# FEMA's Risk Mapping, Assessment, and Planning (Risk MAP)

Fiscal Year 2012 Report to Congress

*February 23, 2012*

Homeland Security

*Federal Emergency Management Agency*

# Message from the Administrator

February 23, 2012

I am pleased to present the "Risk Mapping, Assessment, and Planning (Risk MAP): Fiscal Year 2012 Report to Congress," which has been prepared by the Federal Emergency Management Agency (FEMA).

This document responds to the reporting request set forth in House Report 112-91, which accompanies the *Fiscal Year* (FY) *2012 Department of Homeland Security* (DHS) *Appropriations Act* (P.L. 112-74).

Pursuant to congressional requirements, this report is being provided to the following members of Congress:

The Honorable Robert B. Aderholt
Chairman, House Appropriations Subcommittee on Homeland Security

The Honorable David E. Price
Ranking Member, House Appropriations Subcommittee on Homeland Security

The Honorable Mary L. Landrieu
Chairman, Senate Appropriations Subcommittee on Homeland Security

The Honorable Daniel Coats
Ranking Member, Senate Appropriations Subcommittee on Homeland Security

Inquiries relating to this report may be directed to me at (202) 646-3900 or to the Department's Deputy Chief Financial Officer, Peggy Sherry, at (202) 447-5751.

Sincerely,

W. Craig Fugate
Administrator
Federal Emergency Management Agency

# Executive Summary

FEMA, in partnership with federal, national, state, local, and tribal entities, achieved the goals for Flood Map Modernization and provided 92 percent of the Nation's population with digital Flood Insurance Rate Maps (FIRMs). FEMA eliminated 95 percent of paper flood map distribution and transitioned from the paper map printing process to an all-digital mapping inventory. Building on the success of Flood Map Modernization, FEMA is moving forward with the successor program Risk Mapping, Assessment, and Planning (Risk MAP). The vision for Risk MAP is to deliver quality data that increase public awareness and lead to action that reduces risk to life and property.

FEMA is evaluating the most practical options for establishing a Risk MAP Advisory Committee. FEMA will continue to report on progress in implementing Risk MAP and sustaining the Flood Map Modernization investment.

FEMA manages several risk analysis programs, including National Flood Insurance Program (NFIP) mapping, National Dam Safety, Multi-Hazard Mitigation Planning, and Hazards United States Multi-Hazard (HAZUS), that assess the impact of natural hazards that lead to effective strategies for reducing risk. These programs support the DHS objective to "strengthen nationwide preparedness and mitigation against natural disasters."

FEMA began Risk MAP in FY 2009 with funding from the National Flood Insurance Fund and congressional appropriations for flood hazard mapping. Risk MAP integrates and aligns the individual risk analysis programs into a more effective unified strategy.

Risk MAP provides the quality data and tools that enable analysis and awareness of natural hazards. Communities can use Risk MAP data and tools to create or improve mitigation and disaster recovery plans, make informed decisions about land use and building codes, and communicate flood and other risks more effectively to citizens. This supports the Nation's comprehensive emergency management framework for natural hazards and other threats. Risk MAP ultimately supports FEMA's priorities to strengthen the Nation's resilience to disaster and supports FEMA's strategic priority to foster a community-oriented approach to emergency management nationally that strengthens local institutions, assets, and social networks to build sustainable and resilient communities.

FEMA continues to collaborate with federal, national, state, local, and tribal partners in communicating these objectives and implementing Risk MAP. FEMA's efforts extend throughout the Nation. Implementing Risk MAP helps to maintain the engineering capability in the state and private sectors, sustaining jobs and stimulating the economy.

# Risk Mapping, Assessment, and Planning (Risk MAP)

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# I. Legislative Language

This document responds to language in House Report 112-91 accompanying the *FY 2012 DHS Appropriations Act* (P.L. 112-74), which states:

> With the fiscal year 2013 budget request, FEMA shall submit to the Committee a status report on the progress made towards the five-year Risk MAP strategy.

House Report 112-91 further states:

> Therefore, FEMA is directed to report within six months after the date of enactment of this Act on its timetable and efforts to transition from cartographic Flood Insurance Rate Map panel grids to a database-generated digital display environment.

Also, House Report 112-91 states:

> … the Committee directs FEMA to establish a Risk Map Advisory Committee to provide FEMA with sustained, ongoing advisory input and feedback on Risk Map implementation …

# II. Risk MAP Goals

The goals for Risk MAP, as articulated in the Risk MAP Multi-Year Plan and illustrated in Figure 1, are:

- **Goal 1:** Address gaps in flood hazard data to form a solid foundation for flood risk assessments, floodplain management, and actuarial soundness of the NFIP.
- **Goal 2:** Ensure that a measurable increase of the public's awareness and understanding of risk management results in a measurable reduction of current and future vulnerability to flooding.
- **Goal 3:** Lead and support state, local, and tribal communities to effectively engage in risk-based mitigation planning resulting in sustainable actions that reduce or eliminate risks to life and property from natural hazards.
- **Goal 4:** Provide an enhanced digital platform that improves management of limited Risk MAP resources, stewards information produced by Risk MAP, and improves communication and sharing of risk data and related products to all levels of government and the public.
- **Goal 5:** Align Risk Analysis programs and develop synergies to enhance decision-making capabilities through effective risk communication and management.

