- 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.

Activity 6 – Hydrologic Analyses

Responsible Mapping Partner: DNRC

Scope: Where hydrologic analyses are required for new or revised studies, the methods and discharge values shall be identified in Appendix B. The flood discharges will then be used as the basis for subsequent hydraulic analyses under Activity 8. The DNRC shall address all concerns or questions regarding Activity 6 that are identified by FEMA/NSP during the independent QA/QC review under Activity 7.

If Geographic Information System (GIS)-based modeling is used, such as for Approximate A Zones, the DNRC 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 DNRC 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 DNRC shall provide full user documentation, technical algorithm documentation, and the software to FEMA for review before performing the hydrologic analyses.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

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, DNRC shall submit the results to FEMA/NSP for an independent QA/QC review under Activity 7. DNRC 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*, DNRC 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 values and a description of the method used will be made available if requested;
- 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.

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 DNRC 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. FEMA will fund this activity to the NSP through a Regional Task Order (RTO#).

- 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 DNRC*:

- 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

Activity 8 – Hydraulic Analyses

Responsible Mapping Partner: DNRC

Scope: DNRC shall perform hydraulic analyses for the specific flooding sources listed in Appendix B of this MAS. For new or revised studies based on detailed analyses, the hydraulic modeling will include the 10-, 2-, 1-, and 0.2 percent-annual-chance events, as well as the regulatory floodway, based on peak discharges computed under Activity 6. For new or revised studies based on approximate or limited detailed analyses, the hydraulic modeling will only include the 1-percent-annual-chance event. The hydraulic methods used for these analyses will involve step backwater calculations performed using a FEMA accepted 1-dimensional model such as the US Army Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) computer model, currently version 3.1.2.

DNRC shall use the cross-section and field data collected under Activity 3 and any topographic mapping collected during Activity 4 to perform the hydraulic analyses. The hydraulic analyses shall be used to establish flood elevations and regulatory floodways for the subject flooding sources.

DNRC may 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 DNRC shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, DNRC 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, such as for Approximate A Zones, DNRC 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. DNRC 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 DNRC shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

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 Actibity 8: Scope), DNRC shall submit the results to FEMA/NSP for an independent QA/QC review under Activity 9. DNRC 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 described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, DNRC 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 RASPLOT 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

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 DNRC 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. FEMA will fund this activity to the NSP through a Regional Task Order (RTO#). This work may include 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 DNRC:

- 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.

Activity 10 – Floodplain Mapping

Activity 10 has been subdivided into four floodplain mapping activities describing:

- detailed riverine analyses (Activity 10A),
- limited detail analyses (Activity 10B),
- redelineation of detailed floodplain boundaries using updated topographic data, (Activity 10C), and
- refinement, redelineation, or creation of Zone A (Activity 10D).

Applicable flood hazard data shall be referenced to NAVD88 where necessary, vertical datum adjustments shall be performed according to the procedures outlined in Appendix B of *Guidelines and Specifications for Flood Hazard Mapping Partners*. It is anticipated that items such as base flood elevation (BFE) markers, still water elevations, published cross section elevations, published graphical profiles, etc that are currently in the National Geodetic Vertical Datum of 1929 (NGVD29) will need to be converted to NAVD88 during this activity.

In addition to performing datum adjustments, graphical flood profiles and tubular data included in effective FIS reports will be reproduced in a unified countywide format for this activity, as appropriate. Graphical flood profiles and tabular data for effective detailed study reaches and limited detail study reaches that cross jurisdictions within the county will be combined into continuous reaches for the countywide conversion effort. Lettered cross sections will be re-lettered as necessary to provide a consistent product for the entire study reach and will be uniquely identified. Narrative descriptions in the community FIS reports will be combined into a common narrative for the new countywide format.

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, DNRC shall submit the mapping to FEMA/NSP for an independent QA/QC review under Activity 11. DNRC 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 described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, DNRC shall make the following products available to FEMA:

- Digital work maps showing the 1 and 0.2-percent-annual-chance floodplain boundary delineations and redelineations, regulatory floodway boundaries (as applicable), cross-sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- Written summary of the analysis methodologies;
- Any backup or supplemental information, including supporting calculations and assumptions for any computed 1-percent-annual-chance water-surface elevations used in the mapping required for the independent QA/QC review under Activity 11;
- Hardcopy and digital versions of input and output for any computer programs that were used;
- 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;
- NSP Format Mapping Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.

