The Federal Emergency Management Agency (FEMA) Map Modernization Program

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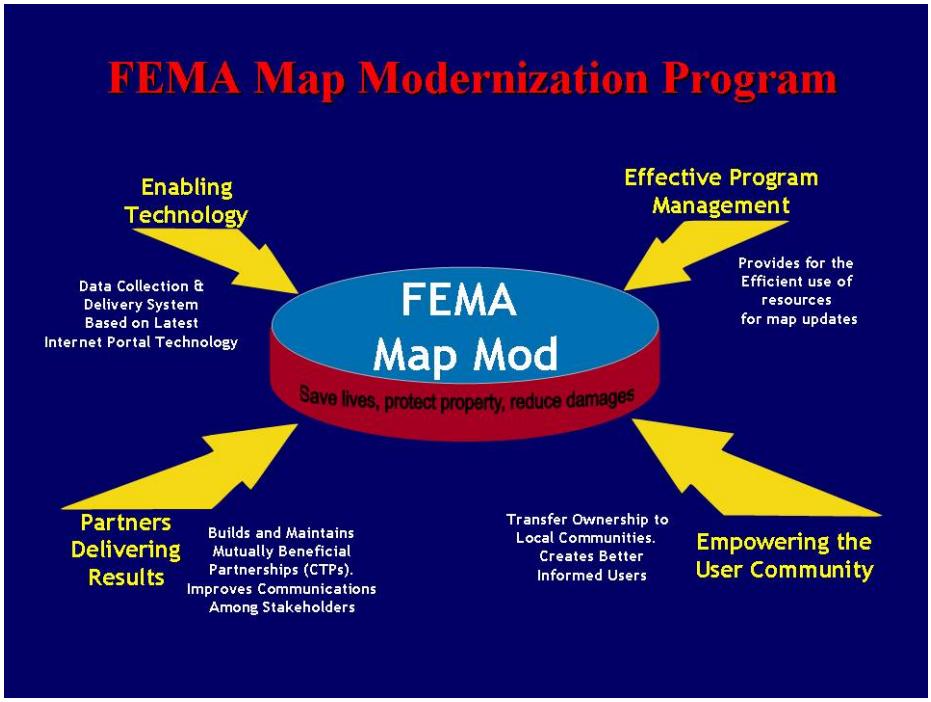


(Source - http://www.fema.gov/)

The Federal Emergency Management Agency (FEMA) Map Modernization Program

FEMA has embarked in the Flood Insurance Rate Maps (FIRMs) Map Modernization. The objective is to make the flood maps more reliable, easier to use and update, and readily available to the communities. In this manner, flood maps become better tools to prevent and reduce flood losses. FEMA envisioned the Map Modernization program to be a process that is developed through strong partnerships with State, regional, and local agencies that would contribute resources, expertise, and most importantly, local knowledge.

The Map Modernization Program has now been underway for more than five years. As a follow-up of previous issue in 2004 ("*Latest on Flood Insurance Program and Digital Mapping Tools"*, Volume 2, No. 5), we thought it would be important to share with the readers the impressions and experiences of various participants regarding program implementation. Following are papers that address perspectives from FEMA Region IV, the State of Georgia Department of Natural Resources, and the Florida Water Management Districts.