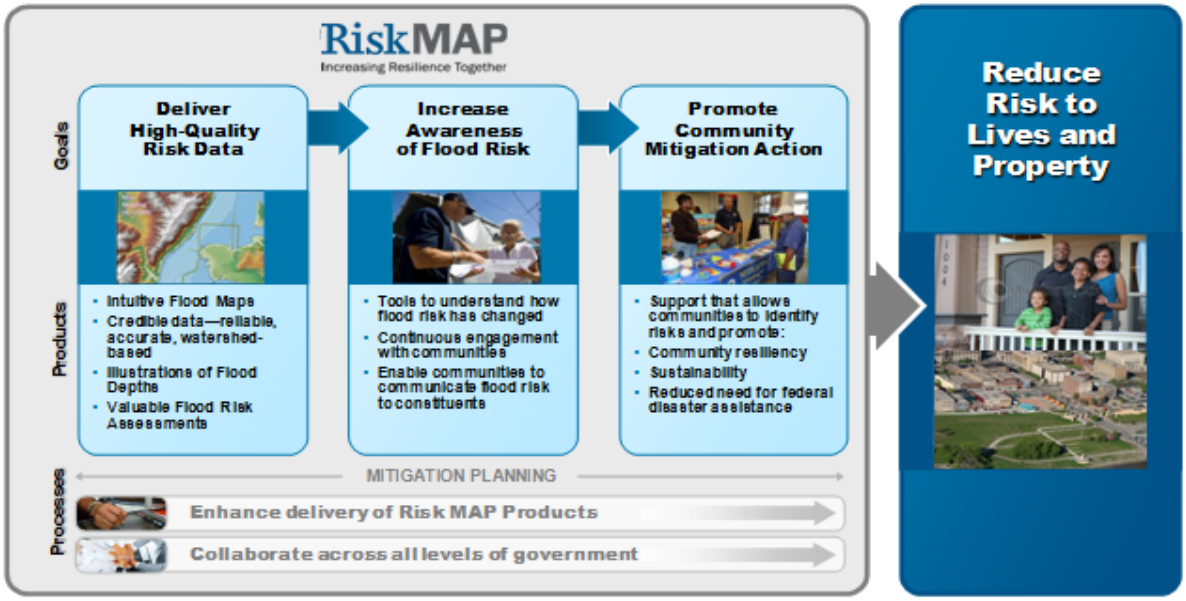



**Figure 1: Risk MAP Goals and Objectives**

# III. Risk MAP Progress

| Vision Component | Measure | Metrics (units) | FY2011 Actual | FY2012 Target | FY2013 Target |
|---|---|---|---|---|---|
| Quality Data | •Risk MAP data can be relied upon as reflecting current conditions | •Percent of mapped miles meeting New, Validated, Updated Engineering Standard (NVUE) | 51% | 52% | 56% |
| Awareness | •Risk MAP is increasing awareness of flood risk | •Percentage of local officials with flood risk awareness in Risk MAP communities | 68% | 70% | 70% |
| Action | •Risk MAP is being deployed widely | •Percentage of population where Risk MAP has been deployed | 37% | 43% | 46% |

**Figure 2: Risk MAP Key Performance Measures**

## Quality Data

The measure pertaining to quality data quantifies the amount of FEMA's flood hazard data that accurately reflect existing conditions. By ensuring high-quality Risk MAP data, FEMA can address data gaps and ensure that the underlying technical information on the flood maps is current. By statute, these data must be validated and, as necessary, updated every 5 years.

## Awareness

The measure specific to awareness is based on annual surveys of local officials. Risk MAP has expanded the outreach activities during a Risk MAP study to increase local officials' awareness of their flood risk. This will be accomplished through enhanced Risk MAP project team engagement with local officials and delivery of flood risk products that increase awareness of the presence and origin of the community's flood risk.

## Action

Flood risk data and products provided through Risk MAP give local communities the basis to develop sound, practical hazard mitigation plans, communicate risks to citizens, and allow the public to take action to prevent or reduce flood risk. The measure pertaining to action to reduce flood risk is a cumulative measure of population (in a watershed) where Risk MAP data and products helped communities identify new or improved planned mitigation strategies and ultimately advance identified mitigation actions. FEMA is developing methods to measure actions taken to reduce risk.

As the Risk MAP Program is being implemented, FEMA will continue to ensure that necessary performance targets are identified and tracked to demonstrate the progress of the program.

## Progress through FY 2011

FEMA utilized resources in FY 2009, FY 2010, and FY 2011 to make progress toward Risk MAP goals by:

- Defining Risk MAP products and processes to augment existing flood mapping products
- Implementing Risk MAP projects across the Nation that address critical coastal and levee engineering and mapping needs
- Providing improved data, tools, and processes for community use in risk assessment, mitigation planning, disaster recovery plans, and informed decision-making about land use and building codes

## Projected Progress in FY 2012

FY 2012 marks the fourth operational year of Risk MAP. FEMA's 10 regional offices are working to initiate new Risk MAP projects, utilizing FY 2012 funding, which will:

- Increase the percentage of available flood hazard data that meet NVUE standards from 51 percent to 52 percent
- Increase local officials' flood risk awareness from 68 percent to 70 percent in Risk MAP communities
- Increase the population in watersheds where Risk MAP has begun from 37 percent to 43 percent

In FY 2012, FEMA will continue to prioritize coastal engineering and mapping projects and Risk MAP projects conducted by state and local Cooperating Technical Partners (CTPs). In addition, Risk MAP projects are being augmented in FY 2012 to address areas affected by coastal flood hazards and dams.

