A Report by a Panel of the

NATIONAL ACADEMY OF PUBLIC ADMINISTRATION

for the U.S. Congress and the Federal Emergency Management Agency

FEMA Flood Mapping: Enhancing Coordination to Maximize Performance

November 2013
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FEMA Flood Mapping: Enhancing Coordination to Maximize Performance

PANEL

Beverly A. Cigler,* *Chair*
Gerald Galloway*
Mary Glackin*
Scott Quehl*
Christine Gibbs Springer*

** Academy Fellow*

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Study Team

Joseph P. Mitchell, III, *Director of Project Development*
Roger Kodat, *Project Director*
Stephanie Bailenson, *Senior Advisor*
Sarah (Sally) Jaggar, *Senior Advisor*
Maria Rapuano, *Senior Advisor*
Lisa Warnecke, *Senior Advisor*
Jonathan Tucker, *Senior Research Analyst*
Amanda Mullan, *Research Associate*
Jonathan Wigginton, *Research Associate*

The views expressed in this report are those of the Panel. They do not necessarily reflect the views of the Academy as an institution.

National Academy of Public Administration
900 7th Street, N.W.
Suite 600
Washington, DC 20001-3888
www.napawash.org

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FOREWORD

The Federal Emergency Management Agency (FEMA) plays an essential role in mitigating flood-related losses suffered by Americans. Begun in 1968 and managed by FEMA, the National Flood Insurance Program was established to help participating communities reduce future flood damages and insure their property owners against potential losses. Accurate flood maps are necessary to evaluate flood risk and calculating insurance rates. The issue of FEMA coordination is important given the many federal agencies, as well as state and local entities, that have a connection with flood mapping and flood-risk mitigation.

In the Biggert-Waters Flood Insurance Reform Act of 2012, Congress required FEMA to contract with the National Academy of Public Administration (hereafter, the Academy) to conduct a six-month study of FEMA's interagency and intergovernmental coordination in flood mapping, including a funding strategy to leverage and coordinate budgets. As part of this study, the Academy was charged with addressing how FEMA can establish joint funding mechanisms with other federal agencies, as well as state and local governments, for the collection and utilization of data among all governmental users.

The five-member Academy Panel of Fellows recognized that FEMA, as well as the many other stakeholders engaged in flood mapping-related activities, operate with significant resource constraints that can impact quality of coordination. Even though study interviews reveal that FEMA has made progress in its interagency and intergovernmental coordination over the past several years, Panel findings specify that FEMA can improve. The Panel's recommendations propose actions for how FEMA can enhance its coordination activities, devise funding strategies, and use joint funding mechanisms to advance its critical mission to the American people. The Panel also includes recommendations for how the Office of Management and Budget, given its government-wide role, can contribute to efforts to attain more coordinated funding strategies to enhance flood mapping and flood risk determination.

As a congressionally chartered non-partisan and non-profit organization with nearly 800 distinguished Fellows, the Academy brings seasoned experts together to help public organizations address their most critical challenges. We are pleased to have had the opportunity to assist Congress and FEMA by conducting this study. I appreciate the leadership of FEMA and the stakeholders who provided important insight and context needed to inform this study. Also, I thank the members of the Academy Panel, who provided invaluable expertise and thoughtful analysis to this undertaking, and the professional study team that provided critical support to the Panel.

Dan G. Blair
President and CEO
National Academy of Public Administration

ACRONYMS AND ABBREVIATIONS

3DEP	3D Elevation Program
AAG	Association of American Geographers
AASG	Association of American State Geologists
Academy	National Academy of Public Administration
ACWA-US	Association of Clean Water Administrators
AMWA	Association of Metropolitan Water Agencies
ARS	Agricultural Research Service
ASCE	American Society of Civil Engineers
ASDWA	Association of State Drinking Water Administrators
ASFPM	Association of State Flood Plain Managers
ASIWPCA	Association of State and Interstate Water Pollution Control Administrators
ASWM	Association of State Wetland Managers
AWRA	American Water Resources Association
AWWA	American Water Works Association
BIA	Bureau of Indian Affairs
Biggert-Waters Act	Biggert-Waters Flood Insurance Reform Act of 2012
BLM	Bureau of Land Management
BOEM	Bureau of Ocean Energy Management
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
CNMS	Coordinated Needs Management Strategy
CO-OPS	Center for Operational Products and Services
CRS	Community Rating System
CSC	Coastal Services Center
CSO	Coastal States Organization
CTP	Cooperating Technical Partners
CWN	Clean Water Network
DHS	Department of Homeland Security
DISDI	Defense Installation Spatial Data Infrastructure
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
DOJ	Department of Justice
DOL	Department of Labor
DOS	Department of State
DOT	Department of Transportation
ED	Department of Education
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Ecological Society of America
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency

FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FIFM-TF	Federal Interagency Floodplain Management Task Force
FIMA	Federal Insurance Mitigation Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FSA	Farm Service Agency
FTE	Full-time equivalent
GIS	Geographic Information Systems
GPRA	Government Performance and Results Act
GPRAMA	Government Performance and Results Act Modernization Act
GSA	General Services Administration
GWPC	Ground Water Protection Council
HAZUS	Hazards US-Multi-Hazards
HHS	Department of Health and Human Services
HUD	Department of Housing and Urban Development
IAA	Interagency Agreement
IBC	International Boundary Commission
IBWC	International Boundary and Water Commission
ICWP	Interstate Council on Water Policy
IPA	Intergovernmental Personnel Act
LAMP	Levee Analysis Mapping Procedures
LiDAR	Light Detection and Ranging
LOC	Library of Congress
LWV	League of Women Voters
MOU	Memorandum of Understanding
MSHA	Mine Safety and Health Administration
NACP	National Association of County Planners
NACWA	National Association of Clean Water Agencies
NAFSMA	National Association of Flood and Stormwater Management Agencies
NALMS	North American Lake Management Society
NARA	National Archives and Records Administration
NASA	National Aeronautics and Space Administration
NCAI	National Congress of American Indians
NCASI	National Council for Air and Stream Improvements
NCDC	National Climatic Data Center
NCPC	National Capital Planning Commission
NCSAI	National Council for Air and Stream Improvements
NDEP	National Digital Elevation Program
NFIP	National Flood Insurance Program
NGA	National Geospatial-Intelligence Agency
NGWA	National Ground Water Association
NHD	National Hydrography Dataset
NHWC	National Hydrologic Warning Council
NIH	National Institutes of Health
NIST	National Institute of Standards and Technology
NIWR	National institutes for Water Research

NLD	National Levee Database
NOAA	National Oceanic and Atmospheric Administration
NORTHCOM	United States Northern Command
NOS	National Ocean Service
NPS	National Park Service
NRC	Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NSF	National Science Foundation
NSGIC	National States Geographic Information Council
NTWC	National Tribal Water Council
NVUE	New, Validated, or Updated Engineering
NWS	National Weather Service
OGC	Open Geospatial Consortium
OMB	Office of Management and Budget
ONR	Office of Naval Research
OPM	Office of Personnel Management
OSMRE	Office of Surface Mining and Reclamation Enforcement
Risk MAP	Risk Mapping, Assessment and Planning
SBA	Small Business Administration
SSA	Social Security Administration
TMAC	Technical Mapping Advisory Council
TRES	Department of Treasury
TVA	Tennessee Valley Authority
UCOWR	Universities Council on Water Resources
USACE	US Army Corps of Engineers
USAID	US Agency for International Development
USBR	Bureau of Reclamation
USCB	Census Bureau
USDA	Department of Agriculture
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
USNO	US Naval Oceanography Portal
VA	Department of Veterans Affairs
WEF	Water Environment Federation
WHAFIS	Wave Height Analysis for Flood Insurance Studies
WSWC	Western States Water Council
WUCA	Water Utility Climate Alliance

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EXECUTIVE SUMMARY

Flooding presents the greatest natural threat to life and property to the citizens of the United States, greater even than tornadoes, wildfires, or earthquakes. From 2002-2012, there were 806 fatalities in the United States and the nation incurred over $100 billion in damages[1] from over 400 flood disasters.[2] In 1968, in recognition of flood impacts, Congress created the National Flood Insurance Program (NFIP) to provide federal insurance in the absence of private insurance and to encourage actions to mitigate risk; the Federal Emergency Management Administration (FEMA) is responsible for administering the NFIP.

Flood Insurance Rate Maps (FIRMs) are the official maps of communities on which FEMA has delineated both special flood hazard areas—areas that are subject to floods having a one percent chance of being equaled or exceeded in any given year (the 100-year flood)—and insurance risk premium zones applicable to the community. Producing these maps is complex, requiring extensive data collection, engineering analysis, and coordination among federal agencies, states, and local communities. Their pay-off is clear, though: a 1997 FEMA benefit-cost analysis of its proposed flood mapping program showed a benefit to the taxpayer of over $2 for every $1 invested; the State of North Carolina later used the same analysis methodology as FEMA and calculated a benefit-cost ratio of $2.3 to $1.[3]

In 2009, FEMA expanded its focus through a program called Risk Mapping, Assessment, and Planning (Risk MAP). Risk MAP encompasses the production of FIRMs, but it also requires FEMA to deliver products that increase communities' awareness and understanding of risk with the goal of encouraging mitigation—action that reduces potential damages to life and property.

The Biggert-Waters Flood Insurance Reform Act of 2012 (Biggert-Waters Act) called on FEMA and other agencies to make a number of changes that affect the way the NFIP is operated. It codified many of the efforts begun under Risk MAP and authorized several new initiatives for implementation by FEMA, the Office of Management and Budget (OMB), other federal agencies, and state and local governments, to enhance integration of FEMA's flood mapping.

In order for Risk MAP to be an effective and efficient program it is essential that FEMA work extensively with other federal agencies, as well as with state and local governments. For strategic and policy-related issues, FEMA must work to maximize interagency and intergovernmental engagement to secure broad efficiencies, coalesce around common technical standards, synchronize strategies, and avoid duplication. At an individual project

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[1] National Weather Service. *Hydrologic Information Center-Flood Loss Data*. http://www.nws.noaa.gov/hic/

[2] A disaster declaration is requested by state governors once the combined local, county, and state resources are deemed insufficient and the situation is beyond state recovery capabilities. FEMA then reviews the request and provides the President with a recommended course of action. FEMA Declaration Fact Sheet: http://www.fema.gov/declaration-process-fact-sheet; FEMA Disaster Declarations by Year, http://www.fema.gov/disasters/grid/year?field_disaster_type_term_tid_1=6837&=GO

[3] Association of State Floodplain Managers. *Flood Mapping for the Nation*. March 2013.

level, FEMA must align its approach and coordinate project execution with state and local governments, and with local representatives of federal agencies. With resource constraints facing all levels of government, the need for strategic alignment and integrated planning has arguably never been so important.

In Section 100221 of the Biggert-Waters Act, Congress required FEMA to contract with the National Academy of Public Administration (hereafter, the Academy) to prepare a Report on "how FEMA should improve interagency and intergovernmental coordination on flood mapping, including a funding strategy." In addition, the Academy studied how FEMA "can establish joint funding mechanisms with other federal, state and local governments to share the collection and utilization of data among all governmental users."

This Panel of the Academy finds that, while FEMA has made progress in coordination on flood mapping since the initiation of Risk MAP, it should enhance efforts going forward. Improvements in coordination can be achieved by further leadership attention to strategic goals and their communication; consistent use of employee performance policies and metrics; deployment of more user-friendly web sites; transferring best practices among the ten FEMA regions; and conveying risk information to localities. The Panel's recommendations highlight other areas as well.

The Panel also emphasizes the future role of the Technical Mapping Advisory Council (TMAC), re-established in the Biggert-Waters Act. Since the TMAC is to include federal, state, and local representatives, the Panel urges FEMA to use the TMAC to drive continued improvements in interagency and intergovernmental coordination on flood mapping.

Both the Presidential budget request ($205 million for fiscal year 2013) and the amount appropriated by Congress ($207.5 million for fiscal year 2013) are far short of the $400 million authorized by the Biggert-Waters Act or to address the more than $4.5 billion mapping needs identified by the Association of State Floodplain Managers.[4] The Panel finds that inadequate funding levels have delayed full deployment of the Risk MAP program. In the absence of the authorized funding to support new activities mandated by the Biggert-Waters Act, FEMA will not be able to meet its mission requirements in a timely manner.

The Panel finds that the efficiency and effectiveness of flood mapping efforts and other federal government mapping activities could be advanced by a government-wide strategy in multi-purpose mapping capabilities. This strategy can be used to drive investments. The Panel recommends that OMB work with FEMA and its major partners to use the budget crosscut required by the Biggert-Waters Act to drive more strategic operational and funding coordination. The Panel also urges FEMA to use the TMAC as a platform to drive greater interagency and intergovernmental funding coordination. The Panel posits several recommendations that underscore the importance of implementing projects through joint funding mechanisms that leverages the federal investment.

[4] Association of State Floodplain Managers. Flood Mapping for the Nation. March 1, 2013.

This Report has four chapters:

Chapter 1 presents the Report's purpose, framing, and methodology, and provides context on the NFIP and flood mapping.

Chapter 2 discusses the current state of flood mapping and the nature and importance of interagency and intergovernmental coordination.

Chapter 3 provides findings and recommendations including implementation suggestions for improving FEMA flood mapping coordination.

Chapter 4 provides findings and recommendations on funding strategies to leverage and coordinate budgets and expenditures and joint funding mechanisms to share the cost of collection and utilization of data among all governmental users.