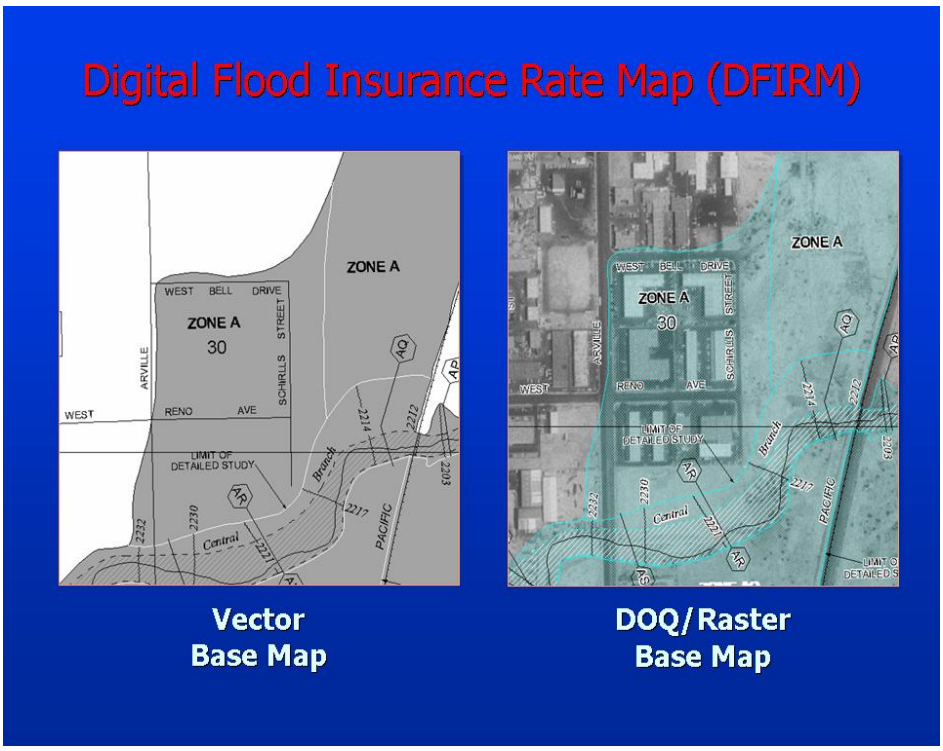
#1: FEMA's Multi-Hazard Flood Map Modernization Program (Map Modernization) – FEMA's Perspective

FEMA's overall vision is to create "A Nation Prepared." To support this vision, FEMA has embarked on an aggressive 5-year initiative to update the Nation's flood hazard maps. This initiative has been funded by the President and Congress. Map Modernization will transform the Flood Insurance Rate Maps (FIRMs) into a more accurate, easier-to-use, and readily available product. Updated, digital FIRMs will become the platform for identifying multiple hazards—not just floods. Specifically, Map Modernization will achieve the following goals:

- Create a premier hazard map collection and technically advanced delivery system to support risk management.
- Achieve effective program management by sharing responsibilities and aligning partner missions.
- Build and maintain mutually beneficial partnerships by communicating hazard risk information.
- Establish better understanding of where to obtain flood hazard data and how to use the information for sound mitigation decisions.

Accurate information about risks is the first step in preventing and reducing losses. In emergency management, risk information is the key to mitigation. Flood maps are a powerful tool for mitigation and are referenced an estimated 20 million times annually. Today, many of the Nation's flood maps are outdated, severely limiting their usefulness. An estimated 30 million Americans are at high risk from flooding, and almost every American is at some degree of flood risk. Communities, Developers, Insurance agents, Lenders, Home owners and Business owners all use the FIRMs to determine their flood risks and make better informed development decisions. It is imperative to make sure that accurate, up to date information is available for all these users of the Flood Insurance Rate Maps.

With rapidly changing technology, an important deliverable of the Map Modernization program is the development of a digital Flood Insurance Rate Map (DFIRM). Having the FIRMs in a digital format will allow for the immediate access to local officials, developers and the general public. It will also create a simplified utilization of these Maps for all users by allowing them to overlay their flood hazard with localized information and other hazard information.



Map Modernization is a collaborative process and a new way of doing business for FEMA, cutting across all layers of government. Officials and other stakeholders will be active in the mapping process (e.g., collecting, updating, and adopting data). Local engineering companies are contracted to do the mapping and determine where the high, medium, and low flood risk zones are located. The maps are reviewed and adopted by the local government and FEMA. Leveraging partnerships will allow States and communities to choose their level of involvement. These Partnerships will be maintained through the Cooperating Technical Partners (CTP) Program to manage the flood hazard data

development, in coordination with FEMA, which will update the Digital Flood Insurance Rate Maps.

FEMA has set targets or Key Performance Indicators (KPI) through FY09. These are designed to measure population for whom maps are available online and population for communities whom have adopted effective maps. FEMA also uses other KPIs related to leveraging partnerships and creating partnerships as well. There are many challenges to the success of Map Modernization. Some of these include: managing the magnitude of work that will be completed, working with and maintaining partnerships with CTPs, and meeting the KPIs overall with resources available. FEMA has already begun to work on these challenges to ensure success. To create better ways to manage and oversee projects, FEMA is creating the Mapping Information Platform (MIP) which you can view at **www.hazards.fema.gov**. We are also working very closely throughout the Nation to assist and support our Partners in the CTP program in order to ensure KPIs are met and Map Modernization is successful.