# IV. Risk MAP Implementation

## A. Flood Hazard Mapping and Engineering

FEMA, through Risk MAP, continues to maintain the currency of the flood hazard data used in support of the NFIP. Leveraging successes from Flood Map Modernization, FEMA will continue to refresh more of the underlying engineering data depicted on the flood map.

Flood Map Modernization focused on establishing a foundation for easier information depiction and distribution of the mapped flood hazard in digital format. As of November 2011, 92 percent of the Nation's population has received a digital FIRM. A map depicting areas that have been provided digital FIRMs is provided in Appendix A. To ensure that Flood Map Modernization's investment is preserved and that synergies are realized, it is imperative to maintain the integrity and credibility of the underlying flood hazard data, and ensure the information can be leveraged to improve mitigation activities beyond the minimum federal requirements for participation in the NFIP.

Risk MAP investments that are dedicated to flood hazard mapping will produce accurate flood hazard data, integrated watershed flood risk assessments, and more effective hazard mitigation plans. Risk MAP's primary areas of focus include coastal flood hazard mapping, areas affected by levees, and significant riverine flood hazard data update needs. A national map depicting areas where Risk MAP projects have been initiated is provided in Appendix B.

The Risk MAP products suite was established to leverage the successes of Map Modernization and to further enhance the usability and value of flood hazard mapping by integrating that component with the risk assessment, mitigation planning, and risk communication processes into one seamless program. The Risk MAP Products Suite is being augmented in FY 2012 to include definition of coastal data-set products and data-set products related to dams. These new products will help communicate the flood risks associated with these high-risk, high-population impact hazards for coastal areas and rivers affected by the operation of dams.

**Figure 3. Risk MAP Products Suite**

Risk MAP products are being developed in collaboration with affected communities. FEMA's 10 regional offices throughout the United States manage the development and delivery of Risk MAP products. The first step in identifying needed Risk MAP products is to meet with representatives of state, local, and tribal entities. Such meetings are being held as Risk MAP projects are initiated.

These initial discovery meetings typically cover the following topics:

- Flood risk changes over time.
- Identified watersheds FEMA will review in Risk MAP on the basis of risk, areas of significant development, and engineering and mapping needs, including:
  - State, local, and tribal inputs regarding Risk MAP project prioritization
  - Input for selected areas where updates to FEMA flood maps are ongoing within the watershed

## B. Levee Strategy

As FEMA produced FIRMs for communities affected by levee systems, some stakeholders expressed concern about how flood risk was modeled on FIRMs when the levee is not certified and accredited. Members of both the House and Senate echoed this concern and asked FEMA Administrator Craig Fugate to consider discontinuing the former levee analysis and mapping approach and to draw on current modeling techniques to more precisely reflect the level of flood hazard reduction that levee systems can provide, while at the same time recognizing that uncertainty will remain. FEMA has proposed a cost-effective, repeatable, and flexible approach that:

- Complies with all statutory and regulatory requirements governing the NFIP, most notably 44 CFR § 65.10

- Leverages local input, knowledge, and data through proactive stakeholder engagement
- Aligns available resources for engineering analysis and mapping commensurate with the level of risk in the leveed area
- Considers the unique flooding and levee characteristics (solely from an engineering perspective) of each levee system

FEMA is coordinating with affected communities and other stakeholders in reviewing this new levee analysis and mapping approach for nonaccredited levees. Starting on December 15, 2011, the public was provided 45 days to provide comments regarding this new approach. FEMA conducted three 90-minute online public Webinars to present the approach and answer clarifying questions. Feedback is an important part of FEMA's process for developing the new levee analysis and mapping approach. More information on the background and development of the new approach is available on FEMA's Web site at: http://www.fema.gov/plan/prevent/fhm/lv_lamp.shtm.

## C. Coastal Strategy

Throughout Flood Map Modernization, FEMA provided coastal communities with digital data in accordance with the program goals, but in almost all cases the underlying coastal flood hazard analyses were not updated. One notable exception is the post-Hurricane Katrina updates performed for the States of Mississippi and Louisiana. The goals of the Risk MAP Program extend beyond prior efforts, putting a greater focus on updating flood hazard data and engineering supporting NFIP maps and other Risk MAP products. Given this change in focus and the limited updates performed throughout Flood Map Modernization, coastal communities will be provided with more comprehensive updates to their flood hazard data, similar to the updates following Hurricane Katrina. Additionally, affected coastal communities will be provided new Risk MAP products that increase communities' understanding of flood risk.

Throughout the Risk MAP Program, FEMA intends to update the Nation's coastal Flood Insurance Studies (FIS) and FIRMs and, where appropriate, establish new FIRMs in populated areas that previously had not been mapped. FEMA anticipates that it requires coastal funding through FY 2013 to initiate all updates. Upon initiation, coastal flood hazard and mapping updates can take 3 or more years of scoping, data collection, flood hazard analyses, and mapping, followed by regulatory appeal and compliance periods, during which the public has the opportunity to provide input and adopt the new maps into their local floodplain management ordinances. FEMA is identifying and prioritizing the study areas on the basis of mapping needs, flood risk, community and state cost-share, and cost efficiencies so that areas most in need are provided with updated maps as efficiently and expeditiously as possible.

FEMA has already made significant progress toward the goal of providing the Nation's coastal population with updated flood hazard analyses and mapping. Throughout Flood Map Modernization, FEMA initiated updates to approximately 35 percent of the Nation's coastal flood hazard mapping. With 3 years of funding—FY 2009, FY 2010, and FY 2011—FEMA initiated studies that raise the percent of the Nation's coastline miles with updated flood hazard mapping to 75 percent.

