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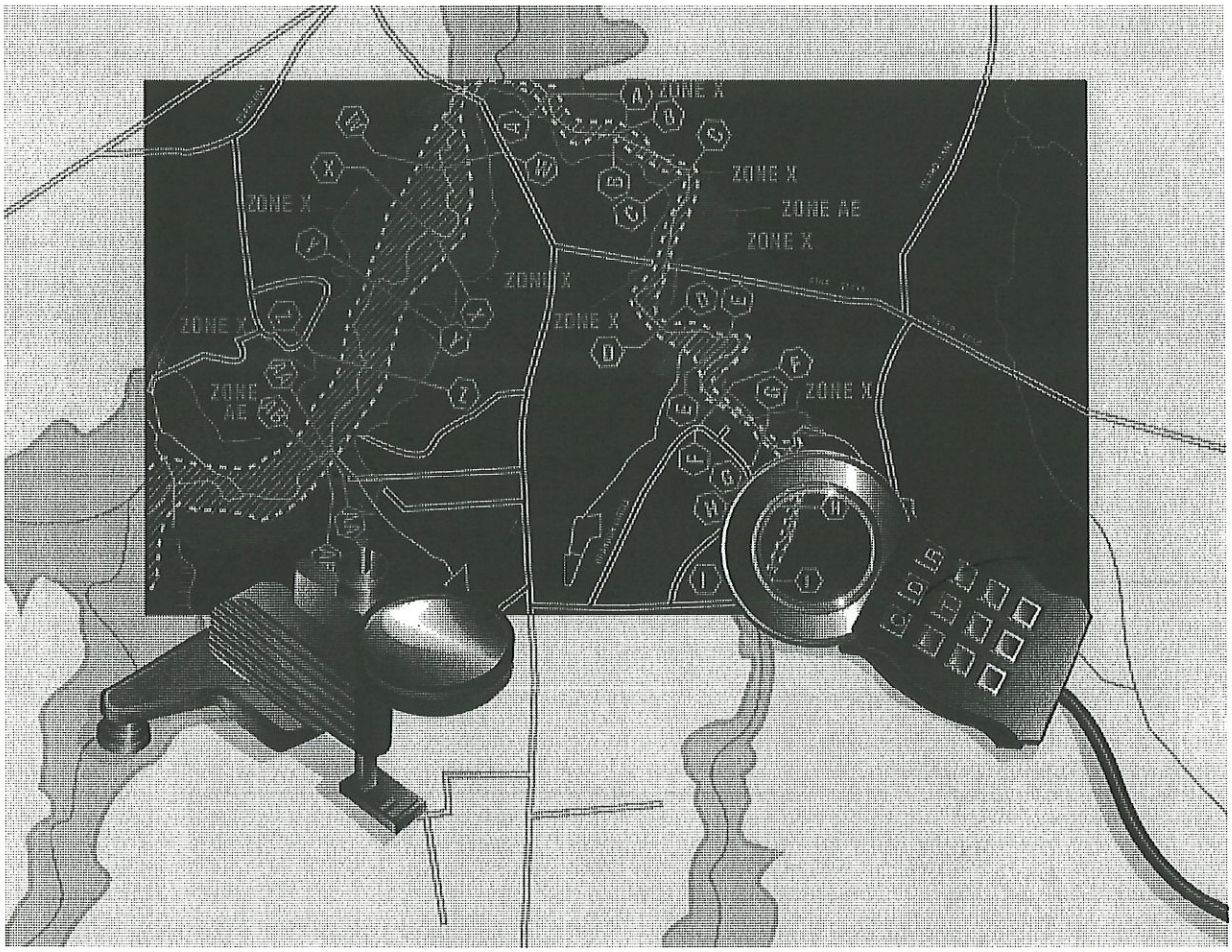
Modernizing FEMA's Flood Hazard Mapping Program

A Progress Report

December 1998



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1. Introduction

In 1997, the Federal Emergency Management Agency (FEMA) developed a plan for modernizing its flood hazard mapping program. The plan was set forth in detail in a November 1997 report "Modernizing FEMA's Flood Hazard Mapping Program: A Progress Report."

The modernization plan has received widespread and enthusiastic support. Director Witt strongly supports the plan, especially because of its close link to ***Project Impact.*** Interested organizations including the Association of State Floodplain Managers, Inc.; the National Lenders' Insurance Council; and the National Association of Flood and Stormwater Management Agencies have approved resolutions endorsing FEMA's modernization plan. In addition, the American Congress on Surveying and Mapping, the American Society of Civil Engineers, the National Emergency Management Association, and the National League of Cities have expressed support for the plan.

On May 31, 1998, the Technical Mapping Advisory Council passed a resolution strongly supporting the modernization plan. Chairman Mark Riebau wrote in a June 4, 1998, letter to Director Witt:

> The benefits of implementing the modernization plan will accrue to citizens of the United States. Implementation will result in improved public safety and welfare. Better flood data and mapping also can assist states and communities in taking preventive actions, such as improving floodplain management, land-use planning, and building design, as well as in planning for pre-disaster mitigation, emergency response, and disaster recovery. The Cooperative Technical Community initiative described in the plan complements Project Impact and is representative of the new, forward-looking trend at all levels of government to work in partnership and to involve citizens appropriately in assuming responsibility for reducing risk in American communities.

The response from Congress has also been positive. FEMA overviewed the plan to the U.S. House of Representatives at FEMA's appropriation hearing for the Fiscal Year 1999 budget. Also, FEMA has briefed members of the U.S. House of Representatives and the U.S. Senate regarding the plan.

The purpose of this report is to provide a summary of the key events, activities, and initiatives that have taken place in support of the map modernization plan since its formulation.

2. Fiscal Year 1998 Objectives

In Fiscal Year 1998, FEMA initiated 38 separate objectives that addressed the many different aspects of a modernized mapping program. The key objectives are discussed below.

Objective: Develop and Implement Marketing Plan

Summary of Objective: This objective is to develop and implement a marketing plan for map modernization. It seeks to publicize the map modernization plan to facilitate progress on all the other objectives of the plan. Providing information about the plan will allow many disparate parties to work together to further the goals of map modernization.

Accomplishment to Date: To disseminate information about the map modernization plan, FEMA has undertaken several initiatives. One of the most important was the creation of two publications in May 1998 that explain the plan and how it complements Project Impact: *Modernizing the Flood Hazard Mapping Program and Modernizing the Flood Hazard Mapping Program: Community Involvement and Ownership.* FEMA has distributed these publications at numerous conferences and meetings, and in response to inquiries about the map modernization plan.

FEMA has also published a bimonthly bulletin tracking the progress on map modernization, *Work in Progress*, in September and November 1998. Each issue highlighted several of the objectives and discusses the progress to date. The first issue included a pull-out section listing each mapping modernization objective.

Additionally, FEMA has addressed attendees and provided information about mapping modernization at many conferences and other meetings, including the following:

Association of State Floodplain Managers 22nd Annual Conference in Milwaukee, Wisconsin. May 17-22,1998.

National Flood Conference in Atlanta, Georgia. May 31 -June 4, 1998.