Please feel free to go to FEMA's new website, the MIP, for up to date Map Modernization Information at **www.hazards.fema.gov**.

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#2: Georgia Takes FEMA Flood Mapping Project by Storm

When FEMA envisioned the Map Modernization Program, they knew it would require strong support from the state and local agencies to effectively upgrade the entire 100,000-plus flood panel map inventory. Because of the critical significance of these maps, FEMA hoped states would contribute resources and expertise to aid in this process. The State of Georgia took on an ambitious role to do just that. As a Cooperating Technical Partner with FEMA, Georgia, through the Georgia Department of Natural Resources (DNR), is managing a six-year, $18.2 million Flood Map Modernization Program designed to create and update flood insurance rate maps (FIRMs) for all 159 counties and 531 communities in Georgia by 2009. Nearly 7,000 DFIRM maps are expected to result from this process.

According to Nolton Johnson, P.E., Chief of Georgia's Water Resources Branch of the Environmental Protection Division, "*We see this as a tremendous opportunity for*

Georgia to create a climate of understanding and ownership for the mapping process. Georgia's map modernization program is unique in that it provides in-kind personnel services that fill voids in federal funding for mapping needs and in the large number of local governments involved". In fact, Georgia's maps utilize a wealth of local data to create significantly improved flood zone delineations. Despite very tight budgets, Georgia has been able to incorporate some new flood studies in almost every county. Now well into the third year of production, this unique project is a magnet for unprecedented collaborative data gathering between state, regional, and community groups.

Testing the Waters

The Flood Map Project began in 2003 when the Georgia DNR map modernization team began the project with the conversion of about 200 FIRMs along with the related data updates to digital format for three counties: Henry, Gwinnett and Union. While selected at random, these counties are representative of Georgia in terms of population growth, flooding issues and other related planning scenarios.

At the beginning of the map modernization effort, the map modernization project team established a scoping process with the local county officials to refine planning level cost estimates based on detailed assessment of flood map update needs. These meetings have included floodplain administrators, public works directors, zoning and planning staff, and building permit staff from the community. Other state agencies, such as the Georgia Department of Transportation, are also often represented, as their interests and projects often impact the floodplain. Also, federal agencies with flood control or flood modeling roles such as the United States Geological Survey (USGS), U.S. Army Corps of Engineers (USACE), Natural Resources Conservation Service (NRCS), and Tennessee Valley Authority (TVA), provide representation as well. Any agency with a vested interest in improving the quality of flood maps within a county is invited.

Collis O. Brown, CFM, NFIP Coordinator for the State of Georgia, explains, "*These communities are in the best position to supply this type of information primarily because they are at the 'ground level' - they understand their flood control infrastructure better than anyone else and can 'ground truth' what the DNR is putting together*".

Detailed Maps

The converted digital maps go well beyond the traditional paper maps that simply depict the state's floodplains. Built in a geographic information system (GIS) framework per FEMA standards, Georgia's digital FIRMs reflect a distinctly state and local

emphasis, drawing information from local detailed flood analysis models, topographic maps, and aerial photography, as well as state information of the same types. The DNR technology framework includes ArcGIS 9.0 mapping and spatial analysis software from ESRI, customized Visual Basic (VB) programming, as well as a number of industry-standard flood hazard data study tools, like HEC-RAS and HEC-HMS.

Data acquisition and hydrology and hydraulics (where applicable) are a part of the process and encompass the acquisition or manipulation of data into a format useful for the Flood Insurance Study. In addition, the project mapping specialists register the data to the Georgia state plane coordinates, rectify aerial photos, and where possible, incorporate hydrologic and hydraulic studies completed by others.

Georgia has recently pioneered two new technical standards for the map modernization project: one for "Limited Detail" study and one for future conditions mapping. "Limited Detail" study is a hybrid of traditional FEMA approximate study and detailed study, and combines the usefulness of locally-available digital topography with supplemental field measurement of hydraulic structures. Georgia has developed and implemented a statewide standard for the creation of this data, and the display of the information on the DFIRMs. Likewise, the State has developed a standard for the display of future conditions floodplains on the DFIRMs. Within the Atlanta Regional Commission planning area, computation of future conditions floodplains is mandated by local ordinance, and this data can be displayed on DFIRMs by FEMA specifications. Georgia developed and coordinated a simple method to display this data, resulting in a low-cost, but highly-useful addition to the DFIRM.