## D. Elevation Data

In FY 2011, FEMA continued to invest in new ground elevation data as a key strategy for implementing Risk MAP. Similar to FY 2010, FEMA allocated $20 million to acquisition of elevation data. The acquisition of new elevation data increased through coordination with the U.S. Geological Survey and FEMA's CTPs. These strong partnerships help to increase the opportunities for the collection of new high-quality elevation data.

High-quality elevation data form the foundation for increasing the quality of the flood maps, aid in developing risk assessment data, and assist in developing actionable mitigation plans based on improved hazard data. The importance of the accuracy of elevation data for FEMA has been emphasized in two National Academies of Science reports. As a result, under the Risk MAP strategy, FEMA will obtain, and support partners' efforts to obtain, high-quality elevation data. FEMA will manage elevation data used for Risk MAP as part of its Engineering Library system that houses all supporting data used for Risk MAP.

FEMA will also continue to work with the U.S. Geological Survey to integrate Risk MAP elevation data with other national elevation data resources to make the data more widely available and easier to use. FEMA and the U.S. Geological Survey have memoranda of understanding in place to support this collaboration. In FY 2011, FEMA completed a project to reconcile the inventory of elevation data in the Engineering Library with the U.S. Geological Survey elevation data holdings and transferred all existing elevation data from the FEMA Library to the U.S. Geological Survey.

High-quality elevation data will not only increase the quality of the flood hazard maps, but the data will aid in developing risk assessment data, assist in developing actionable mitigation plans, and improve credibility, all of which help FEMA achieve its overall mission of reducing the impact of disasters on lives and property. Furthermore, these data will result in a substantial increase in the public's awareness of risk—one of Risk MAP's operational goals—which in turn drives citizens to take actions toward mitigating risks. Finally, these data can be used for other purposes such as real-time flood inundation mapping to aid emergency response, water supply and quality modeling, and non-water related work such as roadway design, land use planning, communication and energy transmission line planning, and more. Because high-quality elevation data are useful in so many areas, FEMA is working with many interagency partners to maximize the use of all light detection and ranging (LIDAR) data. As a first step, FEMA is developing a policy to standardize LIDAR data collection specifications and data-sharing policies across the Agency.

## E. Risk Assessment

A risk assessment identifies hazards and their associated risks, including threats to public health and safety, the environment, property damage, and economic loss. The assessments combine the probabilities with the consequences in a way that quantifies risk. Quantifying the risk is a powerful way to communicate the threat, determine the key factors that cause it to be high, and ultimately perform trade-off analyses to determine the most effective way to reduce, avoid, or otherwise control it.

For NFIP purposes, the ability to compare flood risk across states and regions is critical. At the state and community levels, flood risk information helps community leaders with planning, evaluating costs and benefits associated with building codes, and achieving other preventive measures. An understanding of the flood risk is important to manage and mitigate risk for businesses and industries that may be located within or near the floodplain.

Through the integrated delivery of Risk MAP, one of the key data sets a given watershed will receive will be a flood risk assessment. FEMA uses the HAZUS tool for risk assessment and loss estimation. This assessment begins to quantify, in economic terms, the impact of a particular flood event. With this information available, local communities can begin to get a sense of:

- Economic losses to residential, commercial, and other assets within the community across a watershed
- Estimated damages to building stock
- Potential disruptions to the business community or tax base

To support Risk MAP and the development of risk assessments, FEMA is:

- Enhancing the HAZUS model by developing storm surge methodology and adding a storm surge component of the hurricane module
- Leveraging the National Oceanic and Atmospheric Administration's expertise in tsunami hazard identification to add a tsunami risk assessment to methodology to HAZUS
- Updating the functionality and loss estimation accuracy for easier use by decision makers and Geographic Information System users at the state, regional, and local levels so they incorporate risk assessment data into their emergency management and mitigation planning efforts

In addition, FEMA continues to provide training opportunities and communication materials on HAZUS with the goal of educating new and existing HAZUS users, and to gather feedback on how to further improve the tool's ability to accurately assess risk and quantify losses from flood and other hazards.

## F. Multi-Hazard Mitigation Planning

Hazard mitigation planning is the process used by state, tribal, and local governments to identify risks, assess vulnerabilities, and develop long-term strategies for protecting people, natural environment, and property from the effects of future natural hazard events. The process results in a mitigation plan that offers a strategy for breaking the cycle of disaster damage, reconstruction, and repeated damage; and a framework for developing feasible and cost-effective mitigation actions.

In September 2011, FEMA released new mitigation plan review tools and guidance that streamlines the plan review process and reinforces the emphasis on mitigation strategies, specifically actions and implementation.

To support Risk MAP in achieving the overarching Mitigation Planning Strategy and vision, this project has achieved the following goals:

- Developed a refined, strategy-focused Mitigation Plan Review Process that meets the intent of the Stafford Act and Title 44 of the Code of Federal Regulations (CFR) Part 201 by leading communities to implement action to reduce risk
- Developed the necessary tools to support the new Mitigation Plan Review Process, and to meet stakeholder needs and create efficiencies

FEMA developed the new process during FY 2011 with insightful feedback from internal and external stakeholders, including all FEMA Headquarters and regional offices, state Hazard Mitigation Officers, local government officials, the National Emergency Management Association, the Association of State Floodplain Managers, and the National Hazard Mitigation Association.