If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted.

Appendix N may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsana.pdf.

Activity 10A - Floodplain Mapping (Detailed Riverine Analysis)

Responsible Mapping Partner: DNRC

Scope: DNRC 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 in Appendix B. DNRC shall incorporate all new or revised modeling and shall use the topographic data acquired under Activities 3 and 4 to delineate the floodplain and regulatory floodway boundaries on a digital work map.

In addition, DNRC shall incorporate the results of all effective Letters of Map Change (LOMCs) issued by FEMA since the date of the current effective FIRM for each community, as appropriate. Mappable Letters of Map Revision (LOMRs) shall be incorporated as described under Activity 10.

Also, DNRC shall address all concerns or questions regarding Activity 10A that are identified by FEMA/NSP during the independent QA/QC review under Activity 11.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

Activity 10B- Floodplain Mapping (Limited Detail Analyses)

Responsible Mapping Partner: DNRC

Scope: DNRC shall delineate the 1-percent-annual-chance floodplain boundaries for the flooding sources for which new limited detailed hydrologic and/or hydraulic analyses were performed in Appendix B. DNRC shall incorporate all new or revised modeling and shall use the topographic data acquired under Activities 3 and 4 to delineate the floodplain and regulatory floodway boundaries on a digital work map. Field measurements taken for the purpose of performing limited detailed analyses are not required to be performed according to the accuracy and precision specified in Appendix A of *Guidelines and Specifications for Flood Hazard Mapping Partners.*

The results of the hydraulic models shall be used to delineate the 1-percent annual exceedance floodplain boundaries on a digital work map. The results of the limited detailed analyses may be shown as Approximate A or Zone AE (Area of special flood hazard with water surface elevations determined). If sufficient data exists to justify designation of the area as a new detailed study area (AE), including BFEs, DNRC shall coordinate with FEMA/NSP to determine if the results should be incorporated as new detailed analyses as described in Activity 10A.

In addition, DNRC shall incorporate the results of all effective Letters of Map Change (LOMCs) issued by FEMA since the date of the current effective FIRM for each community, as appropriate. Mappable Letters of Map Revision (LOMRs) shall be incorporated as described under Activity 10.

Also, DNRC shall address all concerns or questions regarding Activity 10A that are identified by FEMA/NSP during the independent QA/QC review under Activity 11.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

Activity 10C - Floodplain Mapping (Redelineation of Detailed Floodplain Boundaries Using Updated Topographic Data)

Responsible Mapping Partner: DNRC

Scope: DNRC shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for all effective flooding sources previously studied by detailed methods that are to be redelineated for those projects as described in Appendix B. DNRC shall use the topographic data acquired under Activities 3 and 4 to delineate the floodplain and regulatory floodway boundaries as appropriate on a digital work map.

If it is determined that the new topographic data does not reflect the same hydraulic characteristics as in the effective study, DNRC shall coordinate and evaluate the topographic data with FEMA/NSP to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If warrented, DNRC shall contact the FEMA Regional Project Officer identified in Section 11 of this MAS with a description of the issue along with a recommendation on its solution. This type of correspondence shall be in accordance with the Special Problem Report procedures described in SECTION 2 of this MAS.

In addition, DNRC shall address all concerns or questions regarding Activity 10C that are identified by FEMA/NSP during the independent QA/QC review under Activity 11.

Activity 10D - Floodplain Mapping (Refinement/Redelineation or Creation of Zone A)

Responsible Mapping Partner: DNRC

Scope: DNRC shall delineate the 1-percent-annual-chance floodplain boundaries for the flooding sources identified in Appendix B. DNRC shall use existing topographic data or the topographic data acquired under Activities 3 and 4 to delineate the floodplain boundaries on a digital work map.

In addition, DNRC shall address all concerns or questions regarding Activity 10D that are identified by FEMA/NSP during the independent QA/QC review under Activity 11.

DNRC shall redelineate all approximate Zone A floodplain boundaries contained in the effective FIRM using the best available topographic data and/or aerial photography. Redelineation of Zone A's: DNRC may use the approaches outlined in *Guidelines and Specifications for Flood Hazard Mapping Partners* and in FEMA 265, *Managing Floodplain Development in Approximate A Zones Areas* (April 1995), and/or develop new approaches. New approaches shall be coordinated with the FEMA Regional Project Officer identified in SECTION 12 of this MAS before analysis and mapping efforts begin. Documentation shall be provided that will describe the new approach to be used.