Based on its review, the Panel makes 17 recommendations, which are listed below. These recommendations are accompanied by suggestions for implementation in Chapters 3 and 4.

Improving Interagency and Intergovernmental Coordination on Flood Mapping (Chapter 3)

Recommendation 1: FEMA leadership should continue to facilitate and/or accelerate the full implementation of Risk MAP.

Recommendation 2: FEMA should develop additional guidance and prioritize coordination to help advance Risk MAP goals.

Recommendation 3: FEMA should revise the Risk MAP Balanced Scorecard to reflect all Risk MAP goals.

Recommendation 4: FEMA should consistently apply personnel policies at headquarters and in the regions that foster coordination.

Recommendation 5: FEMA should collect, disseminate, and, as appropriate, institutionalize best practices on coordinating with state and local governments, including utilizing Cooperating Technical Partners and the Community Rating System to enhance state and local engagement.

Recommendation 6: FEMA should assess and prioritize its participation in interagency and intergovernmental coordination bodies in support of Risk MAP to ensure that opportunities are not being missed, appropriate staff are participating, and the appropriate amount of resources are being expended. FEMA should also review the work of interagency and intergovernmental coordination bodies and consider proposing changes to these bodies in support of Risk MAP objectives.

Recommendation 7: FEMA should identify interagency and intergovernmental partnerships that would benefit from formalizing a well-defined opportunity for coordination.

Recommendation 8: FEMA should continue to explore and develop shared technologies to facilitate interagency coordination and avoid duplication of effort.

Recommendation 9: FEMA should coordinate with other federal, state, and local agencies to leverage their unique experience and competencies to improve Risk MAP products and services and to understand how they could more broadly support other agencies' missions.

Recommendation 10: FEMA should improve its websites to achieve the goal of providing an enhanced digital platform that improves management of Risk MAP, 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. FEMA should also consider a single portal for entry to FEMA flood hazard and risk information.

Recommendation 11: FEMA should reinforce the importance of non-regulatory products as a means to precipitate community action to reduce flood risk.

Recommendation 12: FEMA should use the Technical Mapping Advisory Council to drive continued improvements in interagency and intergovernmental coordination.

<u>Improving Interagency and Intergovernmental Coordination on Funding (Chapter 4)</u>

Recommendation 13: The Office of Management and Budget should work with, the core group of federal agencies that have flood mapping-related mission responsibilities to develop a government-wide strategy for advancing multi-purpose mapping capabilities that will increase the efficiency and effectiveness of flood mapping, among other benefits. This strategy should be used to guide investments.

Recommendation 14: The Office of Management and Budget, in consultation with FEMA and its partner agencies, should work to refine the initial budget crosscut so it can be used to identify and communicate opportunities for improved funding coordination. The budget crosscut should be informed by the government-wide strategy.

Recommendation 15: The Office of Management and Budget should use the 3DEP implementation plan for nationwide elevation data collection to guide the development of the President's annual budget request.

Recommendation 16: FEMA leadership should work in coordination with its partner agencies to lay the groundwork for leveraging the re-established Technical Mapping Advisory Council to help identify and prioritize opportunities for improved funding coordination.

Recommendation 17: FEMA should systematically explore and evaluate with state, local, and federal stakeholders alternative joint funding mechanisms to further enhance efficiencies and identify innovative options with respect to sharing the cost of the collection and utilization of data.

By adopting the Academy's recommendations, FEMA and OMB can improve interagency and intergovernmental coordination on flood mapping and its funding. FEMA also has the opportunity, through the Biggert-Waters Act, to exercise a strong, strategic leadership role through its participation in the TMAC as well as other interagency and intergovernmental coordinating entities. OMB can use the congressionally mandated budget crosscut to improve interagency coordination to increase the efficiency and effectiveness of federal resources. By adopting this Report's recommendations, and by leveraging its experience over several decades, FEMA, working with OMB, can realize enhanced mission success in its critical service to the American people.

CHAPTER ONE: BACKGROUND

The current interest in improving flood mapping is both propitious and vital. Flooding is the most frequent severe weather threat and the costliest natural disaster facing the nation. Ninety percent of all natural disasters in the United States involve flooding. From 2002-2012, there were 806 fatalities in the United States and the country incurred over $100 billion in damages[5] from over 400 flood disaster declarations.[6] Flooding does not only occur in high-risk areas. About 25 percent of residential and commercial flood insurance claims come from areas deemed to have moderate-to-low risk.[7]

Flooding[8] is caused by a host of factors, including heavy rains, rapid spring thaws, hurricanes and tropical storms, failure of levees or dams, and flash floods. Furthermore, some research indicates that the frequency of flooding in the United States has been increasing during the past several decades. According to a 2013 report, by the year 2100, areas subject to a 100-year flood are projected to increase on average by 40 to 45 percent.[9] To help address these realities, mapping floodplains creates broad-based awareness of flood risk, provides necessary data for mitigation programs, and supports floodplain decision-making.[10]

The Federal Emergency Management Agency's (FEMA) flood mapping program identifies areas at risk for flooding in order to help communities make development decisions and take mitigation actions. The program also provides the basis for flood insurance rates. By encouraging and supporting mitigation and floodplain management efforts the National Flood Insurance Program[11] (NFIP) is estimated to save the nation $1.6 billion annually[12] and is known as "the largest civilian thematic mapping program in the world."[13]

This National Academy of Public Administration (hereafter, the Academy) Panel Report (hereafter, Report) examines FEMA's coordination with local, state, and federal agencies in flood mapping activities and program funding. In light of the gravity of this topic, the Panel acknowledges both the importance of their research, and the degree of complexity inherent

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[5] National Weather Service. *Hydrologic Information Center-Flood Loss Data*. http://www.nws.noaa.gov/hic/

[6] A disaster declaration is requested by state governors once the combined local, county, and state resources are deemed insufficient and the situation is beyond state recovery capabilities. FEMA then reviews the request and provides the President with a recommended course of action. FEMA Declaration Fact Sheet: http://www.fema.gov/declaration-process-fact-sheet; FEMA Disaster Declarations by Year, http://www.fema.gov/disasters/grid/year?field_disaster_type_term_tid_1=6837&=GO

[7] FEMA Fact Sheet found at https://www.fbiic.gov/public/2010/mar/FloodingHistoryandCausesFS.PDF.

[8] A definition of flood mapping-related terms is found in Appendix C.

[9] AECOM. *The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100.* June 2013.

[10] North Carolina CTP: FEMA's Cooperating Technical State. *Strategies and Tools for Floodplain Management.* http://www.ncfloodmaps.com/pubdocs/strategies_tools_fpmgmt.pdf.

[11] P.L. 90-448.

[12] Written Testimony of W. Craig Fugate, FEMA Administrator, to the US Senate Committee on Banking, Housing, and Urban Affairs. September 18, 2013.

[13] Federal Emergency Management Agency. *Risk MAP Multi-Year Plan: Fiscal Year 2009 Report to Congress*. March 16, 2009.

in the course of executing it. Coordination with respect to flood mapping as a whole and concomitant funding of this work are essential to success, especially given that many agencies and other governmental entities have missions that intersect with FEMA's flood mapping efforts, and resource constraints remain challenging. It is the Panel's intent that the findings and recommendations of this Report contribute to FEMA's continued focused efforts in achieving its flood mapping goals by identifying areas for improvement in interagency and intergovernmental coordination.

This chapter reviews the genesis of this study, provides an overview of the NFIP, and discusses the Academy's study approach, including how the term "coordination" is used throughout this Report.

1.1 The Biggert-Waters Act of 2012, Section 100221

In July 2012, the United States Congress passed the Biggert-Waters Flood Insurance Reform Act of 2012 (Biggert-Waters Act)[14] that called on FEMA, and other agencies, to make a number of changes that affect the way the NFIP is run. Key provisions of the legislation require the NFIP to raise rates to reflect true flood risk, make the program more financially stable, change how Flood Insurance Rate Map (FIRM) updates impact policyholders, and establish a National Flood Mapping Program.

Due to the risks and losses flooding causes, and the complexity of the mission to provide up-to-date flood mapping across the country, Section 100221 of the Biggert-Waters Act requires FEMA to contract with the Academy to conduct a study on how FEMA, "(1) should improve interagency and intergovernmental coordination on flood mapping, including a funding strategy to leverage and coordinate budgets and expenditures; and (2) can establish joint funding mechanisms with other Federal agencies and units of state and local government to share the collection and utilization of data among all governmental users."[15]

The Academy's work authorized by Congress in Section 100221 is not a new idea; rather, it has its origin in 2007. The wording of this section is virtually identical to that which appeared in the National Flood Mapping Act of 2007.[16] While not passed during that Congress, it was inserted into the Biggert-Waters Act of 2012 five years later. Since the provision was first considered, our research indicates that FEMA has improved quality and focus on coordination. That said, there is interest in Congress that further progress be achieved, resulting in even greater opportunities for better flood mapping outcomes and potential cost efficiencies.

In keeping with the Congress's request, this project seeks to answer the following question:

[14] P.L. 112-141.
[15] See Appendix E for the legislative language.
[16] S. 1938.

Is the current interagency and intergovernmental[17] process for production and dissemination of flood maps in support of a national effort to create a risk-informed society and a functional NFIP being effectively coordinated and resourced and, if not, how might the coordination and resourcing process be improved?

With this question in mind, the Report describes the current state of FEMA's coordination on flood mapping and the funding of this activity, and a set of recommended actions it might take that could lead to improvements in interagency and intergovernmental coordination. FEMA's Risk Mapping, Assessment, and Planning (Risk MAP) program vision and goals provide the Panel with a framework to evaluate FEMA's interagency and intergovernmental coordination. Thus, this Report's focus is placed on leadership, organizational, and policy-related issues that may contribute to coordination in flood mapping in the framework of Risk MAP.

The Panel notes that the Report is not scoped to address the technical quality of flood maps circulated by FEMA. While this is an important issue, the Panel recognizes that there are a number of recent reports on technical flood mapping issues[18] as well as on-going studies mandated by the Biggert-Waters Act.[19]

1.2 Coordination as a Concept

Flood mapping and flood risk mitigation more broadly are complex policy problems that neither can nor should be addressed by a single agency. Constrained resources do not allow it. It would not be efficient in any case as relevant authorities and capabilities are spread across multiple agencies. Coordination offers a variety of important benefits, such as improved policy making, cost-sharing, avoiding unnecessary duplication, access to a broader range of capabilities, and simplifying government for citizens and business.

Given limited resources and the high transaction costs[20] associated with coordination (building trust, establishing processes and procedures, attending meetings, conducting project work, and monitoring and evaluating results),[21] FEMA should be strategic in its use of coordination.

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[17] Intergovernmental is meant to include interactions among and between federal and state and local governments.

[18] These include three reports by the National Research Council: *Levees and the National Flood Insurance Program: Improving Policies and Practices* (2013)*; Dam and Levee Safety and Community Resilience: A Vision for Future Practice* (2012); *Mapping the Zone: Improving Flood Map Accuracy* (2009).

[19] These include a study of pre-FIRM structures and options for eliminating subsidies to these structures, directed in Section 100231(c); and a study on residual risk areas and best practices for managing flood risks in these areas, directed in Section 100231(e).

[20] Fountain, Jane. *Implementing Cross-Agency Collaboration: A Guide for Federal Managers*. IBM Center for the Business of Government. 2013.

[21] Government Accountability Office. *Managing for Results: Key Considerations for Implementing Collaborative Mechanisms*. September 2012.

As Section 100221 of the Biggert-Waters Act does not define the term "coordination," the study team consulted relevant experts and literature on the general concept of coordination. After review, it seems clear that there is no agreement within government or academia on a widely accepted definition or description of interagency and intergovernmental coordination.

The level at which a linkage between two or more parties occurs may vary across a continuum. At a simple level, it may occur as basic information exchange that might be described as "communication." Sharing ideas between parties can be deemed as "cooperation," and is a next step with respect to a relationship's complexity. "Coordination" can be considered as joint work on a particular project. "Collaboration" is more complex, and requires elements such as commitment and exchange of resources and goal sharing. Further down the continuum, where stronger linkages exist among members, reduction of one member's involvement can often cause detrimental changes in the partnership.

It is difficult to examine coordination of complex policy problems involving multiple federal, state, and local partners with diverse mission requirements. Still, it is possible to assess coordination by considering such things as planning and operational guidance documentation, and carefully considering a wide range of input from FEMA and its partners in light of the conditions under which coordination must be performed. Findings have been developed with due consideration of constraints and recommendations reflect an appreciation of FEMA's need for discretion in a complex and changing operational environment.

1.3 Overview of the National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a federal program created by Congress to identify at-risk flood areas across the nation, minimize the impact of flooding, and provide flood insurance for property owners to financially protect themselves from floods associated with extreme weather in the United States.[22] The demands of this mandate grow every year as America's population grows and development continues, thereby increasing flood risk. The federal government provides financial backing of this program due to the high-risk nature of flooding. Private insurers are reluctant to offer flood coverage because of the potential for catastrophic loss and the inability to calculate appropriate actuarial rates. The NFIP allows for flood insurance to be purchased from the federal government while communicating risk and raising flood awareness.[23]

Managed by the Federal Insurance Mitigation Administration (FIMA), an agency within FEMA, NFIP is a coordinated program by design, with communities and the federal government sharing responsibilities. According to FEMA, each participating state is encouraged to have an NFIP Coordinator.

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[22] Congressional Research Service. *National Flood Insurance Program: Background, Challenges, and Financial Status.* March 4, 2011.

[23] National Research Council. *Levees and the National Flood Insurance Program, Improving Policies and Practices.* 2013.