Arizona Floodplain Management Association. Autumn 1998.

Floodplain Management Association of California. Autumn 1998.

Florida's 23rd Annual Conference on Water Management sponsored by the Southwest Florida Water Management District in Tampa, Florida. October 7-9, 1998.

FEMA Engineers Conference in Emmitsburg, Maryland. October 26-30, 1998.

2nd Annual Indiana Association for Floodplain & Stormwater Management 1998 Meeting & Conference in Turkey Run State Park, Indiana. October 28-30, 1998.

Illinois Association for Floodplain and Stormwater Management's 4th Annual Downstate Conference in Collinsville, Illinois. October 21-22, 1998.

FEMA Study Contractor Workshop for Western States in Laughlin, Nevada.

NFIP Bureau Technology Conference. November 18-19, 1998.

U.S. Department of Agriculture GIS Best Practice Forum, Beltsville, MD. November 18-19, 1998.

Western Governors' Association Flood Committee.

National Emergency Management Agency Mitigation Committee.

Technical Mapping Advisory Council regular quarterly meetings.

Action Plan: Because of the importance of publicizing the important work of map modernization, FEMA will post *Work in Progress* on a bimonthly basis on its web site (www.fema.gov/mit/tsd). Additionally, at upcoming conferences and meetings with stakeholders, FEMA will present information on the progress of individual objectives of map modernization as well as progress on the plan as a whole. Map modernization is also featured on FEMA's web site (www.fema.gov).

Objective: Base Map Standards

Summary of Objective: Base maps cover the entire geographical area of a community and include physical features, including roads, railroads, streams, corporate limits, and section lines. These features are employed by map users to locate properties and structures relative to floodplains. The accuracy of base maps used in the production of Flood Insurance Rate Maps (FIRMS) is important to the overall precision with which users use the FIRMS; therefore, updated minimum standards for base maps will be established for use in the development of FIRMS.

To be able to expend its limited dollars on flood studies, FEMA wants to rely on the states, communities, or the U.S. Geological Survey (USGS) for the development of base maps. The USGS has a National Digital Orthophoto Partnership program that involves partnering between federal, state, and local governmental agencies for the production of Digital Orthophoto Quads (DOQs). The purpose of the Base Map Objective is: (1) Establish base map standards for state- or community-supplied mapping that would be acceptable for displaying the flood hazard; and (2) In the absence of state- or community-supplied mapping, establish, if available, the USGS supplied DOQ as the default base map.

The deliverables are as follows:

- Minimum standards for Digital Flood Insurance Rate Maps (DFIRM) base maps
- Currency standards
- Accuracy standards
- Standards for study contractor work maps

Accomplishment to Date:

- Base map options were established and prioritized. Community data that meet the minimum requirements will be the first choice. DOQs will be the default base map.
- Draft minimum base map standards have been developed and are being reviewed by the work group. Final standards will be completed by December 31, 1998.
- A series of meetings have been held with U.S. Geological Survey (USGS) to discuss partnering options for the acquisition of DOQs to support FEMA's DFIRM mapping needs. These meetings will be continued.

Action Plan:

- A base map prioritization hierarchy has been established.
- Minimum currency and accuracy standards have been developed for DFIRM base maps.
- The standards need to be expanded to include database attributes for required base map features and metadata.
- Coordination with the Federal Geographic Data Committee (FGDC) will be needed before the database attributes are finalized.
- The finalized standards will be added to or referenced by the *Guidelines and Specifications for Study Contractors, the Technical Evaluation Contractor Guidelines and Specifications,* and the CTC Base Map Agreement Specifications.
- A work group is being formed to develop a base map strategy for the implementation of the new base map standards for the FY 2000 flood studies. This will be necessary for the formation of a working partnership with the USGS for DOQ production.

Milestones	**Scheduled Completion Date**
Meetings with USGS	Ongoing
Consultation with the FGDC	Ongoing
Adopt Minimum Standards for Base Map	December 31,1998
Finalize Minimum Standards for Study Contractors	March 1, 1999
Finalize a Base Map Strategy for Implementation	May 1, 1999

Objective: Technologies for Topographic Mapping and Work Map

Summary of Objective: Complete the assessment of advanced technologies, such as Light Detection and Ranging (LIDAR) and Interferometric Synthetic Aperture Radar (IFSAR), for preparing topographic mapping and work maps required for the production of flood studies and FIRMS. Implement the new technologies for the FY 1999 flood study starts by developing appropriate appendices to FEMA 37, *Guidelines and Specifications for Study Contractors,* and developing a training module and presenting it to FEMA regional and national office staff.

Accomplishment to Date: The work group recommendations were presented at the FEMA Engineer's conference at FEMA's Emergency Management Institute on October 27th. Principal milestones include the following:

1. Development of FEMA standards for Digital Elevation Model (DEM) accuracy evaluation
2. Evaluation of LIDAR and/or IFSAR DEMs using these FEMA standards
3. Development of LIDAR and IFSAR costing guidelines
4. Revision of FEMA 37 to include new technologies (LIDAR/IFSAR DEMS, DOQS, GPS)
5. Development of FEMA training module for these new technologies

As part of the New York Department of Environmental Conservation (NYSDEC) FIS of Schoharie County, New York, FEMA has developed guidelines for DEM accuracy evaluation as required by item (1) and has nearly completed the LIDAR DEM evaluation of Schoharie County as required by item (2). FEMA has coordinated these procedures with the Professional Practice Division of the American Society for Photogrammetry and Remote Sensing (ASPRS) since FEMA 37 mandates the use of ASPRS standards for DEM evaluations.

Action Plan. FEMA will also review the Pinellas County, Florida, evaluation of LIDAR DEMs for the restudy of that county as well as the results of a LIDAR DEM project in Los Angeles, CA. FEMA will then draft standards for item (1), costing guidelines for item (3), revision to Appendix 4 of FEMA 37 for item (4), and a training module for item (5). Coordinating drafts are due for all items by March 1999.

Objective: New DFIRM Product

Summary of Objective: The DFIRM product involves converting the existing inventory of manually produced FIRMs to digital format. The new digital product will be able to address maintenance needs as well as restudy needs. The DFIRM product will be designed to allow for the creation of interactive, multi-hazard digital maps. Linkages will be built into a database to allow users options to access to the engineering backup material used to develop the map (e.g., hydrologic and hydraulic models, flood profiles, floodway data table, DEMS, and structure-specific data, such as digital elevation certificates, digital photographs of bridges and culverts).

The deliverables are as follows:

- DFIRM product specifications.
- Guidelines for use of digital products.
- Prototype products.

Accomplishment to Date:

- Product planning tools have been developed and will be refined. These tools include the following:
  - a decision matrix that includes critical input from other Map Modernization objectives;
  - an inventory of automated hydrology and hydraulic software tools that could be used to improve the mapping; and
  - gradations of DFIRM product options and production processes.
- Further work to establish costs and time lines for production of product options is underway.
- Data distribution options that would address proprietary community base map data issues were developed.
- A draft use policy has been developed.
- Draft DFIRM specifications have been started.
- Several draft prototype product options have been developed.