# V. The Participation of States in Leveraging Non-Federal Contributions

Many states participate in FEMA's flood hazard mapping efforts through the CTP Program. Such partnerships bolster state and local ownership and utilization of flood hazard data for the NFIP. In FY 2011, FEMA utilized $68 million, about 30 percent of appropriated funds, in projects performed by CTPs. FEMA will continue to prioritize flood hazard mapping and Risk MAP projects that develop, utilize, and support state capability, and anticipate utilizing a similar percentage of appropriated funds in FY 2012 for CTP projects.

# VI. Cartographic Maps to Digital Display Environment

## A. FEMA Vision for the Elimination of Manual Cartographic Production of Flood Maps

Since the beginning of the Map Modernization effort in 2003, FEMA has maintained a vision of moving from paper-based maps to digital information delivered over the Internet and leveraging this technology to transform the entire mapping process to make it more accurate, efficient, and productive. Key milestones in the effort are:

- Transform to Internet-delivered digital products
- Modernize product specifications to leverage technology
- Transition to database-driven dynamic flood maps
- Deliver the location-specific hazard and risk information

FEMA has progressed in reducing the requirements for manual cartographic map production and in transitioning to database-generated flood maps and flood insurance studies. FEMA has just completed the development of new product specifications for regulatory flood hazard databases, flood map graphics, and flood insurance study documents. FEMA believes that the implementation of these new product specifications in Risk MAP will essentially eliminate manual, cartographic formatting and layout production processes for our maps and reports. Eventually, tools will allow users to create dynamic flood maps as needed, with flood hazard information that is current as of the day it is generated, centered on users' areas of interest, at a scale appropriate to their task, and with additional data provided by the users.

## B. Transformation to Internet-Delivered Digital Products

Over the course of the previous decade, FEMA's flood mapping program:

- Eliminated 95 percent of paper map distribution
- Transitioned from printing presses and a paper inventory to an all-digital mapping inventory
- Provided modernized geospatial data and maps for 92 percent of the Nation

In 1999, FEMA was distributing 2.5 million paper maps each year. FEMA began the transition to digital regulatory products by scanning the entire map inventory and creating an easy-to-use tool online to view and print official copies of a portion of the standard flood maps. These customized products were called FIRMettes and approved by FEMA Counsel as suitable for official use. Downloading and printing FIRMettes soon replaced much of the demand for paper maps.

**Flood Map Modernization**

By 2003, paper map demand stabilized below 1 million maps per year, and FEMA was initiating the Flood Map Modernization Program. The Map Modernization Program republished flood maps for 65 percent of the land area of the United States, covering 92 percent of the Nation's population as digital geospatial FIRM databases, static digital map images, and paper maps. The *FY 2004 National Flood Insurance Program Reform Act* added a provision allowing FEMA to treat digital geospatial data as official, equivalent to the paper maps. FEMA developed policy to implement this change, which was published in 2007. At the same time, FEMA introduced the National Flood Hazard Layer (NFHL). The NFHL is a digital geospatial data product composed of all FIRM databases available nationally and updated daily as revisions to flood maps are processed. The NFHL is available live via the Web through open Web mapping service interfaces.

In 2008, FEMA announced it would discontinue nearly all distribution of paper maps, beginning with maps finalized in October 2009. FEMA focused on reorienting internal production processes to emphasize the FIRM database as the primary product, instead of the static digital and paper flood maps. This was critical to the flood determination industry transition from paper to digital products. Beginning October 1, 2009, FEMA eliminated all paper distribution of flood maps, except a single paper copy when revised to affected communities to support the incorporation of the flood maps into local land use ordinances. This reduced the annual distribution of paper maps to fewer than 100,000 units annually, about one-tenth of what it was in the previous year, and directly reduced FEMA's costs by more than $5 million per year.

**Risk MAP**

Beginning with the Risk MAP multi-year plan submitted to Congress in March 2009, FEMA described the next phase of the digital transition of the flood mapping program to fully database-driven, always current, dynamic flood maps. The vision is to shift from finished products that are prepared in advance with fixed content, tiling scheme, scale, and other specifics, and where updates are distributed separately. Instead users can create products as needed, with flood hazard information that is current as of the day it is generated, centered on users' areas of interest, at a scale appropriate to their task, and with additional data provided by the users. This transition to dynamic flood maps involves three main objectives:

- Overhaul of our database, graphic, and text product specifications that will enable full automation of end user flood hazard data products
- Elimination of all manual cartographic and document compilation production steps for our maps and engineering report products
- Implementation of end-user tools that support the transition of users from our existing products to new dynamic flood maps

## C. Modernize Product Specifications to Leverage Technology

FEMA just completed the first objective with the release of new specifications for all regulatory flood hazard products: FIS databases, static map images, and flood insurance study reports.

This was a major undertaking, sorting through a complex business process built up over nearly 40 years with thousands of business rules. The objective was to eliminate or simplify as many rules as possible without losing any important hazard information provided by FEMA's flood hazard products. FEMA also defined a completely new set of nonregulatory flood risk products to support Risk MAP. These new products are designed to be used to strategically manage flood risk, building on the existing regulatory map and data products used to administer NFIP. Like the regulatory products, the new Risk MAP products are designed so that the cartographic and text products are produced automatically from a geospatial flood risk database. Prototypes of these new regulatory and nonregulatory products have been shared with stakeholders at many meetings and conferences, and feedback has been gathered to refine the new approach.