The 22,000 voluntarily participating NFIP communities and their property owners qualify for federal insurance by agreeing to enforce and carry out "sound floodplain management standards," which attempt to reduce damage from future flooding.[24] Within NFIP, an additional voluntary program, the Community Rating System, exists to incent those communities which exceed the minimum floodplain management standards by providing discounts on flood insurance that range from 5 percent to 45 percent.[25]

Role of NFIP in FEMA's Organizational Structure

FEMA has ten regions throughout the United States and its territories.[26] Organized geographically, each regional office oversees flood mapping operations carried out by contractors and Cooperating Technical Partners (CTPs);[27] serves as the liaison for states, communities, and their emergency managers within its jurisdiction; and advises FEMA headquarters on matters affecting or impacting their region.[28] FEMA headquarters coordinates national level initiatives, overarching priorities, budget planning, and provides guidance to the regions on conducting operations. Headquarters relies on each of these regions as its local connection to the public around the country.

The relationship between FEMA headquarters and its regions is bridged by the Office of Regional Operations, which ensures that FEMA policies and programs are implemented in a consistent manner with the agency's goals. In order to implement these goals, the importance of having a local connection is clear: local leadership is best-suited to research, understand, and adjust mitigation plans.

The NFIP develops Flood Insurance Rate Maps (FIRMs) that identify the special flood hazard areas and the insurance risk premium zones applicable to the community. The special flood hazard area is, "the land in the flood plain within a community subject to a one-percent or greater chance of flooding in any given year."[29] The one-percent annual chance flood is the NFIP standard for regulating new development in the floodplain and determining where mandatory flood insurance coverage is required. FIRMs are produced through a complicated mapping process managed by FEMA's Regional Offices that can last several years. The creation of FIRMs involves considerable coordination with local, state, and federal government agencies, as well as the general public. FIRMs support NFIP and serve as an essential mitigation tool by helping floodplain managers communicate statutory requirements related to development in or around a floodplain.[30] All residential

[24] About the National Flood Insurance Program, http://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp.

[25] National Flood Insurance Program Community Rating System, http://www.fema.gov/national-flood-insurance-program-community-rating-system.

[26] See Appendix D for FEMA Regional Map.

[27] CTPs are state, local, and regional agencies and tribes that enter into a formal partnership with FEMA to carry out various aspects of Risk MAP. Some CTP's are responsible for managing flood mapping contractors.

[28] FEMA Regional Operations, http://www.fema.gov/regional-operations.

[29] 44 CFR 59.1

[30] Government Accountability Office. *Flood Map Modernization: Program Strategy Shows Promise, but Challenges Remain*. March 2004.

and business owners are required to buy flood insurance in order to qualify for federally-regulated mortgages in special flood hazard areas.

1.4 Approach and Methodology

The Academy convened a five-member Panel of Academy Fellows to review FEMA's interagency and intergovernmental coordination on flood mapping activities and make recommendations to Congress and FEMA. Members of the Panel were chosen based on their expertise and experience regarding FEMA's organization, interagency and intergovernmental coordination, budget, and/or flood mapping activities. Together they have experience as senior executives, academics, and advisors to federal, state, and local governments. The Panel received research and analytical support from the professional study team. Appendix A contains information on the Panel members and the study team.

The Panel met three times over the course of the six-month assessment to approve the study work plan; define areas of research; approve preliminary observations; and develop formal findings and recommendations included in this Report.

The study team conducted interviews with a wide variety of stakeholders. The Panel and study team interviewed or met with nearly 150 individuals over the course of this assessment. All interviews were conducted on a not-for-attribution basis. See Appendix B for a list of these participants.

Documents reviewed included congressional testimony and public law; FEMA and FIMA strategic documents, including reports to Congress on Risk MAP; Government Accountability Office reports; National Research Council reports; FEMA budgets, data, and guidance documents; contractor reports; academic reports; and other secondary sources of information. See Appendix J for a list of information sources.

CHAPTER TWO: OVERVIEW OF CURRENT FLOOD MAPPING COORDINATION

Coordination is the key to the creation of FEMA's flood maps: federal, state, and local agencies, contractors, and scientific communities sharing information, expertise, and labor makes this process possible. As the lead in the creation of FIRMs, FEMA currently coordinates with these agencies across the nation, working to leverage flood data, models, and community information from each of the sources rather than performing those functions in-house.

This chapter outlines how FEMA's mission, with respect to flood mapping and risk mitigation, has changed in recent years; explains different levels of coordination important to the agency's work; and describes how divergent features of inland and coastal flood hazards shape effective coordination.

2.1 FEMA'S SHIFT TO RISK MAP

In October 1987, NFIP became self-supporting by collecting enough money from premiums to cover the average historical loss year for the first time since its creation. Congress would no longer support administrative costs associated with NFIP, including the costs of administrative expenses, surveys, and studies.[31] Throughout the 1990s, NFIP flood maps were supported with funding from insurance premiums. Because it had limited resources, FEMA was unable to update and maintain NFIP flood maps and to begin to provide maps in digital format.[32] Of the 3.5 million miles of rivers and coast, FEMA had mapped approximately one million miles as of 2003, often at quality levels that did not meet the standards of the NFIP in place in 2009. [33]

Map Modernization

By the end of the 1990s, it became clear that without significant investment, the usefulness of NFIP's flood maps would continue to degrade, leaving communities with unknown flood risk and NFIP without the tools necessary to set accurate insurance premiums. Based on the recommendations of the Government Accountability Office and the first Technical Mapping Advisory Council,[34] FEMA developed a program called Map Modernization in order to create a digital flood data layer for use by the nation using Geographic Information Systems (GIS) technology.[35] In order to fully implement the agency's plans for Map Modernization, FEMA estimated that it would take five years and a $1 billion budget.[36] The

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[31] American Institutes for Research. *A Chronology of Major Events Affecting the National Flood Insurance Program*. October 2002.

[32] Prior to Map Modernization, of the nation's approximately 92,222 flood maps, 54 percent were over 15 years old and 70 percent were over 10 years old. Government Accountability Office. *Flood Map Modernization: Program Strategy Shows Promise, but Challenges Remain*. March 2004.

[33] National Research Council. *Mapping the Zone*. 2009.

[34] Technical Mapping Advisory Council. *Final Report to the Honorable James Lee Witt: A Summary of Accomplishments and Recommendations*. 2000.

[35] Federal Emergency Management Agency. *Flood Map Modernization Mid-Course Adjustment.* March 30, 2006.

[36] A more detailed description of Map Modernization can be found in the National Resource Council report *Mapping the Zone* (2009).

President requested and Congress appropriated money for FEMA to implement Map Modernization starting in 2003.[37] In total, FEMA spent $1.2 billion on Map Modernization, which was funded from 2003 to 2008 with implementation extending until 2011.[38]

Table 1: Vision and Goals of Map Modernization[39]

Vision	To provide a technology-based, cost-effective, long-term process for updating, maintaining, storing, and distributing the flood risk information portrayed on the flood maps.
Objective 1	To establish and maintain a premier data collection and delivery system.
Objective 2	To expand outreach and better inform the user community.
Objective 3	To build and maintain mutually beneficial partnerships.
Objective 4	To achieve effective program management.

As FEMA implemented Map Modernization, the public and Congress became increasingly concerned about the agency's focus on digitizing flood maps, rather than focusing on the quality of the digital maps produced.[40] In response to these concerns, FEMA issued a report to Congress that modified the objectives of Map Modernization and proposed to focus on producing digital maps with new, updated, or validated engineering analyses.[41] FEMA's focus shifted from providing a modernized digital layer to evaluating the map's engineering and making sure that it was up-to-date.[42]

The Expanded Vision and Goals of Risk MAP

In 2009, FEMA announced a new approach to carrying out the NFIP mission: Risk Mapping, Assessment, and Planning (Risk MAP).[43] The five new goals of Risk MAP, presented in Table

[37] Federal Emergency Management Agency. *FY10 Flood Mapping Progress Report and Production Plan: Flood Map Modernization and Risk Mapping, Assessment, and Planning.* July 2010.
[38] Due to the three to five year project timeframe, studies initiated during Map Modernization continued to be implemented until 2011. Federal Emergency Management Agency. *FY10 Flood Mapping Progress Report and Production Plan: Flood Map Modernization and Risk Mapping, Assessment, and Planning.* July 2010.
[39] Government Accountability Office. *Flood Map Modernization: Program Strategy Shows Promise, but Challenges Remain*. March 2004. Federal Emergency Management Agency. *Flood Map Modernization Mid-Course Adjustment*. March 30, 2006.
[40] Federal Emergency Management Agency. *Flood Map Modernization Mid-Course Adjustment.* March 30, 2006.
[41] Ibid.
[42] Ibid.
[43] Federal Emergency Management Agency. *Risk MAP Multi-Year Plan: Fiscal Year 2009 Report to Congress.* March 16, 2009.

2 below, represented a significant strategic shift of FEMA's flood mapping activities beyond its traditional focus on the production of FIRMs.[44] Its intent was to minimize flood-related losses. However, achieving these goals entails increased intergovernmental and interagency coordination at a time of declining resources and increased funding uncertainty.

Table 2: Vision and Goals of Risk MAP[45]

Vision	To deliver quality data that increase public awareness and lead to action that reduces risk to life and property.
Goal 1	Address gaps in flood hazard data to form a solid foundation for flood risk assessments, floodplain management, and actuarial soundness of 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.

While Map Modernization focused on digitizing and updating FEMA's flood map inventory, Risk MAP takes a broader view of the NFIP's mission. This change in approach is reflected in modifications to the flood mapping project process. During Map Modernization, engagement with communities was more limited and occurred primarily at the very beginning and toward the very end of flood mapping projects, with lower priority given to coordination or communication in between. Since the adoption of Risk MAP, FEMA has sought to improve engagement with state, local, and regional stakeholders by engaging them earlier in the process, more frequently, and in a more collaborative way. FEMA has reoriented existing stakeholder meetings and increased the number of required or recommended meetings. FEMA projects now place greater emphasis on risk communication and stimulating community mitigation efforts than they did prior to Risk MAP.[46] As a result, the range of stakeholders engaged has expanded accordingly. Section 2.3 (page 27) provides an overview of the Risk MAP project process.

In keeping with its greater emphasis on communicating risk and stimulating risk mitigation efforts by communities, FEMA has expanded and enhanced its coordination with other

[44] Risk MAP projects include regulatory products such as FIRMs, as well as non-regulatory products.
[45] Federal Emergency Management Agency. *Risk MAP: Fiscal Year 2011 Report to Congress.* March 15, 2011.
[46] Federal Emergency Management Agency. *Risk MAP Multi-Year Plan: Fiscal Year 2009 Report to Congress.* March 16, 2009; Association of State Floodplain Managers. *Flood Mapping for the Nation*. March 1, 2013.

federal, state, and local partners to leverage resources needed for outreach and the development of new and more useful products. FEMA is in the process of rethinking its approach to its traditional regulatory products: FIRMs and Flood Insurance Study reports. FEMA anticipates that it will take advantage of advances in geospatial technology to provide location-specific hazard information to users rather than requiring them to find that information by reading a map.[47] In addition to FIRMs, FEMA is working with communities and other agencies to develop non-regulatory products such as depth grids, risk assessments, articulating changes since the last map, and areas of mitigation interest. These non-regulatory products are not used in determining NFIP's insurance premiums, but rather to assist in communicating risk to communities and enabling them to mitigate risk more effectively. Other important policy issues currently being considered by FEMA include: what will be included in future regulatory products; what non-regulatory products will be provided; and how investment funds will be allocated.

A discussion of the implications of FEMA's implementation of Risk MAP can be found in Section 3.1 (page 41) of this Report.

The Biggert-Waters Flood Insurance Reform Act of 2012

The Biggert-Waters Act addressed two overarching issues: (1) ensuring the stability of the NFIP by reauthorizing the program until 2017, and (2) establishing additional provisions that strengthen the NFIP's ability to develop accurate flood maps that are used to set insurance premiums and prompt mitigation.[48]

Some of the changes to the NFIP included in the Biggert-Waters Act reinforce the changes already implemented through Risk MAP and others substantially expand the requirements for mapping. This poses additional challenges to interagency and intergovernmental coordination going forward. The following are the sections discussed in this Report.[49]

- Section 100215 re-establishes the Technical Mapping Advisory Council (TMAC).
- Section 100216 establishes an on-going National Flood Mapping Program required to show the 100-year and 500-year flood zones and incorporate residual risk around levees, dams and other flood protection structures. FEMA is directed to use the most accurate elevation data for producing the flood maps. This section also directs the agency to set flood mapping standards, increase communication and outreach to communities, and authorizes $400,000,000 in appropriations from 2013 to 2017.
- Section 100218 formalizes the Scientific Resolution Panel to address situations when a FIRM has been appealed based on scientific or technical data and the appeal has been denied by FEMA.

[47] Federal Emergency Management Agency. *Risk MAP Fiscal Year 2012 Report to Congress*. February 23, 2012.
[48] Congressional Research Service. *The National Flood Insurance Program: Status and Remaining Issues for Congress*. February 6, 2013.
[49] Complete text of these sections can be found in Appendix E.

- Section 100220 requires the Office of Management and Budget to create a budget crosscut on federal agencies' flood risk determination and geospatial activities. This cross-cut is to be conducted in conjunction with the FEMA Administrator and the heads of other federal agencies and departments responsible for carrying out activities under Sections 100215 and 100216.
- Section 100226 directs FEMA and the US Army Corps of Engineers to better coordinate their levee accreditation processes by establishing the Flood Protection Structure Accreditation Task Force. FEMA and the US Army Corps of Engineers are to report to Congress on how both agencies plan to better align their processes, and levee data sharing.