Following this, the State produces the actual GIS DFIRMs using the data gathered or transferred from effective maps. This is a detail-oriented process that involves matching the floodplains to available orthophotography and base mapping and also prepares the cartographic labeling and layouts for the final maps.

Community Review

Once the preliminary map is complete, it is issued to the community for review and formal comment. A meeting is held with the community approximately 30 days after map issuance to discuss the new product. A 90-day appeals period is held if new flood elevations have been posted on the map, and then a 6-month compliance period begins where the community must adopt new floodplain ordinances to match the revised map. Once the community has adopted the new ordinances, the new map becomes effective and is ready for insurance and floodplain management purposes.

Brown adds, "*This is such a shift in traditional mapping roles. We're working side-by-side with the local community. We host public meetings and even conferences that cover everything from the details necessary to customize a map for that particular area to the demonstration of future conditions floodplains which lines with regulatory requirements*".

From a Trickle to a Flood

Full-scale DFIRM production is currently underway for Cherokee, Cobb, Coweta, Floyd, Gwinnett, Hall, Henry, Paulding, and Union counties in Georgia. The DNR team has already issued preliminary maps in Henry and Coweta Counties for review. In Union County, preliminary maps have been issued, and the team is incorporating additional technical data into a revised version of those maps. All six remaining counties will have preliminary DFIRMs issued to the communities by September 2005.

The Georgia DNR Map Modernization team maintains a publicly-available website (**www.georgiadfirm.com**) that tracks map modernization progress by county, provides a wealth of downloadable documents, program contact information and additional links, and allows the electronic submittal of mapping data quickly and easily. The State is utilizing the web site to distribute PDF versions of preliminary maps for public review and comment. Additionally, the site contains groundbreaking outreach material designed for a range of audiences. Finally, the State is utilizing a team collaboration site to facilitate communication among the State, its contractor, and FEMA.

As part of the FY2005 effort, the Georgia DNR is managing map updates for nineteen more counties, including Bartow, Bibb, Carroll, Chatham, Clarke, Clayton, Columbia, Dekalb, Douglas, Fayette, Forsyth, Glynn, Houston, Lowndes, Muscogee, Newton, Richmond, Walker, and Whitfield Counties.

Award-winning Collaboration

Georgia recently won a special "Best Practices" grant from FEMA to implement a regionally-based flood map scoping system based on the boundaries of the Regional Development Centers (RDCs) within the State. FEMA clearly recognized the State's special success in the area of outreach, and, by providing this special grant, is nationally spotlighting Georgia's groundbreaking efforts, and the State's unique position as the one with the most counties in the United States. Georgia's successful grant application highlighted a plan to consolidate the scoping process at the regional level, reducing travel costs and staff requirements, while at the same time drawing on the well-established benefits of the RDCs for outreach, community coordination, and GIS support. Look for several "lessons learned" publications as Georgia implements this one-of-a-kind process, and pioneers the methodology for other states.

Georgia's five-year Flood Map Modernization Program is expected to be complete in FY 2009 depending on funding. Currently FEMA is providing the majority of the funding with the State of Georgia and local counties providing substantial amounts of in-kind services, primarily in the form of digital topographic data and community flood studies. While budgets are extremely tight, the resulting maps issued to the public continue to reflect the highest quality. Georgia is presently projecting a nearly one-to-one in-kind services and data cost share match with FEMA funding over the life of the program. Primarily, this is because of the availability of statewide orthophotography, and a relatively high number of counties with recent topographic data.

Georgia's program epitomizes collaboration and thrift, focusing on bringing together a wide range of partners, communicating effectively among partners, and getting useful data onto the DFIRMs cost-effectively. With a very limited budget, the state is aggressively promoting the program and the collaborative efforts, while producing quality GIS DFIRMs in some of the fastest growing counties in the United States.