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 DNRC 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. FEMA will fund this activity to the NSP through a Regional Task Order (RTO#). 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 DNRC:

- 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/frm_gsam.pdf.

Activity 12 - Base Map Acquisition

Responsible Mapping Partner: DNRC

Scope: DNRC shall provide the digital base map for the project. The required activities are as follows:

- Obtain digital files (raster or vector) of the base map.
- Secure necessary permissions from the map source for non-publicly available sources to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge.
- Document that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.
- Coordinate with and notify Missoula County and the City of Missoula of the final base map (raster or vector).
- Populate the DFIRM database with the information required by FEMA.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

Standards: All work under Activity 12 shall be performed in accordance with the standards specified in Section 5 of this MAS.

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

- Written documentation that the digital data meet FEMA's minimum standards and specifications; and
- Documentation that FEMA can use the digital base map.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 13 – DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: DNRC

Scope: For all flooding sources except those segments for which updated flood data will be developed under Activities 1 through 11, DNRC shall convert the information shown on the effective FIRM and Flood Boundary Floodway Map (FBFM) panels for all incorporated and unincorporated areas of Missoula County to digital format in conformance with FEMA DFIRM specifications. DNRC shall use the base map acquired under Activity 12 for the conversion and will adjust the flood hazard data as necessary to conform to topographic and planimetric data included in the basemap. DNRC shall convert non-revised data attributed to identified flooding sources from the effective FIRM panels as outlined in Appendix B.

The DNRC also shall incorporate the results of LOMCs issued by FEMA since the date of the current effective FIRM for each affected community. In areas with Mappable Letters of Map Revision (LOMRs) that are based on better topographic data than available in the project base map acquired under Activity 12 the LOMR data shall be incorporated by digitization of the LOMR map data. This situation may arise where a topographic survey was performed specifically for a LOMR and that data was not available for incorporation into the base map compiled under Activity 12 or the data was of a small scale not practical for incorporation.

Also, DNRC shall address all comments and questions regarding Activity 13 that are identified by FEMA/NSP during the independent QA/QC review under Activity 13A.

DNRC shall not digitize the flood theme for those segments of flooding sources for which updated flood data will be developed. Rather, DNRC shall leave these as "holes" in the digital flood theme that will be filled in as part of Activity 14 using the digital flood data developed under Activities 10, 10A, and 10B.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

Standards: All work under Activity 13 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of the DFIRM panels as noted above, DNRC shall submit the panels to FEMA/NSP for an independent QA/QC review under Activity 11. In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, DNRC 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
- 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, including a check that the road and floodplain relationship is maintained for all non-revised areas.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: FEMA/NSP

Scope: FEMA/NSP shall review the DFIRM panels submitted by DNRC under Activity 13 to ensure that the new DFIRM panels accurately represent the information shown on the effective FIRMs and FBFMs for the area mapped and are consistent with current FEMA standards. FEMA will fund this activity to the NSP through a Regional Task Order (RTO#). This work shall include, at a minimum, checking the following:

- Cross sections are properly located and oriented as shown on the FIRMs or FBFMs;
- BFEs are properly located and agree with the BFEs shown on the FIRMs;
- Regulatory floodway widths agree with the widths shown on the FIRMs or FBFMs;
- The 1 and 0.2-percent-annual-chance floodplain boundaries agree with the floodplain boundaries shown on the FIRM and the contour lines, other topographic information, and planimetric information shown on the DFIRM base;
- Flood insurance risk zone designations are labeled properly;
- Road and floodplain relationships are maintained for all unrevised areas;
- DFIRM mapping files meet the GIS file and database format requirements specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those requirements for content and attribution; and
- Metadata files describing the DFIRM data include the required information.

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

Standards: All work under Activity 13A 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 DNRC:

- 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 copy of the DFIRM 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/frm_gsam.pdf.