Declining Budgets

Total funding for Risk MAP has dropped significantly each year since fiscal year 2010, declining from $324.7 million to $207.5 million in fiscal year 2013. This reflects significant declines in appropriations (consistent with the President's budget requests), while appropriated fee income from flood insurance premiums has remained relatively stable after more than doubling in 2009 (annual budget and appropriation figures are provided in Table 3 and graphed in Figure 1 below). The Biggert-Waters Act authorized $400 million for each of fiscal years 2013 through 2017 for the national flood mapping program.[50] This is double the amounts requested and appropriated in the last several fiscal years, indicating that Congress recognized that level funding was not sufficient to meet the program requirements included in the Biggert-Waters Act. While some program expenditures are covered by the insurance premiums, increasing the authorization also indicates that Congress found that it is in the national interest to support these activities through additional appropriated funds.

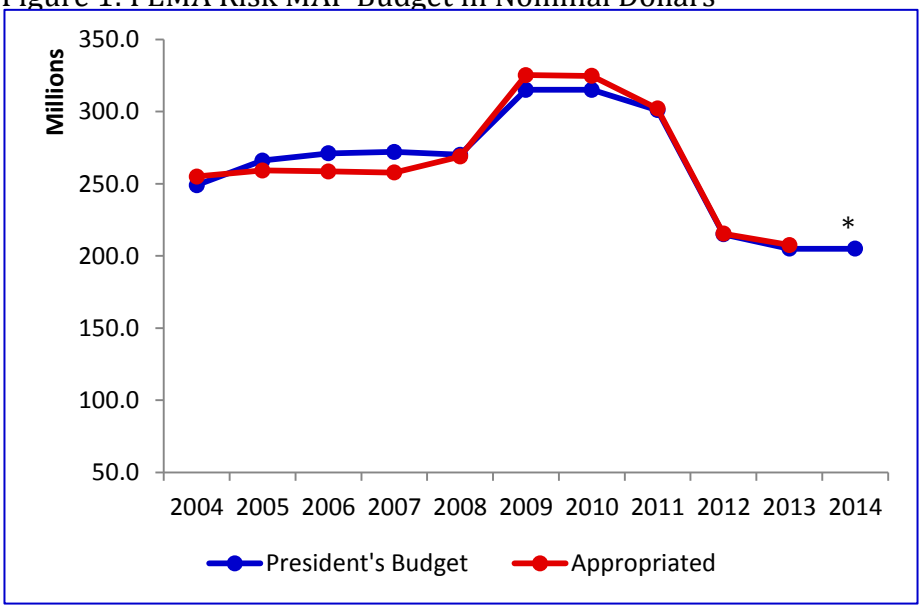
[50] P.L. 112-141, Section 100216(f).

Table 3: FEMA Risk MAP Budget in Nominal Dollars (in millions)

FY	President's Budget			Appropriated		
	Fees	Approps	Total	Fees	Approps	Total
2004	$50.0	$199.0	$249.0	$55.9	$199.0	$254.9
2005	$66.0	$200.0	$266.0	$59.8	$199.4	$259.2
2006	$64.0	$207.0	$271.0	$60.6	$198.0	$258.6
2007	$70.0	$202.0	$272.0	$58.7	$198.9	$257.7
2008	$46.0	$224.0	$270.0	$48.9	$219.9	$268.8
2009	$95.0	$220.0	$315.0	$105.3	$219.9	$325.2
2010	$95.0	$220.0	$315.0	$104.7	$220.0	$324.7
2011	$117.0	$184.0	$301.0	$116.9	$185.1	$302.1
2012	$117.0	$98.0	$215.0	$117.7	$97.7	$215.4
2013	$116.0	$89.0	$205.0	$117.3	$90.2	$207.5
2014	$120.6	$84.4	$205.0	*	*	*

* Appropriations have not been approved for fiscal year 2014.

Figure 1: FEMA Risk MAP Budget in Nominal Dollars



* Appropriations have not been approved for fiscal year 2014.

2.2 Strategic Level Coordination Groups Related to Flood Mapping

FEMA engages in interagency and intergovernmental coordination at both the strategic and the operational levels. Coordination at the strategic level occurs to align policies; develop and agree to common standards; and share information regarding the agencies' activities. Operational coordination occurs to align FEMA mapping activities with those of other agencies, states, and localities.

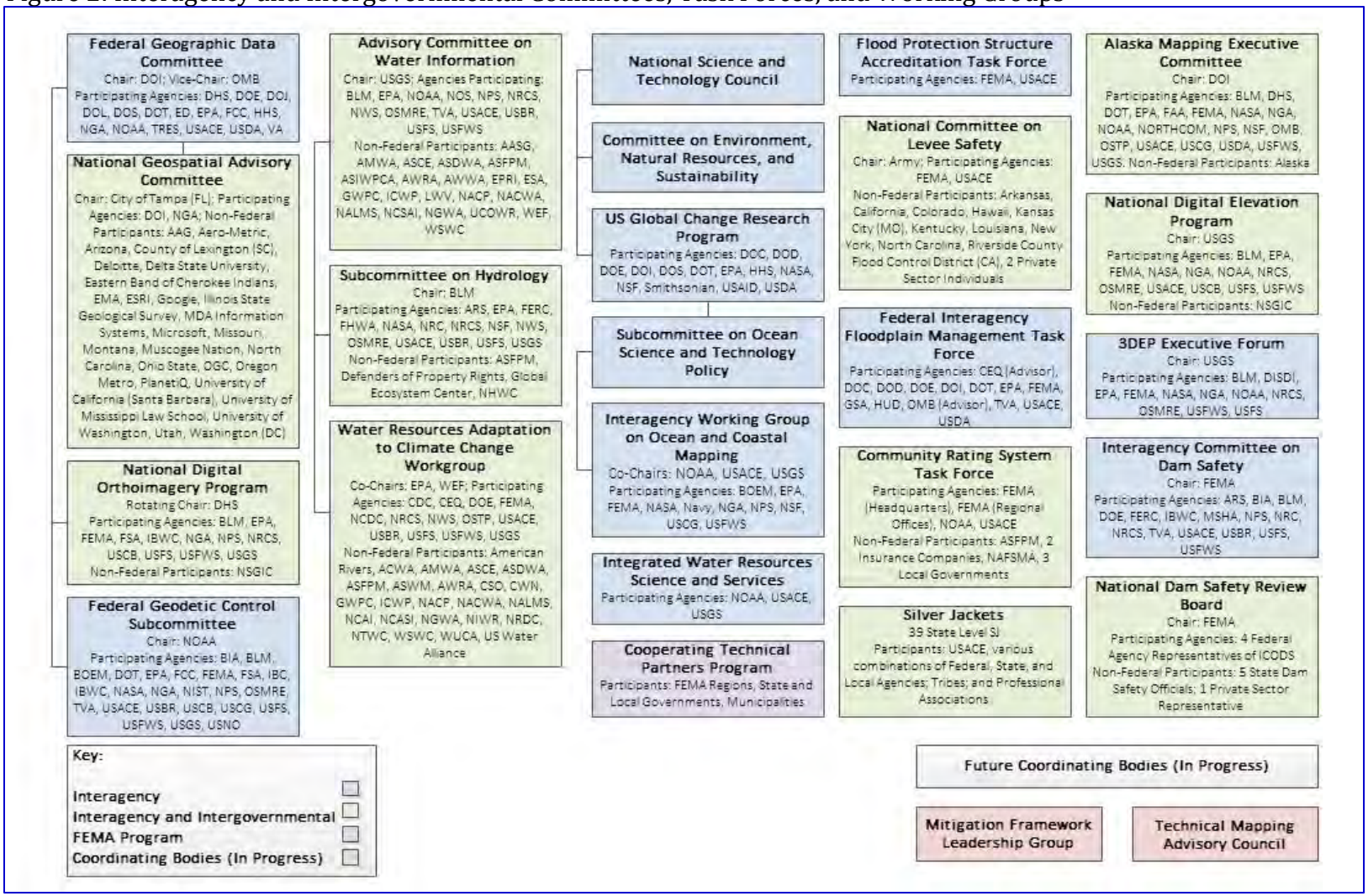
There are a number of methods FEMA's leadership can use to engage in strategic level coordination, including working with interagency and intergovernmental coordination groups. The study team has identified 20 interagency and intergovernmental coordination groups related to FEMA's flood mapping activities. They include participants from over 40 federal agencies and departments, state and local governments, private sector contractors, professional associations, and academia (see Figure 2 below). These groups, to varying degrees, are responsible for a variety of flood mapping-related activities, including developing policies, setting standards, as well as providing advice and recommendations.

There are many related coordinating entities that exist within the federal government, but there is currently no single entity that has a mission focused solely on flood mapping activities. It is expected that coordination will be enhanced by the re-establishment of the TMAC as it will focus a wide range of activities associated with flood mapping. See Section 3.5 (page 67) for additional discussion about TMAC.

Flood mapping is used to support the activities conducted by members of the Federal Interagency Floodplain Management Task Force (FIFM-TF), which is responsible for coordinating and developing a "unified national program for floodplain management" among the different agencies involved with water resources management.[51] While the FIFM-TF does include flood mapping as one of its work plan tasks, its mission and subsequent recommendations have a much broader focus. For additional discussion of the FIFM-TF, see Section 3.3 (page 52).

[51] Federal Interagency Floodplain Management Task Force Fact Sheet, http://www.fema.gov/media-library/assets/documents/21828?id=4707.

Figure 2: Interagency and Intergovernmental Committees, Task Forces, and Working Groups



2.3 Operational Coordination During the Risk MAP Project Process

Operational coordination between FEMA and its federal, state, and local partners should be considered in terms of the Risk MAP project process. This section summarizes current FEMA guidance to "project teams" on engaging local, state, and federal partners throughout the life cycle of Risk MAP projects. Project teams include FEMA regional office staff, contractors, and Cooperating Technical Partners (CTPs). While contractors will coordinate with other stakeholders, it is often at the direction of FEMA regional staff. Community engagement is carried out by FEMA regional staff or CTPs; contractors provide logistical and technical support for meetings, but FEMA regional staff members are the "face" of Risk MAP in the communities.

Risk MAP projects may include: (1) flood hazard mapping, such as revising FIRMs and Flood Insurance Study (FIS) reports; (2) flood risk assessments in areas with updated engineering analysis; and/or (3) mitigation planning technical assistance.[52]

Since the adoption of Risk MAP, FEMA has made significant changes in its approach to flood mapping projects, including changes in scope, focus, and stakeholder engagement. To ensure a more holistic understanding of flooding issues, risks, and mitigation, FEMA now undertakes all projects at the watershed level (except projects in coastal areas). FEMA guidance to Risk MAP project teams places greater emphasis on risk communication and mitigation, including the development of non-regulatory products.

In addition to engaging the greater number of stakeholders involved at the watershed level, FEMA has expanded the range of stakeholders engaged, reflecting in part its increased focus on risk communication and mitigation. FEMA has also sought to improve engagement with state, local, and regional stakeholders in a number of ways—engaging them earlier in the process, more frequently, and in a more collaborative way. FEMA has reoriented existing stakeholder meetings, increased the number of required meetings, and its guidance strongly recommends another meeting early in the process in cases where identified flood hazards significantly increase flood risk.

The Risk MAP project process has seven phases, assuming the project includes the development of regulatory products (FIRMs and FIS reports).

1. Planning and Budgeting
2. Discovery
3. Data Development and Sharing
4. Risk Awareness and Mitigation Outreach
5. Proposed NFIP Map Changes and Impacts

[52] This summary is based primarily on information provided in the following FEMA guidance documents: *Risk MAP Meeting Guidance*, Operating Guidance No. 04-11 (June 30, 2011); *Guidelines and Standards for Flood Risk Analysis and Mapping, Appendix I: Discovery* (June 2, 2011); *Geospatial Data Coordination Implementation Guide*, *Version 3* (January 2011). Additional information on the process is drawn from interviews with FEMA officials.

6. Preliminary NFIP Map Release and Mitigation Planning
7. Due Process and Path Forward

Figure 3 below provides a graphic representing the project phases, associated timeframes, required and recommended stakeholder meetings, and project phases.

The first step in the process is the Planning and Budgeting phase. This is when FEMA regions coordinate with state-level stakeholders and gather data and information required to prioritize watersheds for review and develop budget estimates. NFIP Coordinators and State Hazard Mitigation Officers are key partners for helping identify watershed stakeholders to engage in the Discovery phase, which is the second step in the process.