## D. Completing Transition to Database-Driven Dynamic Flood Maps

Now that the new product specifications have been released, FEMA's focus is on eliminating all manual cartographic and document compilation production steps for our regulatory maps and engineering report products, and implementing end-user tools that support the transition of users from FEMA's existing products to new dynamic flood maps. FEMA anticipates that both of these steps will produce efficiencies for the program. Eliminating manual cartographic map finishing and document compilation is expected to produce the biggest benefits. This will produce direct savings by reducing the labor required for flood map updates and also improve the quality of finished products by eliminating process steps and reducing the possibilities for errors to be introduced to the process. Eliminating the static map graphics and FIS reports may also produce some additional savings by reducing the number of individual products produced, delivered, and managed. Because these products are digital and much of the management and distribution of them is automated, the savings from eliminating these will not be as significant as the savings from automating the production of them.

There are a number of challenges to overcome in achieving each of these critical objectives. Elimination of manual production steps is constrained by the timelines for production and administrative processes. Map updates may take 3 to 5 years to complete. Therefore, many of the projects started using the new specifications in FY 2012 will not be final until FY 2015 or later. Work initiated between FY 2009 and FY 2011 was begun using the old specifications. For some of these projects, it may be possible to implement changes to move to the new specifications. For other projects, compilation of the regulatory products using the old specifications may be far enough advanced that it will not be cost effective to change.

## E. Deliver Location Specific Hazard and Risk Information

In addition, FEMA expects that the creation of digital geospatial flood hazard and flood risk databases will enable site-specific flood hazard and flood risk information delivery in place of maps for most users. Maps very effectively communicate hazard and risk information over large geographic areas and are very useful for applications that need a broad understanding of risk. But many map users are only interested in the flood hazard and risk information for a specific location. The continued rapid advancement in geospatial technology, data, and applications will make it possible to provide those users with the information they need specific to their location without the need to read a map. Future tools, developed by FEMA, state and local governments,

or the private sector, will provide users with flood hazard zone designations, flood elevations, flood depths, and other information based on the user's location rather than requiring the users to interpret the information themselves from a map view.

## F. Timetable for Elimination of Manual Cartographic Production

Risk MAP projects initiated in FY 2012 will be based on the new specifications. These projects will begin delivering preliminary products using the new specifications within about 18 months. These new products will be database driven with a minimum of manual processing. As the new specifications are implemented, FEMA will coordinate with federal, state, local, and private stakeholders and stakeholder associations to communicate the changes and identify issues to address.

Over the next year, FEMA will evaluate work in progress to determine the costs for modifying the existing contracts to implement the new specifications on ongoing projects. Where feasible, these initial database-driven products may be available earlier.

## G. Risk MAP Geospatial Vision

Elimination of manual cartographic production and the implementation of database-driven dynamic maps is one of the key outcomes of the overall Risk MAP Geospatial Vision, but there are other critical aspects to the vision. In the future, FEMA expects to primarily provide flood hazard and risk services that are integrated into third-party tools to provide end users the information they need. Rather than all users receiving the same map from FEMA, users will receive the flood hazard and risk data they need through channels that fit with their specific needs. For example:

- FEMA, other federal agencies, NFIP Write-Your-Own Insurance Companies, lenders, the flood determination industry, states, and large community systems will access regulatory flood data, Risk MAP data, and other NFIP data through Web services and will integrate these data into their own operational data in tools specific to their needs. Commercial systems that serve these sectors will routinely include FEMA flood data integration as a standard function.
- The general public will see FEMA flood hazard and flood risk data regularly through a variety of mapping and other tools they use on the Web. General-purpose mapping Web sites, real-estate Web sites, lending Web sites, insurance Web sites, community Web sites, hazards Web sites, and public safety Web sites will all integrate flood risk as part of the information they deliver to users. Users can easily specify their location of interest and receive site-specific results.

Digital mapping, data management, and Internet distribution will unlock additional value from the data collection and analysis that support flood risk studies. Improved data management standards allow Risk MAP byproducts (elevation data, hydrologic and hydraulic data, etc.) to be integrated with other national and federal data sets and used for other applications beyond the NFIP. Similarly, multiple Risk MAP partners and end users needing access to engineering data

can access the authoritative data online. This change will reduce the time required for Risk MAP projects, increase data reliability, and improve efficiency.

These improved tools and access to data will enable NFIP stakeholders to understand and analyze the complex geographic interrelationships where people live and work, the hazards that threaten people and property, and the impacts of communities' plans and development. This improved understanding will lead to community actions to reduce risks and build healthy, prosperous, resilient, and sustainable futures.

Achieving this transition from defined flood hazard and flood risk products delivered primarily through FEMA-developed tools, to a future where FEMA provides a flood hazard and flood risk information services platform that supports third-party implementation of customer-specific solutions will be a significant challenge. Millions of homeowners, thousands of local governments, and the real estate and lending industries rely on steady access to FEMA flood hazard data to protect people and property, and keep business moving. Change will need to be implemented carefully to avoid significant economic and public safety impacts. The elimination of manual cartographic map production, document compilation, and formatting is an important step, but not the end of the process. The rapid evolution of Internet technology, mobile technology, and geospatial technology is clearly making government-developed and -maintained solutions higher risk and harder to maintain. Although there are already some commercial tools being built that deliver NFIP hazard data, commercial tools that meet all user needs are not yet available. FEMA will work closely with federal, state, and local stakeholders and the private sector over the next few years to accomplish this transition while minimizing the negative impacts on users.