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

Responsible Mapping Partner: DNRC

Scope: Upon completion of the floodplain mapping activities for the revised areas (Activities 10A, 10B, 10C, and 10D) and the DFIRM production for non-revised areas (Activity 13), DNRC shall merge the digital floodplain data into a single, updated countywide DFIRM. 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. This "edge-matching" typically only occurs at county and corporate boundary locations. The

DNRC 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. DNRC shall coordinate with FEMA and those Mapping Partners responsible for Activities 10A, 10B, 10C, 10D, and 13, as necessary, to resolve any potential tie-in issues.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

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 Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, DNRC 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
- Dcoumentation 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/frm_gsam.pdf.

Activity 14A – DFIRM Production (Application of FEMA Graphics and Database Specifications)

Responsible Mapping Partner: DNRC

Scope: DNRC shall apply the final FEMA DFIRM graphics and database specifications to the DFIRM files produced under Activity 14. 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 users). DNRC shall coordinate with FEMA and those Mapping Partners responsible for Activities 10A, 10B, 10C, 10D, 13, and 14, as necessary, to resolve any problems that are identified during Activity 14B.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

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

Deliverables: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, DNRC 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
- 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; and
- NSP Format DFIRM 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.

Activity 14B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications

Responsible Mapping Partner: FEMA/NSP

Scope: Upon completion of the floodplain mapping activities (Activities 10A, 10B, 10C, and 10D) and DFIRM production activities (Activities 13, 14, and 14A), FEMA/NSP shall review the DFIRM to ensure it meets current FEMA graphics specifications. In addition, FEMA/NSP shall review the DFIRM spatial database to determine if it meets current FEMA database specifications. FEMA/NSP shall coordinate with FEMA and other Mapping Partners, as necessary, to resolve any problems identified during this QA/QC review. FEMA will fund this activity to the NSP through a Regional Task Order (RTO#). This work shall ensure that the requirements below are met.

- All required DFIRM features are accurately and legibly labeled and follow the examples shown in the FEMA DFIRM specifications. This includes all flood insurance risk zones, BFEs, cross sections, studied streams, 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 *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- All map collar information is complete, correct, and follows the requirements specified in *Guidelines and Specifications for Flood Hazard Mapping Partners*;

- DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution;
- DFIRM database files are in one of the database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution;
- Metadata files describing the DFIRM data include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- The FIS report is prepared in the FEMA Countywide Format as documented in Appendix J of *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 14B shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format 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 DNRC:*

- 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 15 - Preliminary DFIRM and FIS Report Distribution

Responsible Mapping Partners: DNRC and FEMA/NSP

Scope: Activity 15 consists of the final preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report for community official and general public review and comment. FEMA may audit or assist in these activities if deemed necessary by the FEMA Regional Project Officer. The activities to be performed are summarized below.

Preliminary Transmittal Letter Preparation. The DNRC shall prepare letters to 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.

Preliminary FIS Report Preparation: The DNRC shall prepare the FIS report in the FEMA Countywide Format following the FEMA requirements specified in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Final QA/QC Review of Preliminary DFIRM and FIS Report: The NSP shall perform a final QA/QC review of the Preliminary DFIRM and FIS report, including all data tables, Flood Profiles, and other components of the FIS report. The QA/QC review procedures shall be consistent with the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Discrepancy Resolution: The DNRC shall work with the NSP, FEMA and other Project Team members as appropriate to resolve discrepancies identified during the final QA/QC review.

Distribution of Preliminary DFIRM and FIS Report: The DNRC 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 DNRC shall prepare news release notifications of BFE changes for all affected communities if appropriate and perform QA/QC reviews of the notifications for accuracy and compliance with FEMA format requirements. The DNRC shall file the notifications for later submittal to FEMA for review.

Preliminary Summary of Map Actions (SOMA) Preparation: The DNRC shall prepare Preliminary SOMAs for all affected communities if appropriate. The SOMAs shall list pertinent information regarding LOMCs that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Standards: All work under Activity 15 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners* and the requirements documented in Section 1 and Appendix A of the FEMA *Document Control Procedures Manual,* the DNRC shall make the products listed below available to FEMA.

- Preliminary transmittal letters shall be prepared. 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;*
- Preliminary copies of the DFIRM and FIS report, including all new or updated data tables and Flood Profiles, shall be prepared;
- Preliminary copies of the DFIRM and FIS report 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 mailed with the Preliminary copies of the DFIRM and FIS report when appropriate;
- Revised DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM;
- Revised DFIRM database files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM;

- Revised metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM; 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 shall be provided.