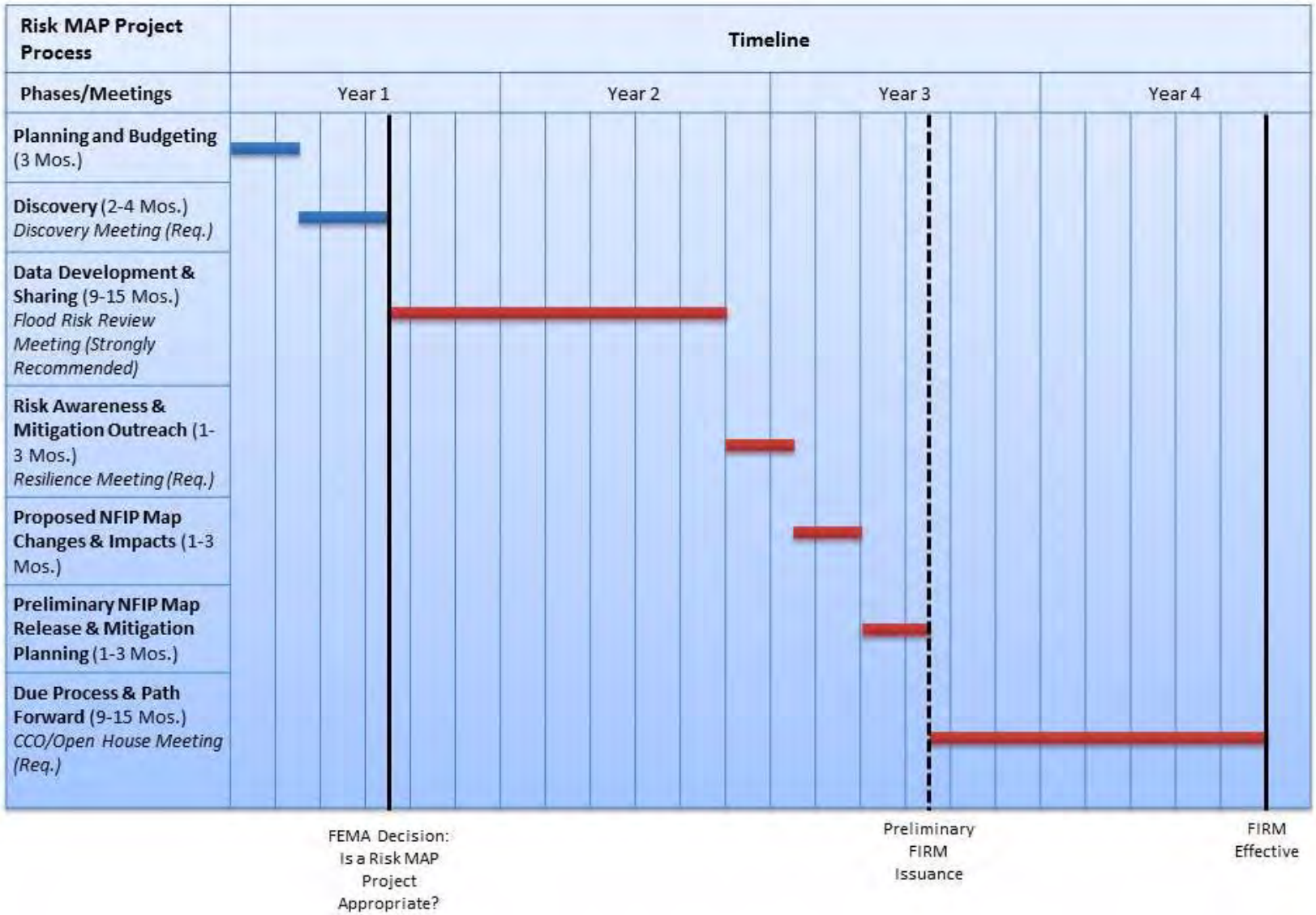
FEMA places special emphasis on the Discovery phase of the project process. This phase is considered critical to the success of a mapping project in terms of building relationships with key watershed stakeholders as well as gathering information and data needed to understand flooding issues, risk, and mitigation. After an initial analysis, a Discovery meeting is held with stakeholders to determine what the scope of the Risk Map project will be.

In the case of projects in coastal areas, stakeholder coordination during the Discovery phase is organized differently. Given that the storm surge studies required for coastal projects may take several years, the Discovery meeting is not held until after the initial storm surge study has been completed. This ensures that Discovery efforts occur closer to the actual start of the flood risk project. Still, stakeholder contact must be initiated before a storm surge study is begun and continued throughout the study period.

The next two project phases—Data Development and Sharing, followed by Risk Awareness and Outreach—focus on risk and the development of non-regulatory products (e.g., Flood Depth and Analysis Grids, Flood Risk Assessment Data, Flood Risk Report, and other enhanced data sets as defined by project scope).

The development of regulatory and non-regulatory products begins during the Data Development and Sharing phase. In cases where identified flood hazards significantly increase flood risk, FEMA strongly recommends in its guidance that the project team hold an additional meeting—the Flood Risk Review Meeting. This meeting brings together technically-oriented stakeholders to discuss risk, review draft non-regulatory products, and gather information needed to focus engagement with a broader set of watershed stakeholders at the Resilience Meeting. The Resilience Meeting is the second required meeting and is held during the Risk Awareness and Outreach phase. This meeting focuses

Figure 3: Risk MAP Project Process



on understanding risk and developing strategies for risk communication and mitigation, including the development of a community outreach plan.

If the project includes regulatory products, it will continue through three final phases. The first of these three final phases involves engaging stakeholders on proposed changes in the NFIP map and their impacts. It is left to the project team's discretion whether to hold a meeting with watershed stakeholders before the public release of the preliminary NFIP map. The second of these three phases involves the public release of the preliminary NFIP map and working with stakeholders on mitigation planning.

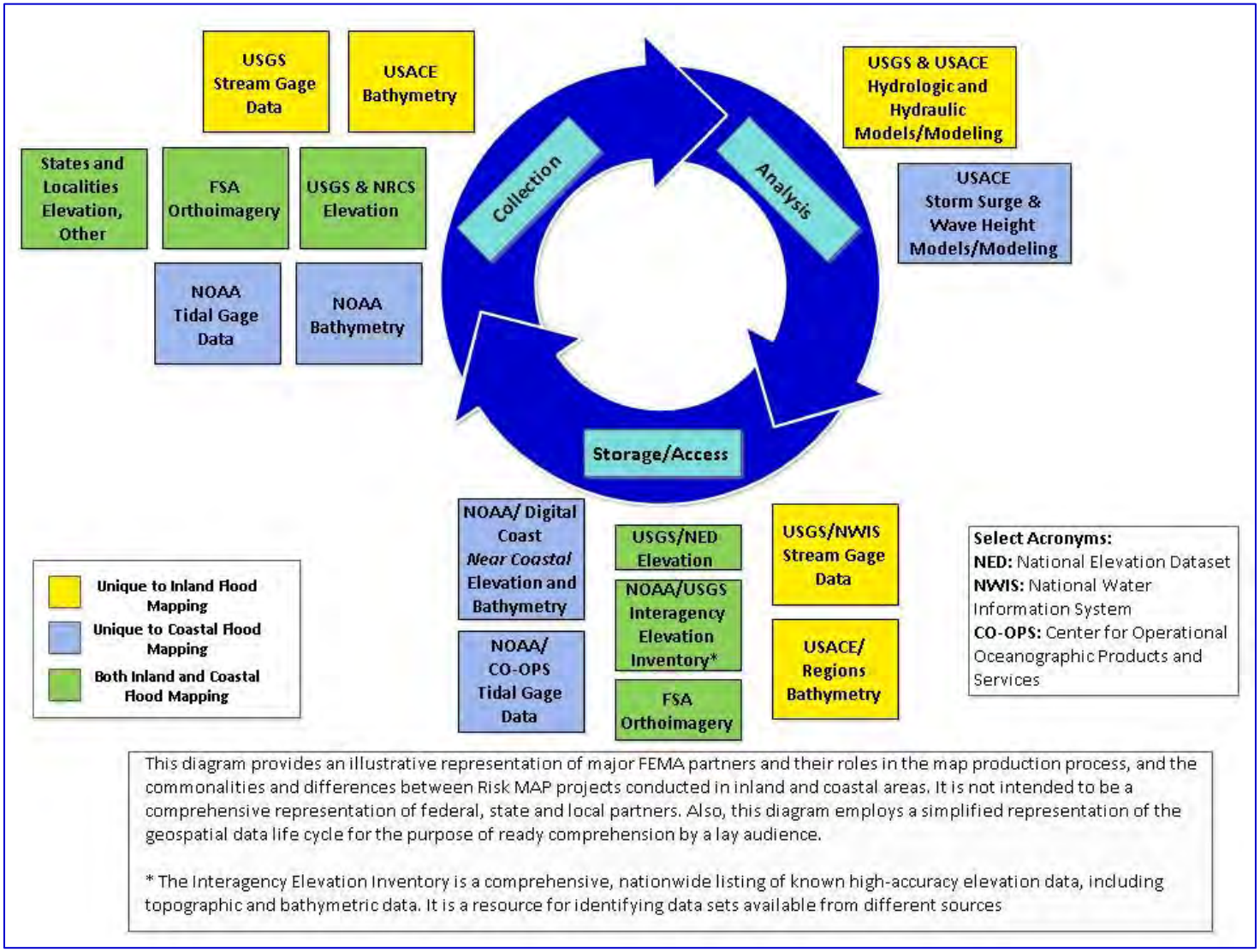
The final phase involves due process steps required before NFIP maps can become effective. This phase begins with a two-part required meeting. The first part is the Consultation Coordination Officer meeting between the project team and local officials from the communities receiving preliminary regulatory products. This is followed by the Open House meeting with the public. Ideally, the Open House meeting is held jointly by the project team and community officials to facilitate community engagement. The Open House meeting marks the beginning of a three-month comment and appeals process. During this time, the project team updates FIRMs and FIS reports based on comments and appeals. FEMA then issues a Letter of Final Determination. The FIRM becomes effective six months after the Letter is issued and final Risk MAP products can be released. At this time, the project team may choose to hold another meeting to engage stakeholders, if a long time has passed since the Open House.

Differences in Coordination on Inland and Coastal Flood Mapping Projects

To produce FIRMs and other flood mapping products, FEMA relies heavily on federal agency partners to collect, store and provide access to a range of data, including but not limited to: orthoimagery, which is generally used to create the base map (a spatially accurate map of geographic features); elevation data (data sets that identify the height of the ground at specific locations used as a component of models to determine where water flows and what water elevation will be for specific floods); and stream gage and tidal gage data, which are important inputs to riverine and coastal flood mapping respectively. State and local agency partners are important sources of data as well. Federal agency partners also provide important analytical tools (e.g., models) and sometimes perform analysis for FEMA flood mapping projects.

Inland and coastal flood mapping projects entail distinctive coordination challenges due to differences in project scope and duration, and the number and range of federal, state, and local stakeholders involved. The following sections on inland and coastal projects discuss these differences. Figure 4 below illustrates similarities and differences in FEMA partners involved in collecting, analyzing, and providing access to data used in producing flood maps for inland and coastal areas.

Figure 4: FEMA's Operational Coordination Related to Flood Map Production



2.4 Overview of Inland Mapping

FEMA has studied over a million miles of rivers, streams, and coastlines. Thus the steps and processes for FIRM development are clearly established, but not simple. Understanding how the maps are made and the roles of major organizations involved in doing so underscores the extent and necessity of coordination between and among individuals, businesses, communities, and government agencies. In addition, new technology and new mapping requirements are prompting mapping agencies to continually consider how FIRMs can be improved and be more useful.

FEMA's coordination on operational activities as described in Figure 4 above shows the involvement of key federal agencies, communities, and state and local governments in various stages of the process. As described earlier, numerous interagency and intergovernmental coordination bodies also exist and play roles of varying importance, including setting standards, developing models, and sharing information. In addition, professional associations such as the Association of State Floodplain Managers are important for "sharing out" information and training as well as serving as a forum for providing federal flood mapping agencies with feedback on what works and what needs attention.

To develop an inland flood map involves application of hydrologic and hydraulic models[53] to the data collected, processed, and analyzed by numerous agencies. Inland flood mapping is typically carried out for river and stream "reaches" with drainage areas exceeding 1 square mile.[54] Each river reach is mapped as a separate entity, and a collection of reaches is studied in a planning region such as a county or a watershed. For each reach, the flood discharge for the 100-year flood event is estimated using US Geological Survey (USGS) regression equations, rainfall-runoff modeling, or a statistical analysis of peak discharges measured at stream gages.[55]

The river channel shape and longitudinal profile are described by a stream centerline, and a set of cross sections is measured relative to the centerline. The Base Flood Elevation—the critical piece of water surface elevation data portrayed on a flood map[56]—is computed at each cross section by applying a hydraulic model. The points of intersection of the water surface and land surface for each cross section are mapped on the landscape and joined by a smooth line to define the floodplain boundary for the special flood hazard area for the 100-year flood event. This process is repeated for the 500-year flood event.[57]

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[53] Hydraulic models focus on the physics of fluid flow. This information overlays computed flood elevation on the surrounding topography to determine the extent of a floodplain. Mathematical equations account for many factors including changes in water surface profile due to the irregular shapes of a natural channel and structures and flow impediments (which increase the height of water upstream).
[54] National Research Council. *Mapping the Zone*. 2009.
[55] Ibid.
[56] Ibid.
[57] Ibid.

Also critical to inland mapping is information about water flow. USGS is the primary source of this information, which is collected from about 7,000 USGS stream gages. Stream gages record the stage height (water height relative to gage elevation) every 15–60 minutes as well as the maximum stage height and corresponding maximum discharge for the year. Frequency analysis of peak discharge is the standard approach for defining extreme flow magnitudes.[58] Inland water flow is affected by the objects that are in the path of that flow.[59]

Understanding the consequences of flooding, including which buildings and structures are likely to be damaged and by how much, is important. To that end, FEMA developed the Hazards US-Multi-Hazards (HAZUS) software, which aids in estimating the loss from floods by integrating hazard, damage, and loss estimation modules with other data. Thus HAZUS allows the development of damage curves for use in estimating potential flood damage.[60] This helps FEMA develop hazard-consequence flood maps, and calculate loss estimates which can be a major influence in helping communities focus on the potential risk associated with floods.