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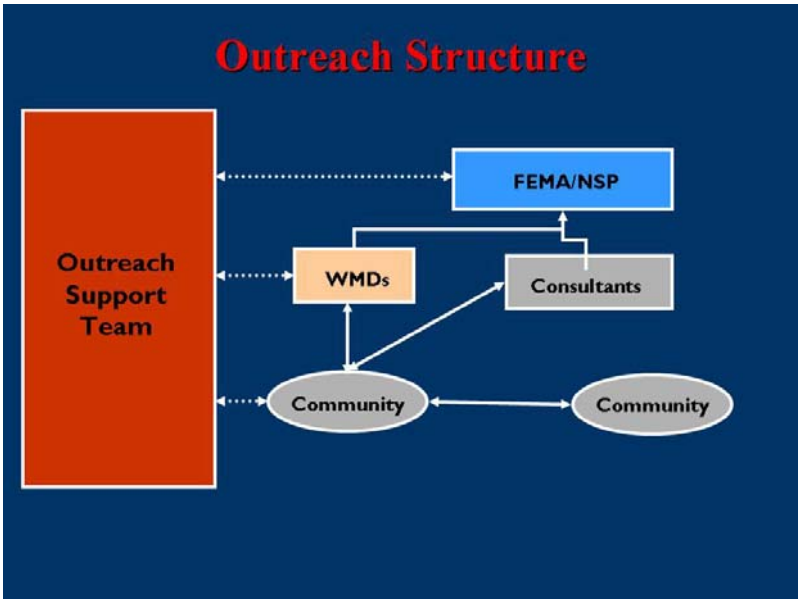
#3: Florida Water Management Districts Continue Collaboration on FEMA Map Modernization Issues

At the April 2005 Federal Emergency Management Agency (FEMA) Region IV Cooperating Technical Partners annual meeting held in Atlanta, a group of attendees from Florida broke away from the general sessions to participate in a discussion on the unique issues facing Florida in implementing the Map Modernization program. Present at the meeting were representatives from each of the five water management districts (WMDs), the Department of Community Affairs (DCA), FEMA Region IV, National Service Provider (NSP), and interested consultants. A similar meeting between the WMDs and DCA was held in March 2005 in Orlando, Florida.



The group was initiated because as Cooperating Technical Partners (CTP), the WMDs see the necessity of a coordinated approach to implementing Map Modernization and the advantages of dealing with issues as a united front. Also, discussions provide opportunities to learn from others on program strategies and experiences. The agenda covered a variety of items:

- **Shared Counties**-WMD boundaries are based on watersheds, but Map Modernization projects are designated by county. Several counties in Florida are under the jurisdiction of more than one WMD. Issues to address include:
  1) *How will FEMA funds be allocated?*
  2) *How will workload be distributed?*
  3) *How will outreach message be consistent?*
  4) *How to handle critical data such as GIS from differing systems?*
  5) *What will be the technical approach?*
  6) *How to develop DFIRM mapping panels?*
  7) *What is the best mechanism for formalizing each WMD's responsibilities (e.g. via an inter-local agreement)?*

- **Statewide LiDAR**- Accurate topographic information is critical for good flood maps. FEMA is hesitant to fund this task. A statewide LiDAR contract would yield other benefits outside flood protection with additional partners and funding sources being pursued. State-wide LiDAR specifications are necessary to develop useful data and maintain consistency across WMDs.

- **Modeling Approaches/Constraints** - Hydrology and hydraulics in Florida are more complicated and detailed then most of the United States. In addition, the data collected and information produced by the WMDs support more than just insurance rate map production. Issues discussed were:
  1) *Standardize modeling approaches and database design standards;*
  2) *Constraints, initial stages and boundary conditions;*
  3) *Actual costs greater than FEMA's "blue book" amounts, need to track expenditures to document;*
  4) *Floodway issues;*
  5) *WMDs' regulatory requirements and ERP thresholds;*
  6) *Appropriate models specific to site conditions; and*
  7) *Vertical datum conversion from the National Geodetic Vertical Datum (NGVD) 1929 to North American Vertical Datum (NAVD) 1988.*

- **GIS/Database Specifications** - Consistency between WMDs. Coordinate on nomenclature, Arc Hydro, and guidelines for Map Modernization.

- **Rainfall Distribution & Design Storms** - Differences seen in ERP design storm versus floodplain analysis requirements and design storm rainfall depths developed by the WMDs. Explore opportunities for isopluvial curves for the entire state.

- **Coastal Flood Mapping** - FEMA methodology changes include extending V zones to toe of primary frontal dune and wave set-up. Changes amplify outreach, agency coordination, and funding issues. Regional studies, one for the Gulf coast and one for the Atlantic coast of Florida, proposed.

- **State Coordination** - Collaborative effort is required between WMDs, DCA and FEMA Map Mod team. Communication and speaking with a unified voice will benefit Florida in implementation of the Map Modernization Program.

The group feels progress has been made already on many of these issues and another meeting is scheduled for this summer.

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