Activity 16 - Post-Preliminary Processing

Responsible Mapping Partners: DNRC and FEMA/NSP

Scope: Activity 16 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 it is deemed necessary by the FEMA Regional Project Officer. The activities to be performed are summarized below.

Community Open House. A meeting will be arranged in coordination with local community stakeholders at the end of the production phase. The purpose of the Community Open House is to review Preliminary DFIRM and FIS projects with the general public, solicit additional QA/QC and feedback from knowledgeable local stakeholders as appropriate, and continue outreach to the community to better facilitate map adoption. This meeting will also serve as the final coordination meeting with the communities. It is the intent the DNRC will coordinate with the County and any mapped communities throughout the project.

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, the DNRC shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*:

- Proposed BFE determination letters are sent to the community CEOs and floodplain administrators;
- News release notifications of BFE changes are published in prominent newspapers with local circulation; and
- The appropriate notices (Proposed Rules) are published in the *Federal Register*.

Resolution of Appeals and Protests: The DNRC shall support FEMA in reviewing and resolving 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 and revised DFIRM and FIS report materials for FEMA review.

The DNRC shall mail all associated correspondence upon authorization by FEMA.

Preparation of Special Correspondence: The DNRC shall support FEMA/NSP 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 when requested by FEMA. The DNRC 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 DFIRM and FIS Report: If necessary, the DNRC shall work cooperatively with the NSP to revise the DFIRM and FIS report at the direction of the FEMA Regional Project Officer and 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: The DNRC shall prepare Final SOMAs for the affected communities as appropriate.

Processing of Letter of Final Determination: The DNRC shall work with FEMA/NSP to establish the effective date for the DFIRM and FIS report, and shall prepare a Letter of Final Determination (LFD) for each affected community for FEMA review in accordance with the FEMA *Document Control Procedures Manual*. The DNRC also shall mail the final signed LFDs and enclosures (including the Final SOMA and the Final Rule for publication in the *Federal Register*, when appropriate) and distribute appropriate copies of the signed LFDs and enclosures upon receipt of authorization from FEMA.

Processing of Final DFIRM and FIS Report for Printing: The DNRC shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to the FEMA Map Service Center for printing by the U.S. Government Printing Office. The DNRC also shall 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. The DNRC, when appropriate, shall prepare and distribute revalidation letters 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: The NSP shall ensure that technical and administrative support data are packaged in the FEMA-required TSDN format and stored properly in the library archives.

Refer to Appendix B, CTP Contractor Scope of Work, for details concerning this Activity.

Prior to uploading any data to the MIP or delivering any data to FEMA/NSP in digital format, the CTP shall have completed a review checklist as available from the NSP, or similar documentation for that data, for this activity.

Standards: All work under Activity 16 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners* and the requirements documented in Section 1 and Appendix A of the FEMA *Document Control Procedures Manual*, the NSP and DNRC shall make the following products available to FEMA:

- Documentation that the news release notifications 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 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; and

- Complete, organized archived technical and administrative support data.

Activity 17—Outreach

Task 17 – Outreach and Coordination

Responsible Entity: DNRC

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. The DNRC will include local officials as part of the Project Team and will coordinate with Project Team members throughout the life of the project. 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/frm_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

TSDN Section	Mapping Activities															
	1	2	3	4	5	6, 6 A	7, 7 A	8	9	10A 10B 10C 10D	11	12	13, 13A	14, 14A	15	16
General Documentation																
Special Problem Reports	X	X	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	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 cover a period beginning May 2005 (start of Scoping Activities) and will conclude with the adoption by the community of the final DFIRM which will be no later than September 30, 2007, as identified in Version 1.4 of the MHIP. The mapping activities may be terminated at the option of FEMA or DNRC in accordance with the provisions of the Partnership Agreement dated March 18, 2005

Section 4—Funding/Cost-Sharing

FEMA is providing funding, in the amount of $402,000 to DNRC for the completion of the Flood Map Project documented in this MAS. DNRC 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. Any CTP Leverage, including in-kind services and blue book values for acquired information (i.e. base map data) will be determined during the detailed scoping process between the CTP and their Contractor and reported back to FEMA at that time.

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.