Action Plan:

- Product planning tools have been developed and will be refined. Additional tools will be developed as needed by the work group.
- Further work to establish costs and time lines for production of the product options is underway.
- A draft use policy has been developed. It is being reviewed by the group and will be finalized and distributed for review by a wider audience.
- Draft DFIRM specifications have been started and will be finalized for review by the group and then a wider audience.
- Several draft prototype product options have been developed. A decision as to whether color printing is a feasible option needs to be finalized before the prototype products can be finalized.
- A DFIRM production prioritization process needs to be identified and implemented.
- Coordination with FGDC will be needed before the DFIRM database attributes are finalized.
- The finalized standards will be added to or referenced by the *Guidelines and Specifications for Study Contractors, the Technical Evaluation Contractor Guidelines and Specifications,* and the Cooperating Technical Community (CTC) Agreement Specifications.

Milestones	Scheduled Completion Date
Consultation with the FGDC	Ongoing
Review of Draft Products	April 1999
Finalize Draft DFIRM Specifications	July 1999
Finalize Standards for Study Contractors	November 1999

Objective: Cooperating Technical Communities

Summary of Objective: Develop and implement the Cooperating Technical Community (CTC) program whereby the responsibility for developing and maintaining key components of the flood hazard mapping, now maintained by FEMA and its contractors, can be transferred to communities with the technical ability to assume responsibility for one or more of the following activities: base map development and maintenance, DFIRM preparation and maintenance, floodplain analysis and mapping, risk assessment and review of flood hazard analyses. To accomplish this objective, cooperative agreements with state and/or local partners are required whereby FEMA will provide flood mapping funds, technical assistance, and training to the state and/or local partner, which will then develop and maintain all or a component of its flood map.

Six primary tasks are necessary to develop and implement the CTC program. Tasks 1 and 2 cover the development of standardized CTC agreements and the technical guidelines and specifications the communities need to adhere to in order to perform their selected technical roles. The basic types of CTC agreements that communities could adopt including the following: digital base map sharing, DFIRM preparation and maintenance, hydrologic and hydraulic data development and mapping, hydrologic and hydraulic review, and risk assessment.

Task 3 is the development of the CTC selection criteria, and Task 4 is the development of a public awareness campaign. Task 5 is the development of an annual program implementation process, and Task 6 is the development of a CTC monitoring plan that will assure that the communities are properly performing and implementing their agreements.

Accomplishment to Date: The work group for the CTC has been selected, and a task force meeting was held on September 11, 1998, where assignments were made for the six tasks necessary to implement the CTC program. At this meeting the directive was given to have the draft products associated with each of the six tasks available for review by the next task force meeting date. The next meeting is scheduled the week of December 14, 1998.

The leader for Task 1 (standardized agreements) has issued two draft agreements to the other tasks members for review and comment. The agreements are reflective of a funding and a no-funding from FEMA option. These agreements are to be reviewed by FEMA's Office of General Council.

Action Plan:

- Draft products to be submitted by December 14, 1998.
- Draft products disseminated to task members for review by January 11, 1999.
- Annotated drafts due back to Objective Manager by February 1, 1999.
- Finalize CTC products by March 1, 1999.
- Implement initial CTCs by November 1999.

Objective: Future Conditions Hydrology

Summary of Objective: Flood risk information presented on the flood maps is based on the existing conditions of the floodplain and watershed. After publication of the maps, however, flood hazards may change significantly in areas experiencing urban growth or changes in physical conditions caused by such geologic processes as subsidence and erosion. When the mapping of flood hazards was initiated under the NFIP, the intent of the Program was to reassess each community's flood hazards periodically and, if needed, revise the maps. However, budgetary constraints prevent initiating actions to update flood maps with sufficient frequency to reflect the changing flood hazards brought about by natural and man-made changes (approximately 45 percent of the flood maps are at least 10 years old, and 70 percent are 5 years or older). Although the existing conditions floodplain will continue to be mapped for flood insurance purposes, future conditions hydrology could also be mapped so that communities could use this information for floodplain management. Options for developing and mapping floodplains based on future conditions hydrology will be explored and implemented.

Accomplishments to Date: Over the last several months, a series of meetings has been held by the work group. A draft report including a sample FIS report and FIRM, which includes future hydrology considerations, has been completed.

Action Plan:

- Submit the report in December to FEMA Headquarters and Regional Mitigation staff, Federal Insurance Administration, and Technical Mapping Advisory Council for review and comment.
- Allow 4 weeks for review.
- Incorporate review comments into (draft) final report in February 1999.
- Anticipated objective completion date May 1999.

Objective: Technical Services Division Web Page

Summary of Objective: FEMA's main web site provides a substantial amount of flood hazard mapping information to the consumer. Unfortunately, this information is not always easy to locate, is scattered throughout the site, and is often located many levels deep on the site. In an effort to provide better service to the public, the Technical Services Division has established a web page on the FEMA web site targeted specifically at the consumer seeking information on flood hazard mapping. The *Flood Hazard Mapping* web page (www.fema.gov/mit/tsd) provides answers to virtually all consumer questions without the need to navigate through many pages or levels of the FEMA web site - basically "one stop for all the answers."

This site has been targeted at four general consumer groups - homeowners, lenders/insurers, engineers/surveyors, and floodplain managers - and has been logically arranged to serve these constituencies. Each group has its own area on the main web page with links to those areas of greatest interest; however, all areas are available to all user groups. The web page contains such items as answers to frequently asked questions, forms (MT-1, MT-2, MT-EZ), guidance documents, and FEMA-developed engineering software. Links are provided to the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center for obtaining the latest copy of its various software packages. The page also contains the names, telephone numbers, and e-mail addresses of key FEMA and TEC personnel, and provides e-mail links for obtaining answers to those questions that still cannot be answered on-line. A significant feature of the web page allows Letter of Map Change (LOMC) requesters to query the status of their requests on-line.

Although a significant amount of new material was developed for this web page, existing material or links to existing material were used where possible.

Accomplishment to Date: The *Flood Hazard Mapping* web page is virtually finished and was demonstrated at the FEMA Regional Engineers' Conference held at the Emmitsburg training facility during the week of October 26 -30. Comments have been solicited and are being incorporated into the final layout and content.

Action Plan: Once the layout and content have been finalized and approved, the web page content will be transferred to FEMA's main web site. Each TEC was assigned the responsibility of establishing the content of a specific portion of the web page, and the currency of the content of these portions will remain the responsibility of the appropriate TEC.

Objective: Partnership with National Geodetic Survey

Summary of Objective: Develop a formal partnership between FEMA and the National Geodetic Survey (NGS) to improve coordination and cooperation. The NGS, a part of the National Oceanic and Atmospheric Administration, maintains a network of

more than 750,000 precisely located monumented reference points in the U.S. The NGS's accurate national reference network and Global Positioning System photogrammetry provide a universal set of coordinates across city, county, or state lines. FEMA requires such a foundation of accurate coordinates for its flood maps.

Accomplishment to Date: Objective participants have agreed that a formal partnership between FEMA and NGS is in the best interests of both agencies. In addition, FEMA 37, *Guidelines and Specifications for Study Contractors,* should be revised to mandate the use of NGS high accuracy benchmarks from the National Spatial Reference System (NSRS) in lieu of FEMA's traditional Elevation Reference Marks (ERMs).