# VII. Establishment of the Risk MAP Advisory Committee

The Technical Mapping Advisory Council (TMAC) was created by Congress in the *1994 Flood Insurance Reform Act*. As required by Congress, TMAC submitted annual reports to FEMA's Director from 1998 to 2000. TMAC's recommendations formed the basis of the objectives of the Flood Map Modernization Program, funded by Congress through FY 2008. The organizations that comprised TMAC represent the varied users of FEMA's flood hazard maps. After TMAC concluded, those organizations (listed in Appendix C) formed the Flood Mapping Coalition. FEMA coordinates regularly with representatives of the Flood Mapping Coalition as part of administering the NFIP.

In establishing the vision for and implementing Risk MAP, FEMA regularly coordinates with and consults members of the Flood Mapping Coalition and Risk MAP stakeholders. FEMA will continue this coordination as Risk MAP moves forward and will adapt current efforts to meet the requirements of a Risk MAP Advisory Committee in 2012. FEMA is evaluating the most practical options for accomplishing this requirement.

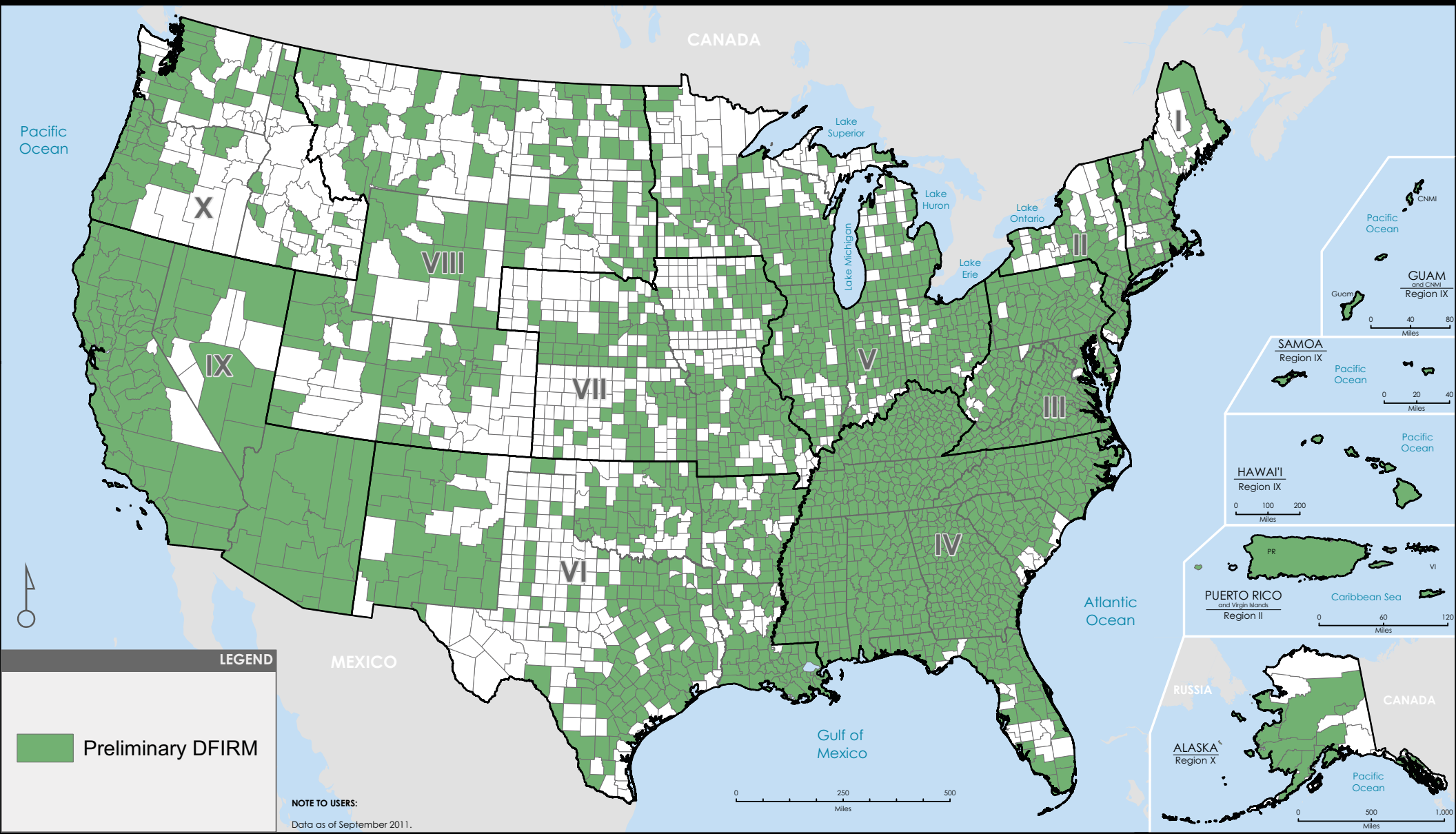
# Appendix A –
# Flood Map Modernization Digital Mapping

NATIONAL FLOOD INSURANCE PROGRAM

# Flood Map Modernization Digital Mapping

FEMA

February 13, 2012




**NOTE TO USERS:**

Data as of September 2011.