There are two kinds of structures of special importance that affect inland flow: levees and dams.

Levees

Although each state has levees, only limited data on the total number of levees, their location and condition, and the population and property protected by them are available. More than 30,000 miles of levees have been identified by FEMA and US Army Corps of Engineers (USACE), but the total number of miles is unknown (although according to a recent estimate, there are likely fewer than 50,000 miles of significant levees in the United States, and possibly fewer than 40,000).[61] Levees can be inland or coastal.

FEMA's approach to mapping levees has been contentious. FEMA provides accreditation to levees that are certified to provide protection from a 1 percent annual chance flood. Levees without accreditation were treated as if they did not exist on flood maps. In response to Congressional pressure, FEMA announced in March 2011 that it would suspend the "without levees modeling" method and develop new approaches to mapping areas with non-accredited levees, which has the potential to shift flood boundaries.[62]

In coordination with the USACE, FEMA has developed new Levee Analysis Mapping Procedures (LAMP) for non-accredited levees. FEMA has initiated 25 pilot projects to test LAMP and determine the scope of work and level of funding that will be required for its implementation. LAMP will rely on enhanced coordination with USACE and state, local, and

[58] Ibid.
[59] Ibid.
[60] Ibid.
[61] National Research Council. *Levees and the National Flood Insurance Program: Improving Policies and Practices*. 2013.
[62] Government Accountability Office. *FEMA and the Corps Have Taken Steps to Establish a Task Force, but FEMA Has Not Assessed the Costs of Collecting and Reporting all Levee-Related Concerns.* July 29, 2011.

regional levee sponsors to collect the levee data and information needed to map areas with non-accredited levees. A recent National Research Council study, while noting that LAMP is technically sound, recommended that it not be used by FEMA as it does not include modern risk analysis techniques and does not require mitigation of deficiencies in the non-accredited levees. The study concluded that the implementation of LAMP could actually interfere with the development of a modern risk-based approach because it would be "highly unlikely" for FEMA to move forward on both fronts simultaneously.[63] FEMA is currently considering what action to take in response to the report.

Dams and Dam Safety

According to the National Inventory of Dams, managed by USACE, the United States has more than 84,000 structures classified as dams.[64] The federal government owns only four percent of the dams listed in the National Inventory of Dams; the rest are owned by states, localities, and private companies, which makes dam safety a complex task. The average age of the 84,000 dams is 52 years.[65] Of the 694 dams it manages, USACE estimates that about 95 percent are more than 30 years old, and 52 percent have reached or exceeded the 50-year service lives for which they were designed.[66]

The National Inventory of Dams classifies dams according to their "hazard potential." Almost 14,000 are classified as high hazard potential, meaning that failure would probably cause loss of human life.[67] Of these, 2,000 are deficient. More than half of the 2,525 hydroelectric dams regulated by the Federal Energy Regulatory Commission are older than 80 years.[68]

Dam safety and safety planning are a priority for a number of federal agencies. FEMA operates the National Dam Safety Program in partnership with other federal agencies, states, and other stakeholders. Coordinating the activities of ten federal agencies and associated bureaus that have roles in dam safety is the responsibility of National Dam Safety Program's Interagency Committee on Dam Safety. Other federal agencies with major dam safety responsibilities such as inspections and safety planning include USACE, the Bureau of Reclamation, the Federal Energy Regulatory Commission, and the Tennessee Valley Authority. The Association of State Dam Safety Officials is an important forum for state and federal dam safety professionals, dam owners and operators, engineering consultants, emergency managers, manufacturers and suppliers, contractors, and academics.

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[63] National Research Council. *Levees and the National Flood Insurance Program: Improving Policies and Practices*. 2013.
[64] Website of the National Inventory of Dams, http://www.agc.army.mil/Media/FactSheets/FactSheetArticleView/tabid/11913/Article/10236/national-inventory-of-dams.aspx.
[65] University of Maryland. *Review and Evaluation of the National Dam Safety Program*. December 2011.
[66] USACE website, www.army.mil/Missions/CivilWorks/DamSafetyProgram/ProgramActivities.
[67] Website of the National Inventory of Dams.
[68] University of Maryland. *Review and Evaluation of the National Dam Safety Program*. December 2011.

Concerned about the aging dam infrastructure and the need to reauthorize the Water Resources Development Act of 1996, Congress has recently considered but did not pass dam safety legislation. The draft legislation, among other things, calls upon the National Dam Safety Program to "develop and implement a comprehensive dam safety hazard education and public awareness program to assist the public in preparing for, mitigating, responding to, and recovering from dam incidents."[69] A key element of that involves the mapping of potential inundation areas that would occur should a dam fail. The current National Dam Safety Guidelines encourage states to require the mapping of inundation areas below all high hazard dams. The Biggert-Waters Act also required that FIRMs include information on areas that could be inundated as the result of dam failure.[70]

Other Inland Mapping Issues

New technology and new needs are influencing inland mapping. The transition from Map Modernization to Risk MAP has expanded the focus on mitigation, leading to new discussions of how FIRMs can be better used to help reduce current and future vulnerability to flooding and risks to life and property from natural hazards. In recent years, more communities have become interested in understanding the potential impact of severe weather and future land use and development along rivers and in watershed areas in order to anticipate and potentially regulate development with longer-term mitigation goals in mind. FEMA recently released a report that estimates the impact of climate change on all 50 states and U.S. territories, focusing on areas of greatest population and the largest inventory of at-risk properties.[71] The report identifies the expected increase in floodplain extent as a result of climate change and population growth that will occur between now and 2100.

In this regard, some communities have found that FIRMs do not provide all the data they need or want for risk mitigation purposes.[72] When issued, the National Research Council study, *Mapping the Zone,* noted, for example, that using regulatory floodplain boundaries for mitigation suggested that every building inside a special flood hazard area may flood and that every building outside was safe.[73] *Mapping the Zone* recommended "combining the appropriate attributes of FEMA FIRMs with attributes of the National Oceanic and Atmospheric Administration (NOAA) inundation maps[74], USACE risk maps, and the innovative mapping techniques developed by state and local entities and other countries." Under current FEMA standards, flood elevation must now be included in new maps, and

[69] US Senate. Water Resources Development Act of 2013. Section 9005. S.601., not enacted.
[70] P.L. 112-141, Section 100216.
[71] AECOM. *The Impact of Climate Change and Population Growth on the National Flood Insurance Program*. June 2013.
[72] See the North Carolina case study in the National Research Council report. *Mapping the Zone.* 2009.
[73] National Research Council. *Mapping the Zone*. 2009.
[74] Under the auspices of the Integrated Water Resources Science and Services group, the National Weather Service, USGS and USACE are defining the specifications for flood inundation maps. FEMA is participating in an advisory fashion.

FEMA has implemented several new depth and probability mapping products under Risk MAP, based in part on the *Mapping the Zone* recommendations.[75]

In addition to showing 100-year and 500-year floodplains for all populated areas and areas of possible population growth, the Biggert-Waters Act required that maps show areas with residual risk behind levees or below dams. It also required mapping of the level of protection provided by flood control structures. As part of the newly established National Flood Mapping Program, the Biggert-Waters Act required that new flood maps use the most accurate topography and elevation data available, and required acquisition of new elevation data when necessary.

Inundation maps that show the potential impact of flooding on a community linked to the observed depth of flood at USGS-run water gages are of increasing interest. Online flood inundation map libraries—comprised of a series of sequential maps that communicate the impact of flooding at different flood stages—are particularly effective at making real to communities the potential impact of a flood. The National Weather Service reports having created more than 90 such inundation libraries, in such locations as New Orleans and the coastal communities of North Carolina. USGS, NOAA, and USACE are currently working on specifications for inundation mapping. Inundation maps are also important tools for communicating risk to communities downstream of dams and to coastal communities.[76]

Improving the accuracy of hydraulic models is also a priority. For example, *Mapping the Zone* suggests studying how to better forecast the backwater effects of structures located in stream channels, understanding the impact of the slope of the channel in which water flows, and better understanding shallow flooding, which is related to soil sedimentation and can lead to "ponding" during severe storms.

FEMA should continue to monitor the utility, cost, and potential value of these and other studies and advances in pursuit of Risk MAP goals.

2.5 Overview of Coastal Hazards

The three major factors that contribute to coastal flooding are storm surge,[77] heavy rain, and overflowing rivers.[78] Other contributing factors include waves, erosion, sea level rise and tides. Coastal flooding can also be caused by tsunami waves. The Great Lakes region is unique in that long-term lake level variations also contribute to coastal flooding there.

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[75] National Research Council. *Mapping the Zone*. 2009.

[76] In addition to the activities under Integrated Water Resource Science and Services, NOAA's Coastal Services Center issued a guidebook entitled *Mapping Coastal Inundation Primer* in April 2012, which provides information about mapping coastal inundation. CSC has also developed a Sea Level Rise Viewer (http://www.csc.noaa.gov/slr/viewer/#) that illustrates the effects of different sea level rise scenarios on coastal inundation and has been a major tool in Sandy recovery efforts.

[77] Storm surge is "the pulse of water that washes onto shore during a storm, measured as the difference between the height of the storm tide and the predicted astronomical tide." National Research Council *Mapping the Zone*. 2009.

[78] National Research Council. *Mapping the Zone*. 2009.

Coastal flood mapping is currently a FEMA priority under Risk MAP. Interviewees indicated that prior to Risk MAP; most coastal studies in the country had not been fully updated since the 1980s. The main purpose of coastal flood studies is to predict the area affected by flooding and identify Coastal High Hazard Areas, including dunes and areas with significant wave action.[79] The coastal events that cause extreme flooding are statistically rare and there is a dearth of empirical data. Therefore, mapping coastal flood hazards relies on complicated models that simulate the circumstances that cause coastal floods.[80] Coastal flood mapping consists of three processes: a storm surge study; a wave height study; and mapping (when the results of these studies are interpreted and used in conjunction with topographic and land use data to create the FIRM). Storm surge and wave height modeling are done on very different scales.

Storm Surge Studies

Storm surge studies typically take two years to complete and are often done at a state-wide scale, or even at the scale of an entire FEMA Region (for example, the Region III storm surge study included Maryland, Virginia, Delaware, and Washington, D.C.). The benefit in doing these studies over large areas is that it matches the scale of the storms that cause coastal flooding. Some of the storm surge models used by FEMA were developed by USACE.

The storm surge model starts with a very large data collection effort, including topographic, bathymetric (sea floor elevation), and climatological data. The topographic data collection effort involves pulling together many different Light Detection and Ranging (LiDAR) and other datasets. Comprehensive bathometry data sets are much more difficult to acquire and develop as there are many more disparate bathymetric datasets than topographic, including dredge reports, lead-line reports, and shipping traffic surveys. The typical sources of topographic and bathymetric data are NOAA, USACE, USGS, states, counties, and communities. It can take up to one year to collect all of the data, which then has to be converted to a consistent datum and stitched together. The end product is usually a seamless topographic/bathymetric digital elevation model. Once the digital elevation model is created, FEMA can share it with all the data suppliers but does not currently have a process for actively doing so.

Climatology data are also very important for storm surge studies because they provide a picture of what storms look like (e.g., size, speed), where are they coming from, etc. Actual information on historic storms and their impacts are reflected in the storm surge model. Much of this climatological data comes directly from NOAA's Center for Operational Products and Services (CO-OPS) website. For example, buoy data are all available through the CO-OPS website, even if the buoy is owned by another agency, such as USACE. The CO-OPS site also includes National Ocean Service tidal data. FEMA also relies on USGS's Storm Surge Network's High Water Mark data, which is collected immediately after significant coastal floods from temporary gages deployed before an expected storm, and other

[79] Ibid.
[80] Ibid.

surveyed high water marks. These data are used to verify storm surge model results.[81] Once the storm surge model is complete and reflects historical storms, it is validated to ensure it produces reasonable results.

Even though the Discovery phase of the Risk MAP process (described in Section 2.3 on page 27) is often delayed until after the storm surge models are complete, engagement with communities in the affected areas is ongoing during the storm surge phase of the mapping process. Coordination with a large number of stakeholders over multiple years is complicated and time-consuming. One region has instituted monthly outreach calls that include communities and other federal agencies. Other regions rely on newsletters and other methods to keep stakeholders informed.

Wave Height Studies

Wave height studies are done at a much smaller, more detailed scale, covering a county or portions of a county. The rationale for conducting the wave height study at this level is that finer scale features that do not affect storm surge, such as structures, vegetation, and dunes do impact wave heights.

Wave heights are determined using the Wave Height Analysis for Flood Insurance Studies (WHAFIS) model. This model was developed by USACE specifically for FEMA. A key input for this model is the high-resolution LiDAR data that are collected as part of the initial storm surge study. Another important input for this model is land use: there is a dataset called the National Land Cover Dataset—a GIS dataset that identifies areas as developed or vegetated (including type and density). This dataset (managed by USGS) is used in conjunction with field visits, aerial imagery, and local input to identify objects in the study area that impact wave heights. The outputs of the WHAFIS model are interpreted and used to map flood hazards using topographic and land use data to create the FIRM.

Coastal Mapping Coordination Issues

Running the surge and wave models separately can over or understate the Base Flood Elevation.[82] *Mapping the Zone* recommended that FEMA work toward using an integrated model that simultaneously accounts for storm surge, wave height, erosion, and topographic features.[83] Improving the models would require FEMA to work closely with other federal agencies, particularly USACE.