Action Plan: A meeting will be scheduled between FEMA, the NGS, and the TECs to coordinate the partnership agreement and proposed revisions to FEMA 37. Coordinating drafts are due for both items (partnering agreement and revised FEMA 37) by March 1999.

Objective: Establish Partnership with the U.S. Geological Survey

Summary of Objective: Establish a partnership with USGS for assistance in developing and maintaining suitable FIRM base maps and topographic data compatible with NFIP needs. This includes making DOQs readily accessible and useable as a DFIRM base map.

The deliverables are as follows:

- A Memorandum of Understanding with the USGS. (If FEMA enters into a cost share arrangement with USGS for the production of the DOQs or other base map products, FEMA will have to execute an Interagency Agreement [IAA] with USGS.)
- Based on a reasonable production schedule identified through the 5-Year Map Revision Effort, USGS would produce base mapping and topographic data for all new studies and revisions.

Accomplishment to Date:

- A series of meetings have been held with USGS to discuss partnering options for the acquisition of DOQs to support FEMA's DFIRM mapping needs. These meetings will be continued.

Action Plan:

- A series of meetings have been held with USGS to discuss partnering options for the acquisition of DOQs to support FEMA's DFIRM mapping needs. These meetings will be continued.

Milestones	Scheduled Completion Date
Meetings with USGS	Ongoing
Complete Development of a Draft Memorandum of Understanding	
Develop Interagency Agreement	
Finalize Base Map Strategy	May 31, 1999
Initiate Multi-year Production Schedule of Base Maps	
Memorandum of Understanding Finalized	

Objective: Establish Partnership with the U.S. Fish and Wildlife Service

Summary of Objective: This objective is to establish partnership with and provide technical assistance to the U.S. Fish and Wildlife Service (USF&WS) resulting in the Service's improved mapping of Coastal Barrier Resources System (CBRS) areas. Specifically, it is to encourage and assist the Service in producing digital, vector mapping suitable for direct incorporation as a thematic layer in DFIRMs as well as posting on the World Wide Web. It is also to improve and extend mapping of CBRS-protected areas.

Accomplishment to Date: The partnership with the USF&WS has been established through monthly meetings between FEMA, USF&WS, and the TECS. At these meetings, this objective is addressed as an ongoing initiative and goal of both agencies. Progress towards meeting this goal can be measured by the following actions:

- Three meetings between the agencies, in which progress on past mapping improvement initiatives are reported and new initiatives are begun.
- Completion of the Dare County, NC, pilot project, in which CBRS boundaries were added in a horizontally controlled environment to the Dare County GIS. This initiative was completed in August 1998.
- Meetings with a congressional delegation to look at how Congress may play a role in the improvement of CBRS mapping.

Mapping all previously unmapped CBRS units and using Digital Orthophoto Quarter Quadrangles (DOQQS) as the base map where DOQQ coverage is available.

Action Plan:

- Continue to hold meetings between FEMA, USF&WS, and the TECS.
- Continue to pursue a digital conversion of all CBRS boundaries to eventually be adopted by Congress and ultimately to be used for determination purposes.

Objective: Post Flood Hazard Verification

Summary of Objective: Flooding events provide a valuable opportunity to evaluate the mapped flood hazards versus what actually happened. This objective is to develop a standard procedure for verifying the accuracy of the FIRM and Flood Insurance Study (FIS) for flooded communities declared disaster areas by the president and, if necessary, revising the FIS and FIRM. Providing such up-to-date flood hazard information will be vital to communities' reconstruction efforts after an event.

Accomplishment to Date: Draft work plan established. Presentation on objective given at the Engineers Conference in October. Invitation to initial meeting sent in November. Initial meeting of work group members took place November 30, 1998.

Action Plan:

- February 1999 - Draft post flood hazard verification document and route to group members
- March 1999 - Second work group meeting
- April 1999 - Distribute second draft of post flood hazard verification document
- June 1999 - Document ready to "Test Drive" in real disaster (Beginning of Hurricane Season)

Objective: Toll-free Telephone Response (FEMA Map Assistance Center)

Summary of Objective: The FEMA Map Assistance Center is the name given to the group that will respond to inquiries regarding the FEMA flood maps. This toll-free number will provide the general public with a free and more efficient method of contacting and communicating with FEMA regarding issues that involve the NFIP maps.

Accomplishment to Date: The hardware to support this service has been installed, and the Call Management Software is currently being installed at both TECs. Upon the completion of the installation and a brief testing and training period, the service will be implemented and fully operational.

Action Plan: To have the installation of the hardware and software completed and to have the service fully operational within the near future.

Objective: LOMA 2000

Summary of Objective: LOMA 2000 is the name given to a new software package that is currently being developed that will automate LOMC production. This software

will generate and track Letters of Map Amendment (LOMAS) and Letters of Map Revision Based on Fill (LOMR-Fs). These products will increase processing efficiencies as well as generate a product that has greater availability.

Accomplishment to Date: The LOMA 2000 prototype products have been developed and disseminated for review both internally by FEMA and externally by the user constituency. Review comments have been received and a summary of these comments has been developed and distributed to the objective's work group members. On November 24, 1998, the work group convened to discuss the issues that were brought to FEMA's attention during the review process. Following this meeting, the prototype products will be modified as per the recommendations of the work group. Upon completion of this modification phase, FEMA will begin using the LOMA 2000 Products. In addition, process of programming the LOMA 2000 Software is underway and will be completed by the start of the new calendar year.

Action Plan: To finalize the prototype products and begin using them in the near future. Continue with the programming of the LOMA 2000 Software, thus enabling FEMA to develop automated products. Tentative completion date is May 1999.

Objective: LOMC Delegation

Summary of Objective: This objective has been created to investigate and address the issues and concerns regarding the delegation of the LOMC authority to the community and private sectors, particularly licensed surveyors and professional engineers.

Accomplishment to Date: The objective work group has met to discuss and outline the scope of this effort. A meeting has been scheduled for December 9, 1998, between FEMA and certain LOMC user constituents from the states and professional organizations.

Action Plan: Following the December 9th meeting, the objective work group will continue to work with the user community to address their issues and concerns. FEMA will establish an audit procedure as well as a procedure by which the privately issued LOMCs will be provided to FEMA and posted on FEMA's Web site. A final report with recommendations and an action plan will be completed in early spring 1999.

Objective: New Study Processes

Summary of Objective: The processes for conducting FEMA-funded flood data updates, which have evolved over 25 plus years, are linear and rigid, That is, each of the entities involved in the process, such as study contractors, TECs, and communities, performed a specific function in a specific sequence. However, current electronic communication technologies and increasing technical sophistication by FEMA's contractors and the participating communities demand a more interactive, flexible

process. This objective is to optimize the FIS process so that each community's flood map can be created and updated more timely, efficiently, and effectively.