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 A, B, C, D	11	12	13, 13A	14, 14A	15	16
Guidelines and Specifications for Flood Hazard Mapping Partners, 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, *Photogrammetric Mapping* (USACE), July 1, 2002	X	X	X	X	X											
Engineer Manual 1110-2-1003, *Hydrographic Surveys* (USACE), January 1, 2002	X	X	X													
"Numerical Models Accepted by FEMA for NFIP Usage," Updated April 2003	X	X				X	X	X	X							
Content Standard for Digital Geospatial Metadata (Federal Geographic Data Committee), 1998	X	X		X	X					X	X	X	X	X	X	X
Document Control Procedures Manual, 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
10A	Floodplain Mapping (Detailed Riverine or Coastal Analysis)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3)
		Appendix C, Sections C. 4 and C.6
		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
		Section 7 of the MHIP

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
10B	Floodplain Mapping (Limited Detail Analysis)	Appendices E, F, G, H, K, L, M, and N
		Volume 1, Section 1.4
		Appendix C, Sections C. 4 and C.6
		Appendix D, Sections D.2
		Appendices E, F, G, H, K, L, M, and N
		Section 7 of the MHIP
10C	Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	Appendix C, Sections C. 4 and C.6
		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
10D	Floodplain Mapping (Refinement or Creation of Zone A)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3)
		Appendix C, Sections C.4 and C.6
		Appendices K, L, and M
11	Independent QA/QC Review of Floodplain Mapping (Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3)
		Appendix C, Sections C.4 and C.6
		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
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)
		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)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
		Appendices K, L, and M

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
13A	Independent QA/QC Review of 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) Appendices K, L, and M
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) 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) 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) 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) Appendices J, K, L, and M
16	Post-Preliminary Processing	Volume 1, Section 1.5 (specifically Subsection 1.5.2) 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	DNRC, FEMA/NSP	2/30/05
Activity 2 - Scoping	DNRC, FEMA/NSP	5/30/05
Activity 3 – Field Surveys and Reconnaissance	DNRC	11/15/05
Activity 4 – Topographic Data Development	DNRC	11/15/05
Activity 5 – Independent QA/QC Review of Topographic Data	FEMA/NSP	12/15/05
Activity 6 –Hydrologic Analyses	DNRC	2/15/06
Activity 7–Independent QA/QC Review of Hydrologic Analyses	FEMA/NSP	3/1/06
Activity 8 – Hydraulic Analyses	DNRC	4/15/06
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	FEMA/NSP	5/1/06
Activity 10 – Floodplain Mapping Redelineation	DNRC	1/15/06
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	FEMA/NSP	2/15/06
Activity 12 – Base Map Acquisition	DNRC	11/1/05
Activity 13 – DFIRM Production (Non-Revised Areas)	DNRC	3/1/06
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	FEMA/NSP	3/15/06
Activity 14 – DFIRM Production (Merging Revised and Non-Revised Information)	DNRC	4/15/06
Activity 14A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)	DNRC	5/1/06
Activity 14B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications	FEMA/NSP	6/1/06
Activity 15 – Preliminary DFIRM and FIS Report Distribution	DNRC, FEMA/NSP	7/15/06

ACTIVITIES	RESPONSIBLE PARTNER(S)	DATE DUE
Activity 16 – Post-Preliminary Processing	DNRC, FEMA/NSP	9/30/07
Activity 17 - Outreach	DNRC	N/a

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)

- The DNRC shall document that the community-provided 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.

Documentation 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

DNRC intends to use the services of PBS&J as a contractor for the Flood Map Project documented in this MAS. DNRC 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.

Section 10—Financial Reporting

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

DNRC will meet with the NSP and/or FEMA to review the progress of the project.

DNRC 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 Marijo Camrud, the FEMA Regional Project Officer; Laura Pfister, the Montana Map Mod Coordinator for the DNRC; or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities.

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.

Jack Stults Administrator, Water Resources Division Montana Department of Natural Resources and Conservation	Date
Laura Pfister Montana Map Mod Coordinator Project Manager Montana Department of Natural Resources and Conservation	Date
Marijo Camrud Regional Project Officer Federal Emergency Management Agency, Region VIII	Date
Robert Ives Branch Chief, Hazard Identification and Risk Assessment Federal Emergency Management Agency, Region VIII	Date