In addition to developing some of the models that FEMA uses to develop coastal floodplain maps, USACE's Engineer Research and Development Center can provide technical support in using the models, reviewing the results of FEMA's flood hazard analysis, and evaluating the effectiveness of risk reduction measures. In some cases, such as in the Great Lakes and Region III, USACE District Offices conduct the storm surge analysis for FEMA. At the

[81] Ibid.
[82] Ibid.
[83] Ibid.

headquarters level, USACE and FEMA coordinate on developing and reviewing coastal policies.

With respect to data, bathymetric data is expensive to collect, and therefore, hasn't been updated regularly. The *Mapping the Zone* recommended that FEMA work with NOAA and USACE to acquire high-accuracy near-shore bathymetric data.[84]

As FEMA works with coastal communities to use flood mapping data to encourage flood risk mitigation, it would be beneficial to increase coordination with other federal agencies also working with these communities. Coordinated federal messaging to communities helps avoid confusion and increase public trust.[85] In addition, FEMA could leverage the relationships, expertise, and experience of other federal agencies. For example, the Coastal Resources Center has significant experience and expertise in communicating flood risk, primarily through its Digital Coast website. This website provides coastal communities with a variety of tools, including the Sea Level Rise Viewer, which provides coastal inundation scenarios at different levels of sea level rise, and the Coastal County Snapshots, which provides easy-to-understand information and graphics for decision-makers and the public.[86]

Coastal Non-Regulatory Products

Even though coastal mapping is a currently an agency priority, most coastal Risk MAP projects have not progressed enough to produce non-regulatory products. The timing and nature of non-regulatory Risk MAP products are still under consideration. The non-regulatory products currently being planned for many coastal studies are intended to highlight the changes from the previous FIRM (interviewees indicated that communities appear to be most interested in this product), inundation depth grids (comparisons of flood elevation with ground elevation), wave hazard areas, and reaches of flood-related shoreline with relatively smaller dunes. One region is developing a non-regulatory product to present tsunami data (with support from USGS). Some of these non-regulatory products entail presenting the same information that is in the FIRMs but in a different format. Others may rely heavily on data inputs from a variety of sources, including other federal agencies and state and local governments.

FEMA, in coordination with other federal agencies and local governments, has begun to develop some non-regulatory products related to climate change. After Hurricane Sandy, and in response to a request by the Sandy Task Force, FEMA, NOAA, USACE, and the US Global Change Research Program worked with local governments to develop new sea level rise tools (maps and a calculator) for the New York and New Jersey counties affected by

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[84] National Research Council. *Mapping the Zone*. 2009.

[85] National Research Council. *Levees and the National Flood Insurance Program: Improving Policies and Practices*. 2013.

[86] Digital Coast, http://www.csc.noaa.gov/digitalcoast and Digital Coast Coastal County Snapshots, http://www.csc.noaa.gov/digitalcoast/tools/snapshots/.

Sandy with the purpose of helping communities understand future risk.[87] Thus far, this interagency effort has been very informal. There has been no exchange of funds among the agencies—each agency has donated staff time to the effort. There is also no formal memorandum of understanding or interagency agreement outlining outcomes and roles and responsibilities. This informal group will continue to work together to implement two pilot projects being planned and funded by FEMA to develop sea level rise tools for San Francisco County, California, and Hillsborough and Pinellas Counties, Florida.

Potential New Mandates for Coastal Mapping

FEMA is still in the process of interpreting parts of the Biggert-Waters Act. The language includes a number of things FEMA could now be required to include on FIRMs when they are updated. Those related to coastal maps include coastal long-term erosion areas and relevant NOAA and USGS data or information on the best available science on future changes in sea levels, precipitation, and intensity of hurricanes.[88] In addition, coastal levees will be subject to the same new requirements described in Section 2.4 (page 32).

The results of FEMA's sea level rise pilot projects will be provided to the TMAC to inform its recommendations regarding including sea level rise on FIRMs. Whether sea level rise tools remain non-regulatory products or become part of the FIRM, FEMA will need to continue and possibly expand coordination with NOAA, USACE, the US Global Change Research Program, and potentially other agencies and states and communities, depending on the tools the TMAC recommends developing and the inputs that would be needed to create them (the current sea level tools rely on best available flood hazard data from FEMA, USACE models, and NOAA scenarios and mapping, with input from communities).

FEMA also is going to seek recommendations from the TMAC on addressing long-term coastal erosion in the FIRMs. If FEMA conducts long-term coastal erosion mapping, it will require greater coordination with USGS and other key agencies.

[87] Sea Level Rise Tool for Sandy Recovery. http://www.globalchange.gov/what-we-do/assessment/coastal-resilience-resources.

[88] P.L. 112-141, Section 100216.

CHAPTER THREE: ENHANCING FLOOD MAPPING COORDINATION

During study interviews, there were generally positive reactions about the caliber and effectiveness of coordination by FEMA with other agencies around mapping issues. Many expressed appreciation that it has improved in recent years since Risk MAP was introduced. In many cases, interest in additional or different coordination focused on the potential for making continual improvements in flood mapping and flood management or concern that opportunities to improve risk communication and risk reduction could be missed.

Reflecting the somewhat autonomous nature of operation for FEMA regional offices, some interviewees at other agencies said that some regions were better at coordinating than others. In a few instances, agencies leading or playing a major role in a coordinating workgroup or task force noted that additional participation from a FEMA representative on that workgroup was desirable, but most recognized that resource constraints rather than lack of interest by FEMA was the limiting factor. FEMA officials appeared to be in considerable demand to participate on committees and in working groups, requiring that decisions be made about which ones are most relevant to FEMA's mission.

This chapter outlines areas that were identified where FEMA could improve program operations and outcomes through enhancing its coordination. This includes (1) facilitating the transition to Risk MAP; (2) reinforcing the importance of coordination by FEMA leadership; (3) institutionalizing practices that can facilitate coordination; (4) demonstrating the value of both regulatory and non-regulatory products; and (5) effective use of the Technical Mapping Advisory Council.

3.1 A PROGRAM IN TRANSITION

The move from paper FIRMs to Map Modernization was viewed by many interviewees as largely a technical change. The move from Map Modernization to Risk MAP also involved technical improvement by improving the data quality and standards for FIRMS,[89] but, perhaps more importantly, it was a new approach to flood mapping that brought greater emphasis to the use of regulatory flood maps paired with other tools to engage communities in floodplain management. The new approach is articulated through the Risk MAP vision and goals (Table 2, page 21).

Finding 3a: While FEMA has made progress with the implementation of Risk MAP, it is still a program in transition. FEMA employees, other agencies, and stakeholders view the shift to Risk MAP as a positive.

[89] FEMA began measuring the quality of its map data through the New, Validated, or Updated Engineering Standard (NVUE). This measure aims to identify the amount of FEMA flood hazard data that accurately reflect existing conditions. Data that do not meet this standard would warrant being re-studied in order to bring up to date. Federal Emergency Management Agency. *Risk MAP Multi-Year Plan Fiscal Year 2009 Report to Congress.* February 23, 2012; Federal Emergency Management Agency. *Coordinated Needs Management Strategy Factsheet*. October 2012.

The production of flood maps is not a new concept for FEMA and the Risk MAP process improves on previous efforts. An emphasis on producing quality data *to improve public awareness and increase action to reduce risk* was introduced in 2009 as the vision of Risk MAP. This builds upon the history of FEMA mitigation efforts and makes a strong statement of purpose for mapping efforts as more than delineating zones for insurance.

Whenever a program's vision is altered, changes in procedures, data, and organizational culture are typically needed. Processes and data needs can be addressed through revisions to guidance and programmatic regulations. Producing new products for new purposes and engaging communities more extensively throughout the mapping process and beyond is more challenging and requires changes in culture.[90] Often, transformations of programs are accompanied by extensive outreach and engagement efforts. These not only provide an opportunity to explain the change, but also solicit feedback from key stakeholders on how to meet their needs.[91] FEMA staff and stakeholders need time to assimilate the new approach, embrace its value, and respond accordingly.

To date, FEMA has initiated 600 Risk MAP projects affecting 3,800 of the 22,000 NFIP communities.[92] These range from initial discussions about communities' flood risk data needs as part of the planning process, to the delivery of updated FIRMs. FEMA is tracking the deployment of Risk MAP into communities, with a program level target for fiscal year 2013 of having it deployed to 50 percent of the population. The extent of current deployment varies by FEMA region with targets for fiscal year 2013 ranging from 28 percent to 64 percent.[93]

Considerable effort is still needed to ensure that the Risk MAP goal of having 80 percent of the Nation's flood hazard data be current is met. Having current flood hazard data means it is new, has been updated, or is deemed still valid.[94] FEMA tracks the inventory of mapped flood hazards through the Coordinated Needs Management Strategy (CNMS) website. This website depicts the status of FEMA maps both geospatially and in traditional tabular format.[95] According to data provided by FEMA, of the 1.13 million stream miles that the agency tracks in its inventory, only 517,523 miles (46 percent) are considered to be modernized and valid according to the New, Validated, or Updated Engineering (NVUE)

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[90] Federal Emergency Management Agency. *Risk MAP, Fiscal Year 2012 Report to Congress*; Risk MAP Multi-Year Plan, *Fiscal Year 2009 Report to Congress.* February 23, 2012; General Accounting Office. *Results Oriented Cultures: Implementation Steps to Assist Mergers and Organizational Transformations*. July 2003.

[91] Government Accountability Office. *Results Oriented Cultures: Implementation Steps to Assist Mergers and Organizational Transformations*. July 2003.

[92] Written Testimony of W. Craig Fugate, FEMA Administrator, to the US Senate Committee on Banking, Housing, and Urban Affairs. September 18, 2013.

[93] Targets provided by FEMA. Some performance data are reported through annual reports to Congress.

[94] This is referred to as the New, Validated, or Updated Engineering Standard (NVUE). Federal Emergency Management Agency. *Risk Map Multi-Year Plan, Fiscal Year 2009 Report to Congress.* March 16, 2009. Federal Emergency Management Agency. *Coordinated Needs Management Strategy Factsheet*. October 2012.

[95] The Coordinated Needs Management Strategy website, https://hazards.fema.gov/cnms/Main.aspx.; Federal Emergency Management Agency. *Coordinated Needs Management Strategy Factsheet.* October 2012.

standards.[96] The remaining required assessments as to the validity of the data, studies to bring the data up to date, or to be modernized from the old paper format.

In addition to the maps that still need to be assessed or updated, Congress set for FEMA the goal "to review and, as necessary, update maps that are three years past their modernized dates, and to complete necessary updates no later than five years past their modernized dates to ensure maps are accurately maintained."[97] This guidance was used by FEMA in developing the Risk MAP Multi-Year Plan, which anticipates a five year review cycle. The current funding levels do not yet provide FEMA with the resources to maintain such a review and update cycle. Both the Presidential budget request ($205 million for fiscal year 2013) and the amount appropriated by Congress ($207.5 million for fiscal year 2013) are far short of the $400 million authorized by the Biggert-Waters Act.[98] The fiscal year 2014 budget request included level funding, but 14 additional full time equivalent employees to help address the new statutory requirements. The fiscal year 2015 budget request will be the first one that was fully developed after the enactment of the Biggert-Waters Act and will be transmitted to Congress in February 2014. The Association of State Floodplain Managers developed an estimate to complete initial flood mapping for the entire nation, all 3.5 million river and coastal miles and not only the 1.13 million in FEMA's current inventory. The placed this cost at $4.5-7.5 billion with an annual maintenance cost of $116-275 million (not including certain administrative and data dissemination costs currently funded through insurance policy fees).[99] A further discussion of funding is in Chapter Four.

The FIRMs are accompanied by non-regulatory products and services that help communicate flood risk to communities with the goal of prompting mitigation action. Among non-regulatory products are "visual illustration of flood risk, analysis of probability of flooding, economic consequences of flooding, and greater public engagement tools."[100] Based on information obtained during interviews, while there is guidance for these non-regulatory products, not many have been completed due to the multi-year timeframe of Risk MAP projects.

Furthermore, the Biggert-Waters Act included new requirements to which FEMA is still adapting. FEMA has begun implementing some of these requirements, but is still analyzing others to determine what changes may need to be incorporated in the FIRMs and the non-regulatory products. Once this analysis is completed, the agency can assess how to accomplish these changes and if resources need to be re-aligned to do so. This assessment will also be informed by the advice from the TMAC and the many studies the Biggert-

[96] The CNMS is a dynamic system. The figures cited here were provided by FEMA on August 19, 2013, and may have changed since that time. Appendix F provides additional information on the status of FEMA's maps. Federal Emergency Management Agency. *Coordinated Needs Management Strategy Factsheet*. October 2012.
[97] Explanatory statement accompanying the Fiscal Year 2009 Department of Homeland Security Appropriations Act. P.L. 110-329.
[98] P.L. 112-141, Section 100216(f).
[99] Association of State Floodplain Managers. *Flood Mapping for the Nation*. March 1, 2013.
[100] Written Testimony of W. Craig Fugate, FEMA Administrator, to the US Senate Committee on Banking, Housing, and Urban Affairs. September 18, 2013.

Waters Act required, only some of which have been completed (see Appendix G for list of studies and reports).

Based on study interviews, FEMA employees, other agencies, and stakeholders view the shift to Risk MAP as positive and Risk MAP products as valuable or even essential. The following two case studies serve to illustrate this point.