Accomplishments to Date: A work group consisting of representatives of the FEMA Regional and Headquarters office, the U.S. Army Corps of Engineers, the State of Maryland, private architectural/engineering firm study contractors, TECs, and a flood map determination firm was convened in June 1998 and has met four times. This work group evaluated each step of the flood data update process and developed a preliminary set of recommendations. These preliminary recommendations include the following:

- Implementation of an interactive flood data update process that de-couples tasks and accomplishes work in parallel rather than in series;
- Development of flexible scopes of work assigning tasks in the process to study contractors, TECS, and communities dependent on the strengths and capabilities of the contractors and the communities;
- Implementation of more efficient contracting mechanisms; and
- Investigate rulemaking to allow FEMA to accept cost-share funding from communities.

Action Plan: The work group is developing a report summarizing the recommendations of the work group, along with an implementation plan. This report will be submitted to the FEMA program office for review and consideration in January 1999. The final approved recommendations will be implemented for FY 2000 flood data updates; those recommendations feasible for earlier implementation for FY 1999 or other ongoing updates will be implemented as soon as practicable.

Objective: 5-Year Map Review/Update Process

Summary of Objective: The Five-Year Map Update Process was developed in 1994 in response to the National Flood Insurance Reform Act (NFIRA). This process assists FEMA in assessing flood hazard mapping needs for floodplain areas and flood risk zones identified under Section 575 of the NFIRA. The Five-Year Map Update Process is an integral component of the Map Modernization Plan and a key ingredient to the flood insurance study process. To ensure the success of the Five-Year Map Update Process, FEMA will be working closely with State offices and community officials so that accurate and complete flood hazard information is available to all stakeholders.

Accomplishment to Date: A solid foundation has been built to support the Five-Year Map Update Process. Initial procedures have been developed for contacting communities, reviewing data, verifying needs, and reporting results of the data collection and needs evaluation efforts. Recently, these procedures made it possible for FEMA to contact, by letter, all of the National Flood Insurance Program (NFIP) communities which have flood hazard maps and to document the identified mapping

needs as communities submit data. The documentation is accomplished through the Mapping Needs Update Support System (MNUSS).

MNUSS is the computerized software program and database that was designed, specifically, for the Five-Year Map Update Process, to house an inventory of the nation's mapping needs and to rank and prioritize communities for map updates based upon the identified needs. Data entered into MNUSS fall into two distinct categories: maintenance needs and flood data update needs. Maintenance needs involve changes to corporate limits, streets and other map features that are not specifically related to flood hazards, and, inclusion of letters of map corrections. Flood data update needs involve engineering updates where technical analysis is required. In addition, a variety of data within MNUSS, such as panels affected by maintenance needs, can be queried and analyzed for regional funding or workload assessment purposes.

Action Plan: Now that 100% of the mapped NFIP communities have been contacted during the first five-year cycle, we will focus our attention on other aspects of the Five-Year Map Update Process, such as: reviewing the results of the initial data collection to develop other strategies for: obtaining mapping needs, populating the MNUSS database, and other uses of the data; updating the logic and cost modules in MNUSS to reflect information generated regionally rather than nationally; developing a different approach for contacting communities for the next five-year screening cycle that begins Fiscal Year 2000; integrating MNUSS into the Regional funding allocation formula for conducting flood insurance studies; developing a process for devolving the maintenance of MNUSS to the Regions and States; developing and conducting training on the use of MNUSS for the Regions and States; and making refinements to the Five-Year Map Update Process to incorporate suggestions from the Regions and States, such as Internet accessibility to MNUSS.

Objective: Monitoring Information for Contracted Studies (MICS)

Summary of Objective: As the regional engineers' workload continues to increase, automating portions of the study contractor monitoring process is necessary to maintain the quality of the work. Although the Community Information System (CIS) provides part of the required information, this system is community-centric and does not contain the project management or accounting tools to effectively automate the contracted study process.

The Monitoring Information on Contracted Studies (MICS) system is designed to complement the CIS by tracking contracted studies from initiation to completion. The system is a study-centric system designed for use by Regional Engineers and Study Contractors (SCs). Specifically, MICS is designed to 1) include information on SC selection and contract awards, 2) track budgets in both hourly and dollar amounts, 3) record details of monthly SC contacts and regulatory visits, 4) include Special Problem Reports information, and 5) provide SC-specific information.

Accomplishments to Date: A functional Beta-version of the MICS system has been completed, and is ready for testing. In addition, a draft User's Manual has been prepared for distribution with the Beta-version system. These tasks have both been completed on time and within budget. The system was presented at the Regional Engineers Conference the week of October 29, 1998, and will be tested in the coming months, as discussed below.

Action Plan: Future activities will focus on testing the Beta-version MICS system and getting a final version on-line. Specific tasks to be conducted in the future will include the following:

- Conduct Beta-testing, incorporate comments, and put system on-line.
- Finalize User's Manual.
- Enhance the MICS system with additional features, such as additional alert screens, advanced invoicing and accounting functions, e-mail functions, and a CIS interface.
- Develop a long-term maintenance plan.

It is anticipated that the Beta-testing will be completed by the Spring of 1998, and that the additional features will be incorporated within FY 1999.

Objective: "Guidelines and Specifications for Technical Evaluation Contractors"

Summary of Objective: Revise "Guidelines and Specifications for Technical Evaluation Contractors."

Accomplishment to Date: The "Guidelines and Specifications for Technical Evaluation Contractors" (TEC G&S) has been updated to reflect current contractor floodplain assessment and mapping specifications. The first draft was completed in October of 1998 and has recently passed the FEMA review stage.

Action Plan: The TEC G&S will be sent for final revisions and printing in December of 1998. A plan for frequent updates has been formulated to ensure that it is a "living document" that stays current with the changes that occur in the NFIP.

Objective: New Map Service Center Contract

Summary of Objective: This objective is to oversee all aspects of award and implementation of the new Map Service Center (MSC) contract to begin in FY 1999.

Accomplishment to Date: FEMA's new MSC contract was awarded on October 30th to Zimmerman Associates, Inc. (ZAI), in partnership with Michael Baker Jr., Inc. (Baker). ZAI brings to the MSC twenty years of experience managing information distribution centers and a reputation for outstanding performance. ZAI is slated to assume responsibilities at the MSC after a three-month transition period.

Action Plan: The objective has been accomplished.

Objective: Respond to the 1996 National Research Council (NRC) Report on Alluvial Fan Flooding

Summary of Objective: Controversy over alluvial fan flooding issues led FEMA to ask the NRC for assistance. As a result, the NRC established the Committee on Alluvial Fan Flooding composed of eight engineers and earth scientists experienced in alluvial fan flooding to study how to improve the way FEMA addresses alluvial fan flood hazards in the context of the NFIP. Specifically, the committee was asked to revise the existing definition of alluvial fan flooding, to specify criteria to determine if an area is subject to alluvial fan flooding, and to provide examples of the application of the definition and the criteria used.

FEMA has not yet responded to the committee's report, which was published in 1996. This objective is to evaluate how the report's key conclusions and recommendations will be incorporated into FEMA's approach to the mapping and management of alluvial fan flood hazards.