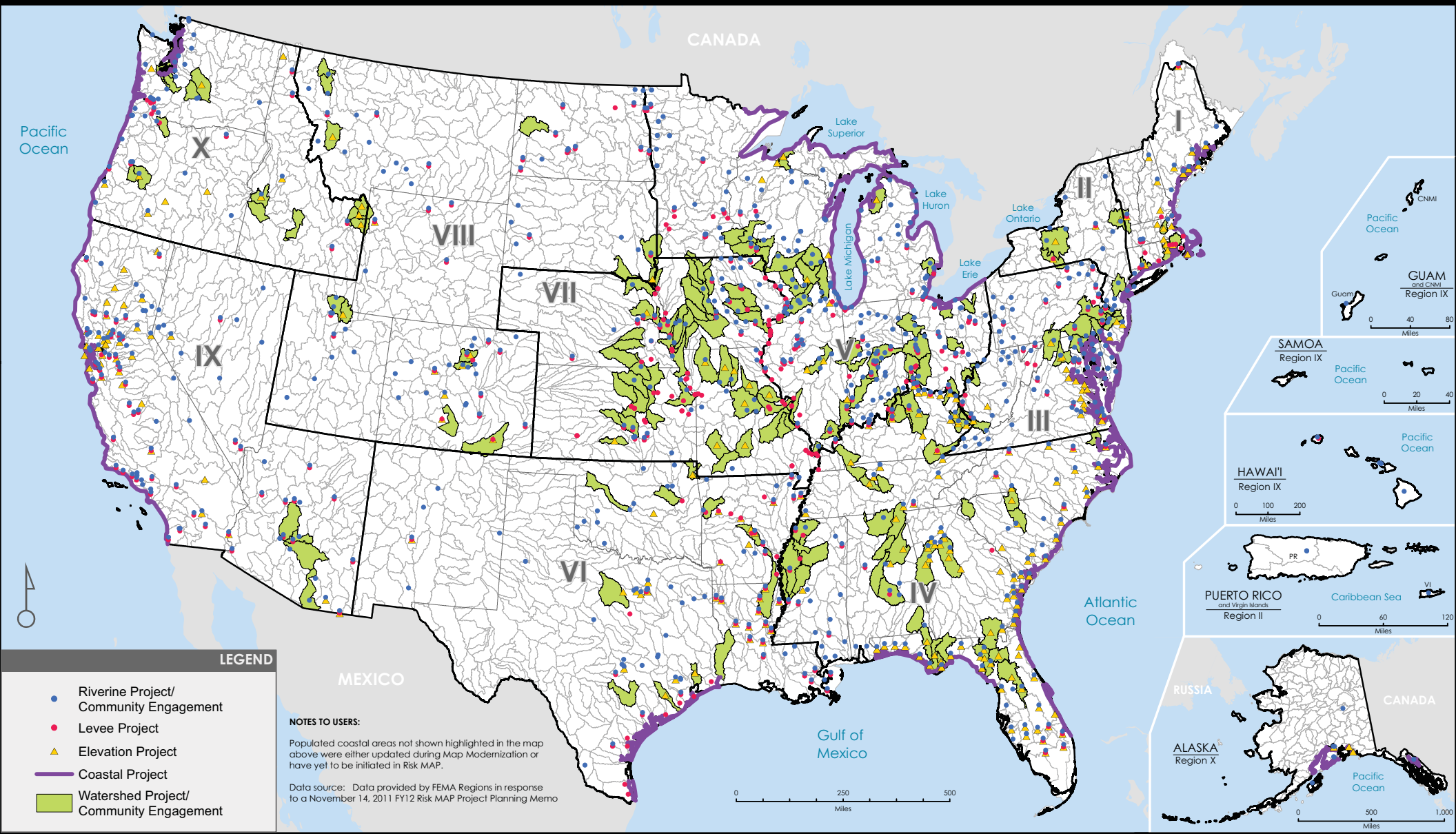
# Appendix B –
# Risk MAP Projects FY 2009 Through FY 2011

NATIONAL FLOOD INSURANCE PROGRAM

# Risk MAP Projects FY 2009 through FY 2011

FEMA

February 13, 2012




**NOTES TO USERS:**

Populated coastal areas not shown highlighted in the map above were either updated during Map Modernization or have yet to be initiated in Risk MAP.

Data source: Data provided by FEMA Regions in response to a November 14, 2011 FY12 Risk MAP Project Planning Memo

# Appendix C – Technical Mapping Advisory Council

Members were mandated by the authorizing legislation and appointed by the Director or his designee. The membership included representatives of the following:

- Under Secretary of Commerce for Oceans and Atmosphere
- Member of recognized surveying and mapping professional associations and organizations: the American Congress on Surveying and Mapping
- Member of recognized professional engineering associations and organizations: the American Society of Civil Engineers
- Member of recognized professional associations or organizations representing flood hazard determination firms: the National Flood Determination Association
- Representative of the U.S. Geological Survey
- Representative of state geological survey programs: the Association of American State Geologists
- Representative of state national flood insurance coordination offices: the Association of State Floodplain Managers
- Representative of a regulated lending institution: NationsBank/Bank of America
- Representative of the Federal Home Loan Mortgage Corporation (now named Freddie Mac)
- Representative of the Federal National Mortgage Association (now named Fannie Mae)
- FEMA representative—Designated Federal Officer

Representatives of the following served as Technical Advisors:

- National Association of Flood and Stormwater Management Agencies
- U.S. Army Corps of Engineers
- Flood Insurance Servicing Companies Association of America, Inc.
- National Emergency Management Association