Accomplishment to Date: The work group has held several meetings to date. A preliminary draft of currently used methodologies has been initiated. Group discussions of the NRC report have occurred. A meeting with the National Academy of Sciences and members of the NRC Committee has occurred. Additional discussions and meetings with communities in the western U.S. has occurred regarding local applications of the NRC approach. The work plan has been presented at several conferences in Arizona, California, and Nevada to get input as well.

Action Plan: A progress meeting took place on November 30, 1998, to set future direction. The action plan includes the following components:

Detailed report outlining FEMA's current approach to evaluating alluvial fans. The "Guidelines and Specifications for Study Contractors," Appendix 5 provides limited guidance for conducting and evaluating alluvial fan studies. In addition, there are no well-documented procedures for FEMA's TEC with regard to the review and evaluation of alluvial fan cases. More specifically, there is not adequate guidance on how to deal with the (local) variability of conditions with regard to mapping alluvial fans. The report will document FEMA's current review and approval criteria and determine appropriate changes as needed.

Letter report to the NRC. This letter report will provide a formal response by FEMA to the NRC regarding their key conclusions and recommendations. In addition, additional needs will be identified, as well as ways to address the NRC's recommendations within FEMA's current program and future directions.

Guidance document. This document will provide recommendations for a consistent approach for evaluating alluvial fan flood hazards. It will serve as a basis for revising the Appendix 5 of FEMA 37. The document will provide guidance on a consistent approach for FEMA, SC, TEC, and constituencies, with regard to the use of existing adopted methodologies and those as proposed by the NRC and other professionals in the field. The final product is intended to provide a framework that meets floodplain management needs for communities, as well as the needs of FEMA for accurate mapping of the flood hazard and for improving the way FEMA addresses alluvial fan hazards in the context of the NFIP.

Objective: Regulatory Reform at 44CFR65.5

Summary of Objective: This objective has been created to address and eliminate the apparent inconsistencies in 44CFR65.5. Under current NFIP regulations, Sections 65.5(a)(3) and 65.5(a)(4) can result in different outcomes when issuing a LOMR-F depending on the timing of the request (a LOMR-F requested after only fill has been placed may result in a different outcome than a LOMR-F requested after fill has been placed and structures constructed). One possible outcome is a structure with a basement below the Base Flood Elevation not required to have a mandatory flood insurance purchase, and an identical structure with a mandatory purchase requirement and in violation of the NFIP floodplain management requirements.

Accomplishment to Date: Determination language has been drafted and is in final review, including a pilot test phase. Upon final review, this determination language will be used in all response letters to requesters asking that land altered by the placement of engineered fill be removed from the Special Flood Hazard Area.

Action Plan: Complete determination language and the pilot testing. Provide information about this determination language in the Federal Register. Implement use of the determination letters in FY 1999.

Objective: Riverine Erosion Hazard Area Studies

Summary of Objective: Complete the riverine erosion hazard area study (REHA) in response to Congress enacting into law on September 23, 1994, the National Flood Insurance Reform Act (NFIRA). Section 577 of NFIRA requires that FEMA submit a report to Congress that evaluates the economic impact of erosion and erosion mapping on the NFIP and to determine if it is technologically feasible to map REHAS. Technological feasibility is defined as the existence of methodologies that are scientifically sound and implementable under the NFIP. Scientific soundness means that the methodologies are based on physical or statistical principles and are supported by the scientific community. Implementable means that the approaches can be applied by FEMA as part of a nationwide program under the NFIP and for an acceptable cost.

The objectives of the study are to

- define riverine erosion processes
- discuss geomorphic and engineering methods that could be used to map REHAs
- evaluate the methods of predicting and modeling REHAs that have been applied in selected case studies within the U.S.
- evaluate the cost to study and map REHAs
- discuss programmatic elements associated with mapping and regulating REHAs

Accomplishment to Date: The study team has completed an in-depth search and technical evaluation of existing methodologies used to predict riverine erosion, with emphasis on case studies. A draft of Chapters 1-3 and an outline for Chapter 4 have been developed and distributed to the Project Working Group (PWG) for review and comment. The PWG is an external group of technical advisers to FEMA with expertise in this area.

Action Plan:

- Review and comments from the PWG will be completed in December 1998.
- Revisions based on PWG comments will be incorporated into the report in January-February 1999.
- The remaining chapters will be drafted by April 1999.
- The complete draft report will be distributed for final review.
- The study team expects to complete its report by early summer 1999.

Objective: Coastal Erosion Studies

Summary of Objective: This objective has been established to provide for the Completion of the coastal erosion hazard studies, as required by a congressional directive included in the National Flood Insurance Reform Act of 1994. It has been widely recognized by coastal communities that the threat of damages from coastal erosion are due to both the long-term gradual changes in shoreline position and the short-term episodic erosion events caused by northeasters and hurricanes - where beaches suffer dramatic losses of dunes and structures. The projected long-term changes of shoreline position (retreat or advancement) and the impact they will have on coastal structures and property are not presently included as separate flood insurance zones on the NFIP maps.

Accomplishment to Date: There are three phases to erosion hazard studies: Phase 1 involves the assessment of the severity and extent of coastal erosion for a statistically valid sample of coastal counties; Phase 2 involves the completion of an inventory of structures for all study areas included in the Phase 1 assessment; and Phase 3 involves the preparation of an economic impact analysis to determine if it would be cost effective for FEMA to implement a nationwide coastal erosion hazard mapping effort for the NFIP. A statistically valid sample of all coastal counties in the United States was developed, and it included 27 counties in 18 states. All of the 27 counties that had erosion hazard studies were completed by December 1997. Each erosion hazard study

was performed by the respective state Coastal Zone Management Program or their designee and involved a site-specific evaluation and determination of average annual erosion (shoreline change rates) by methods established by the governing state or local agency. After establishing the erosion and accretion in each respective study area, an erosion hazard map was created that reflected the hazard area representative of 60years of erosion (if any) as per the shoreline change rate established from the historical data. The information collected for Phase 1 has been transmitted to the Phase 2 and Phase 3 study contractor, H. John Heinz III Center for Science, Economics and the Environment. The Phase 2 structure inventory and Phase 3 economic impact analysis of the overall study were initiated in September 1997.

Action Plan: The Phase 2 and 3 effort is currently underway and is being prepared by the Heinz Center. The inventory of structures located within and near the erosion hazard areas mapped in Phase 1 will be completed by November 1998. The Phase 3 economic impact analyses is expected to be completed by December 1999. Following completion of all three phases, a congressional briefing document will be prepared and a formal presentation of the study findings will be presented by FEMA to Congress.

Objective: Finalize "Guidance and Specifications for Wave Heights Studies"

Summary of Objective: This objective is to finalize the "Guidelines & Specifications for Wave Elevation Determinations and V Zone Mapping" for Atlantic Ocean & Gulf of Mexico (Volume 1) and Great Lakes Region (Volume 11).

Accomplishment to Date: There are currently two draft versions of these NFIP coastal hazard assessment guidance documents that are distributed by FEMA and are recommended for use to FEMA flood study contractors in "FEMA 37, Guidelines and Specifications for Study Contractors." Engineers preparing LOMC requests are also recommended to these guidance documents. The guidance document for the Atlantic Ocean and Gulf of Mexico was originally developed in 1989, and has been updated and revised as new hazard assessment methodologies are adopted or existing methods modified. The current March 1995 final draft version of the document has been updated to a digital format that is compatible for online presentation on the FEMA Web site. The guidance document for the Great Lakes has been in development since June 1991, and, with the assistance of the USACE, Detroit District, a draft revised and updated version has been prepared and distributed in August 1996. This document is also in a digital format and is ready for the online presentation on the FEMA web site.

Action Plan: A final version of both documents is intended to be compiled and published as a single guidance document, and then included in the appendices of the updated version of FEMA 37. The final documents will be based on the best available information, techniques, tools, and understanding of the processes included in determining coastal hazard zones and Base Flood Elevations and are to be completed in fiscal year 1999. To accomplish that task, FEMA will undertake the following: (a) an outreach and education process to all users and local/state/federal officials involved in

coastal hazard assessments and enforcement of coastal floodplain management programs to accept the current standards included in the guidelines; (b) evaluate and review new standards, procedures and techniques for inclusion in the guidelines; (c) finalize the guideline document for General Printing Office publication with the updated version of FEMA 37; and (d) convert to a "pdf' format for online publication on the internet at FEMA's web site.

Objective: Federal Civilian Agency PPS Committee

Summary of Objective: Enter into a Memorandum of Agreement with the Department of Defense to allow FEMA to use the Precise Positioning Service (PPS) in Global Positioning Systems.

Accomplishment to Date: Established infrastructure of objective and also acquired necessary personnel to oversee distinct regional duties. Have had extensive discussions with the Department of Defense to coordinate and successfully arrange for execution of action plan.

Action Plan: FEMA and the Department of Defense are completing the Memorandum of Agreement. Still outstanding is the purchase of necessary equipment, complete training for successful execution of the objective, and obtaining of security clearance for all necessary parties.

Objective: Improving the Letter of Map Revision Process

Summary of Objective: To address this map modernization objective, the work group is developing a new Letter of Map Revision (LOMR) product. The objective is to improve the LOMR process by developing technical and administrative enclosures that succinctly describe map changes and community responsibilities as a result of LOMRS. Presently, the LOMR is a lengthy, complex letter involving technical, regulatory, and general information. Because of the length and format of the letter, recipients often must search for the information most important to them, which is, most typically, how the LOMR revises the map. In addition, preparation of the letter is inefficient in that standard information must be prepared and reviewed for each letter.

Accomplishment to Date: The work group has prepared a draft product that consists of a cover letter and several enclosures. The cover letter describes the basis of the request and states the impact of the project. Placing this information in a separate cover letter will make it immediately accessible. The following enclosures are included, as applicable:

- Annotated portions of the FIS, such as Floodway Data Tables, profiles, Summary of Discharge Table, etc.
- Annotated portions of the FIRM, Flood Boundary and Floodway Map, or Flood Hazard Boundary Map.

- Summary of Federal Register and newspaper notices publicizing the flood hazard changes.
- Comparison the flood hazards as determined by the modeling used for the effective map, the modeling of the conditions existing before the project, and the modeling that was conducted after construction of the project.
- List of data submitted.
- Regulatory authority for making the change.
- Additional information and reminders.

In addition to providing easy access to specific information, the new LOMR format should decrease turnaround time by streamlining the letter-preparation process.

The work group is also considering ways to exploit computer technology to improve the engineering review and letter-preparation processes. For instance, database tables could be used throughout the LOMR process to provide an up-to-date "case history." Through the database, engineers would have immediate access to the pertinent information about the case. The database could be accessed by personnel staffing FEMA's Map Assistance Center line to field questions regarding the status of requests, and aspects of the database could be linked to FEMA's web site. Ultimately, the LOMR writing itself could be automated: the information in the database could be accessed to automatically fill in the information required for the letter and enclosures.

Automation of the LOMR process will allow the engineer to concentrate more fully on reviewing the technical aspects of the revision. It will also allow easy data archival and retrieval for responding to future queries. By simplifying the LOMR format and automating aspects of the review process, FEMA will enhance customer service and satisfaction.

Action Plan: Currently, changes are being made to the cover letter and the attachments to incorporate the comments received from the work group members. Sample letters using the new product will then be tested, and there will be a final review. Implementation of the final product is tentatively scheduled for February 1999.

Objective: Biennial Assessment of Flood Mitigation User Fees

Summary of Objective: The Flood Mitigation User Fee Review Group was organized in January 1995 to review the user fees collected for flood mitigation products and services. The Group reviews the fees charged for flood map products and services provided by FEMA's TECs and the Map Service Center on a biennial basis.

The Group's objectives are to:

- Determine the cost of products and services provided to users;
- Identify are as where user fees should be adjusted to reflect costs; and,

- Identify products and services where fees are not charged and assess whether fees should be charged.

Accomplishment to Date: The Group's efforts over the years have resulted in greater recovery of FEMA's costs for providing flood mitigation products and services. These improvements have resulted from the establishment of flat user fees and the collapse of fee categories for LOMCs and from the imposition of non-refundable initial fees which must be received before work begins on request for LOMCs and archive FIS data products.

The Group recently completed a review of Fiscal Year 1997 costs, and has recommended increasing the flat user fees for certain Letter of Map Revision requests. In addition, the non-refundable initial fee for archived FIS data products will be increased.

Action Plan:
- Publish notice of fee increases in Federal Register.
- Begin charging new fees for Letters of Map Revision and archived FIS data products early in 1999.
- Restart biennial review of FEMA costs for delivering flood mitigation products and services spring 2000.

Objective: FEMA's Regulations and Laws

Summary of Objective: This objective, which is more holistic than the regulatory reform at 65.5, is to compile regulations and laws and pursue changes to remove or minimize impediments to FEMA's Map Modernization Plan.

Accomplishment to Date: As plans and specifications are finalized for the other objectives, this objective work group will evaluate the regulatory impacts. Thus, work on this objective is in its early stages.

Action Plan: As the other objectives are finalized, this work group will evaluate the regulatory impacts and pursue proposed rulemaking, as needed.

3. Tentative Additional Objectives - Fiscal Year 1999

Progress on the Fiscal Year 1998 objectives (discussed in Section 2) has allowed FEMA to consider additional objectives, which will be necessary to begin implementation of the map modernization plan in Fiscal Year 1999 and fully implement in Fiscal Year 2000. The additional objectives under consideration are identified and discussed below (Note: before any new objectives are undertaken, sufficient staff and contractor resources must be in place).

Key Stakeholders and Constituencies: Overall coordination with key stakeholders and constituencies, such as the Technical Mapping Advisory Council, Congress, OMB, ASFPM, and other entities.

Automated Hydrology and Hydraulics: This would complement the topographic mapping and work map objective and new DFIRM, focusing primarily on the integration of engineering models with Digital Elevation Models.

Zone A: Develop criteria and recommended procedures for updating Zone A areas when conducting flood data updates.

Comprehensive Guides and Specifications for Flood Studies: This would be developing the framework for the eventual compilation of all flood mapping guidelines and specifications (FEMA-37, TEC G&S, V Zone G&S) into one "living" document. Would also cover CTCs and LOMA/LOMR-F delegation authority.

MICS Version 2: This updated version of MICS would include numerous enhancements required to support the new products and processes, such as the new DFIRM and CTCS. An example enhancement would be the ability of the Regional Engineers to efficiently develop tailored statements of work for the SC and TEC for a given study.

Unmapped communities: Complete the investigation of communities without flood maps and develop mapping recommendations. Integrate this data into the Five-year Map Review/Update process. Would also include investigating and updating the procedures for mapping military reservations and tribal nations.

Base Map Strategy: Building upon the Five-year database, this would be a preliminary inventory of available public-domain digital base maps for making new DFIRM initiation decisions.

Public Information Packages: Build upon the efforts of ongoing activities, such as the TSD web site, the FEMA Map Assistance Center, and ongoing training efforts to develop standard briefing materials for restudies.

Training: Map modernization will result in training needs for many different entities: study contractors, communities, engineers, surveyors, etc. This objective would develop a holistic approach and plan for conducting this training.

Study Contractor Procurement: Oversee the process of advertising, evaluating, and selecting indefinite delivery order, indefinite quantity (IDIQ) study contracts to begin in FY 2000.

Topographic Mapping Contractor Procurement: The new study process is tentatively recommending the implementation of topographic mapping contractors.

Separating this from the study contractor process would allow the use of specialty contractors with expertise in emerging technologies and will also allow digital elevation data to be developed a year in advance of the flood study/restudy process. This objective would oversee the process of advertising, evaluating, and selecting topographic mapping contracts to begin in FY 2000.

4. Success Stories

A number of initiatives completed or underway in FY 1998 are noteworthy in that they illustrate the innovations taking place in support of map modernization. The success stories discussed in this section show how these initiatives have benefited FEMA and/or FEMA's mapping program customers.

Cooperative Studies

This is a FEMA program designed to involve technically qualified local (community, county, state) agencies in identifying and updating flood hazard information. With these cooperative studies, FEMA may provide seed money, technical support, maps, or data. In exchange, the local agency produces digital floodplain data to FEMA's specifications and returns the data to FEMA. FEMA then reviews and, if appropriate, approves the data. The local agency may then update or maintain data. The successful Cooperative Studies with Harford County, Maryland, and the Georgia Emergency Management Agency illustrate the benefits that can be gained from the Cooperating Technical Communities agreements.

Harford County, MD:

- Harford County contracted for the restudy of 6 streams, digitized the effective floodplain boundaries, updated them to fit newer topography, and provided digital base map and floodplain data to FEMA's DFIRM specifications.
- FEMA then reviewed the county's data and added all DFIRM graphics.
- FEMA published preliminary DFIRMS.
- After reviewing the preliminary DFIRMS, Harford County provided comments and additional data.
- FEMA will publish revised preliminary maps in December 1998.

Georgia Emergency Management Agency (GEMA):

- FEMA provided flat maps of all non-Q3 Georgia counties, Q3 production and QA/QC software, and technical support.
- GEMA has produced Q3 Flood Data for all remaining counties in the state.
- FEMA is currently reviewing the files to ensure that they will fit seamlessly into the existing Q3 databases.
- Once verified, GEMA plans to post all Georgia Q3 Flood Data files on their Internet site.

Jefferson County, Kentucky

- FEMA and the Metropolitan Sewer District of Louisville/Jefferson County (MSD) cooperate on the production and maintenance of DFIRMs for Jefferson County.
- FEMA contracted a restudy of several watersheds within Jefferson County, and MSD provided Geographic Information System (GIS) generated mapping to FEMA's study contractor, which were used as the base map for the restudy.
- FEMA developed digital files showing both the restudied and effective flood hazard information, and provided these to MSD in an agreed-upon format.
- MSD combined the digitized flood hazard information with the base mapping information in its GIS and produced DFIRMS.
- MSD finalized the maps and provided final plots to FEMA ready for printing and distribution.
- FEMA and MSD are planning ways the MSD GIS data and processes can be used to streamline the map revision process.

Harris County, Texas

- FEMA and the Harris County Flood Control District (HCFCD) are cooperating in an effort to determine the full extent of the effects of subsidence on the county's multiple floodplains.
- The county has experienced land subsidence of up to 4.5 feet during the past 25 years. The county's last major releveling was in 1973, with limited relevelings in 1978, 1987, and 1995.
- The upcoming flood study project will rely on information gathered using LIDAR technology.
- The Harris County data, collected primarily in the fall of 1997, will allow for a more accurate flood study of the county with improved horizontal control, vertical accuracy, and location of structures.
- FEMA and the HCFCD are currently negotiating to purchase a usage license from the Houston firm that produced the data.
- Because most of the data have already been obtained, the study portion of the project is likely to cost less and take less time than traditional studies.

NYSDEC Schoharie County Pilot Project:

FEMA has been working with the New York Department of Environmental Conservation (NYSDEC) to improve floodplain mapping for New York State. NYSDEC and their subcontractor are developing terrain-based GIS software applications to aid in automating hydrologic and hydraulic modeling and floodplain mapping. The project is also evaluating the potential use of remote sensing LIDAR. The Schoharie County, NY, FIS is the pilot project study area for the engineering and software development. FEMA is working closely with NYSDEC and Schoharie County to ensure the success of this technologically advanced project. NYSDEC and FEMA may use the software to efficiently update the FIS and FIRMs for the remainder of New York State.

Howard County, Maryland, Using GIS to Manage Flood Insurance Program:

FEMA has been working with Howard County, Maryland, to use the county's existing GIS database to manage its Flood Insurance Program and update the county's maps efficiently. FEMA initiated a demonstration of GIS-based automated hydrology, hydraulics, and flood mapping software using Howard County data. The demonstration showed how to identify flood hazards, visualize flood themes with other county data, and perform the required engineering and mapping tasks. Howard County recognized the value in the GIS applications and is currently working with FEMA to update its FIRMS.

Post-Storm Flood Hazard Verification

South Bethany, Delaware:

Post-storm data collection has proven successful in resolving a dispute over the accuracy of projected 100-year coastal flood levels in Little Assawoman Bay in the Town of South Bethany, located along the Atlantic Ocean and Little Assawoman Bay shorelines in Sussex County, Delaware. FEMA had performed a restudy of South Bethany's inland bay flood levels using a one-dimensional hydrodynamic model, DYNLET. The restudy was a technical improvement and resulted in an increase of the projected 1 00-year BFE to 6 feet NGVD. Community officials appealed the restudy.

While the appeal was being resolved over a 2-year period, a pair of severe northeaster flood events occurred in late January and early February in 1998. The extensive coastal flooding resulted in a Presidential disaster declaration in Sussex County. A FEMA field team was deployed to tag high water marks to document the flood impacts and inundation limits of the northeasters. Flood levels surveyed were found to be close to the projected 100-year level.

Because the northeasters were the most significant flooding since 1962, they provided a unique opportunity to calibrate the restudy model to a major flood event. The results were presented to the community, which then better understood the modeling effort and accepted the restudy flood levels.