Case Study: Leadership Support Contributes to the Success of the Flood Protection Structure Accreditation Task Force

A positive example of leadership involvement in tracking and meeting goals is the Levee Task Force. The Biggert-Waters Act directed FEMA and USACE, in cooperation with the National Committee on Levee Safety,[101] to form a Flood Protection Structure Accreditation Task Force (Task Force) to align levee information collected by the two agencies.[102] Congress charged the Task Force with developing recommendations for ensuring that: (1) the levee data collected by the two agencies can be used interchangeably; and (2) the levee information and data collected by USACE is sufficient to satisfy the flood protection structure accreditation requirements of the NFIP.[103]

As of the writing of this Report, the final report of the Task Force is in the agency review and approval process. Based on the Task Force's interim report and interviews with FEMA and USACE, the Task Force has resulted in some success. Both agencies indicated that, while coordination between the two agencies on levees had been improving steadily for several years, coordination between the agencies has continued to improve at an accelerated rate due to the Task Force. In addition, FEMA and USACE are committed to working together to implement the Task Force recommendations. However, both agencies indicated that coordination needs to improve at the FEMA region/USACE district levels, particularly in the area of data-sharing. A recent National Research Council report found that inconsistent risk communication messaging and terminology is also a problem.[104] Both agencies plan to issue procedural memoranda to facilitate improved coordination at region/district levels.

There were several characteristics of the Task Force that contributed to its success, including a charge from Congress, a specific task that was viewed as necessary by both agencies, a designated Task Force leader (USACE), clear roles and responsibilities, stakeholder input through the National Committee on Levee Safety, and a several-year history of the two agencies working together on levees. In addition, interviewees from both agencies agreed that leadership was a key ingredient in the Task Force's success. Senior leaders from both agencies communicated their support for the work of the Task Force by dedicating resources to it, holding participants accountable for outcomes (some participants had performance metrics related to coordination and the Task Force in their performance plans), and modifying internal processes to help meet deadlines.

[101] The National Committee on Levee Safety was established by the Water Resources Development Act of 2007 to develop recommendations and implementation steps for a national levee safety program. The Committee is chaired by USACE and members include FEMA; state, local, and regional agencies; and the private sector.

[102] P.L. 112-141, Section 10026.

[103] Federal Emergency Management Agency and US Army Corps of Engineers. *Flood Protection Structure Accreditation Task Force: Interim Report.* January 2, 2013

[104] National Research Council. *Levees and the National Flood Insurance Program*. 2013.

Case Study: Contributions of Risk MAP to Post-Superstorm Sandy Recovery

Hurricane Sandy made landfall on October 29, 2012, hitting New Jersey and New York especially hard. Damage estimates totaled $50 billion or more, depending upon the source.[105] The impact of the storm is difficult to grasp. According to FEMA reports, there were millions of power outages; widespread damage to the transportation infrastructure and to phone, cable and other communication lines; thousands of houses along miles of New Jersey and New York coastline were damaged or destroyed; and 8.5 million cubic yards of mixed debris was deposited on roads and in waterways.[106]

Both during and after the event, multiple federal, state, and local agencies, private sector stakeholders, and organizations worked together to prepare for, respond to, and help communities and citizens recover from Sandy. FEMA's *Hurricane Sandy Geospatial After Action Report/Improvement Plan* recounts some of the successes of and areas for improvement from this massive joint effort.[107] Throughout, geospatial information and technology was critical to assessing the extent and severity of flooding and wind damage, to assisting responders, and to helping communities rebuild and recover.

FEMA's FIRMs were notably vital to the recovery and rebuilding process.[108] In the immediate aftermath of Sandy, FEMA began receiving thousands of requests from community officials and property owners to provide updated FIRMs to enable and assist them in rebuilding efforts. Before the storm hit, FEMA had already begun updating New York and New Jersey FIRMs, but the new, official FIRMS were not scheduled for completion for another 18 to 24 months. Property owners could not wait that long to rebuild: FEMA needed to provide an immediate, temporary solution to this challenge.

FEMA's solution was to develop Advisory Base Flood Elevation (ABFE) maps based on the partially completed flood studies. Released in as few as three weeks following Sandy, these maps were designed to help support rebuilding and recovery efforts in FEMA Region II.

To assist property owners, communities, states, and other federal agencies with accessing and understanding the ABFE information, FEMA delivered the map products, guidance and data interpretation tools via the FEMA GeoPlatform and a custom website (www.region2coastal.com). The website and portal have had more than 500,000 unique visitors and 2.2 million page views since release of the ABFEs.

With adoption of amendments to building and zoning codes that incorporate the ABFE information, New York and New Jersey property owners have been allowed to rebuild or to start rebuilding to the ABFEs. In part due to the adoption of new building standards which take into account the latest flood risk (ABFE) information available, New York and New Jersey coastal communities will be safer and more resilient to future storms and flooding.

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[105] Blake, Eric, Todd Kimberlain Robert Berg, John Cangialosi, and John Beven II. *Tropical Cyclone Report Hurricane Sandy*. February 12, 2013.

[106] Federal Emergency Management Agency. *6 Month Report: Superstorm Sandy from Pre-Disaster to Recovery*. April 25, 2013.

[107] Organizations involved included FEMA, NOAA, Civil Air Patrol, Department of Homeland Security, National Geospatial Administration, USGS, Red Cross, USACE, New York Department of Transportation, New Jersey Office of Emergency Management, National Aeronautics and Space Administration, and contractors.

[108] Federal Emergency Management Agency, Region II. *Risk MAP Success Stories: Post-Sandy Resiliency in New York and New Jersey.* New York, NY. 2013.

The following sections include additional findings and recommendations to facilitate and/or accelerate this transition.

3.2 Leadership Sets the Vision and the Priorities for Coordination

The traditional role and responsibility of leadership is to establish an organization's vision and set its course of action to achieve that vision—in this instance, the full transition to Risk MAP. There are numerous other factors and influences on FEMA at this time: the pressure of budget reductions without commensurate reduction in goals is obviously significant. The priority given to coordination by FEMA's leadership and how that priority is conveyed to employees and managers were reviewed as part of this study.

It is a basic tenet that when leadership's priorities are newly established or changed, they must be communicated clearly and consistently throughout the organization. There is a substantial literature that provides advice on how to successfully implement goals,[109] including the importance of using them as a standard for sustained action at all levels throughout the organization. This is taken as necessary for the priorities to be inculcated and have a chance of being achieved.

The two generic ways of communicating about new goals, vision, or sets of priorities are conveying the significance and rationale with words, and demonstrating commitment with actions.

Conveying Priorities in Words

Recommendations for effective written and verbal strategic communications typically include steps such as:[110]

- establishing prominent, clear goals—and not too many of them;
- informing and educating staff about the goals and their responsibilities around achieving them;
- aligning agency policies and materials and making them widely available; and
- providing guidelines about how to achieve the objectives and empowering and engaging staff in doing so.

Thus, the process of deciding upon goals and writing them down so they can be shared and referred to as needed is a critical task for agency leadership. This not only tells staff what they are working to accomplish and why, but is also the precursor to implementation and action.

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[109] Boston Consulting Group. *Your First 100 Days: Starting Strong as a New Leader in Government*. November 29, 2012.

[110] Partnership for Public Service. *Taking Measure: Moving from Process to Practice in Performance Management*. September 2013.

Finding 3b: Coordination is mentioned frequently and clearly in formal written statements, strategic plans, and implementing guidance by FEMA's Administrator as an essential, basic, and necessary operating principle for FEMA. The plans and guidance specify broadly the various agencies, groups, and stakeholders with which FEMA must coordinate.

In February 2010, FEMA's Administrator issued a Memorandum of Intent for FEMA leaders about developing the agency's Fiscal Year 2012–2016 strategic plan. Figure 6 below from the Intent Memorandum defines FEMA's mission, starting with its parent department, the Department of Homeland Security.[111] The Administrator stated that he expected these priorities to enable FEMA to "develop a sustained, multi-year commitment to enable FEMA to build, sustain and improve resilience to all-hazards."[112]

The Administrator also established an important "overarching principle" in his Intent Memo: regional empowerment. He defined this as that "regional offices must have the staff, funding and other resources required to implement FEMA programs." "My intent," he said, "is to continue pushing responsibility, resources and authority to the regions to enable them to be FEMA's implementers, while headquarters will focus on defining the guidance and obtaining the resources necessary for regions to implement FEMA's programs."[113]

The importance of coordination for all of FEMA's operations was laid out as another principle for strategic operations in his fourth priority—Work with Our Partners to Address Our Most Significant Risks. The Administrator noted that the "growing interconnectedness of the world, technological interdependencies, and the advent of very large and complex disasters" necessitated "continuous engagement with our partners and stakeholders." Further, he said, "FEMA must be effective and efficient, and that requires finding creative ways to apply our available tools and resources (e.g., mitigation efforts, planning, training and exercises, logistical capabilities, and grants) in concert with those of our partners to accomplish these shared objectives."[114]

[111] Federal Emergency Management Agency. *Administrator's Memorandum of Intent for Building the FY 2012-2016 Future Year Homeland Security Program.* February 23, 2010.
[112] Ibid.
[113] Ibid.
[114] Ibid.

Figure 6: Agency Missions and Priorities

Vision for Homeland Security
(Per the Quadrennial Homeland Security Review)

A safe, secure, and resilient homeland where
American interests, aspirations, and way of life can thrive.

Homeland Security Missions
(Per the QHSR)

Mission 1: Preventing and Protecting Against Terrorism
Mission 2: Securing and Managing Our Borders
Mission 3: Enforcing and Administering Our Immigration Laws
Mission 4: Safeguarding and Securing Cyberspace
Mission 5: Ensuring Resilience to Disasters

FEMA Mission

FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.

Administrator's Priorities for FY 2012-2016

1. Strengthen the Nation's Resilience to Disasters;
2. Build Unity of Effort among the Entire Emergency Management Team-Federal, State, Local, Tribal Government, Private Sector, NGOs, Communities, and Individuals;
3. Meet the Needs of Disaster Survivors and Effectively support Recovery of Disaster Affected Communities;
4. Work With Our Partners to Address Our Most Significant Risks; and
5. Build, Sustain and Improve FEMA's Mission Support Capabilities

FEMA's subsequent strategic plan (2011–2014) established and built on the concept of "Whole Community" as a framework for coordination.[115] It emphasized the need to "integrate new partners and new approaches to build the Nation's capacity to manage catastrophic disasters, foster a common understanding of the risks we face as a national emergency management team, and advance solutions that engage the Whole Community in every aspect of emergency management."

[115] Federal Emergency Management Agency. *Strategic Plan, Fiscal Years 2011–2014*. February 2011.

FEMA's *Strategic Plan for Mitigation and Insurance (2012-2014)*[116] and Risk MAP further emphasize coordination. The Mitigation and Insurance plan specified that the Federal Insurance and Mitigation Administration (FIMA) had responsibility for integrating mitigation and insurance programs and philosophy across the agency, and to build cooperation with other federal agencies; state, local, and tribal governments; communities; and the public.[117]

Demonstrating Importance by Actions

The amount and length of time devoted to an initiative by senior leaders typically signifies its importance. Certainly, consistency is important to overcoming bureaucratic inertia. Thus, certain kinds of actions can help achieve the goals, such as:[118]

- building attention to an initiative into daily activities and meetings;
- regularly bringing up the initiative and how it is being implemented;
- setting measurable goals and conducting quarterly reviews of progress;
- reaching out in high level meetings with leaders of other agencies about the initiative;
- clearing away barriers; and
- providing the tools and the opportunities staff need to carry forth the initiative.

Establishing accountability for stated objectives and goals is an important part of demonstrating that the organization is serious about the goal. Over the past two decades, the federal government has increased its focus on accountability and performance measurement.

Two of the most important pieces of legislation holding federal agencies accountable for achieving their stated objectives have been the Government Performance and Results Act (GPRA)[119] enacted in 1993 and the GPRA Modernization Act of 2010 (GPRAMA).[120] Since the passage of GPRAMA, increased attention has been paid to collecting and using data to monitor progress toward goals and to providing information to evaluate the effectiveness of existing programs.[121] In his 2010 Intent Memorandum, and aligned with GPRA and

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[116] Federal Emergency Management Agency. *Mitigation and Insurance Strategic Plan 2012–2014*. September 2011.

[117] Goal 1.2 focuses on intra-FIMA and intra-FEMA coordination and Goal 1.3 focuses on communities and stakeholders. Goal 3 expands coordination to include other relevant federal agencies and public and private sector groups. Objective 3.1—State-of-the-Art Tools and Methods— states that "proven and promising new technologies will be used" and that "FEMA Mitigation and Insurance will work with our science and technology partners to deliver practical solutions that allow communities to identify risk and take actions to reduce losses."

[118] Partnership for Public Service. *Taking Measure: Moving from Process to Practice in Performance Management*. September 2013.

[119] P.L. 103-62.

[120] P.L. 111-352.

[121] Partnership for Public Service. *From Data to Decisions: The Power of Analytics*. November 11, 2011.

GPRAMA,[122] the Administrator called for FEMA to "produce measurable objectives" for the next Strategic Plan and to "develop meaningful metrics that do not merely measure the processes…but will further measure the actual outcomes…."[123]

Balanced Scorecard

The Balanced Scorecard is FEMA's primary accountability mechanism for tracking progress toward Risk MAP goals and for keeping senior leaders informed about and involved in goal achievement. The Balanced Scorecard aligns the goals of Risk MAP with sub-objectives, measures for those sub-objectives, and quarterly and annual progress targets.

Finding 3c: The Balanced Scorecard is FEMA's key accountability mechanism for Risk MAP. However, the Program Performance Measurement Plan does not include objectives and measures for all five Risk MAP goals.

For example, Table 4 below shows that Objective 1.1 "Operate Risk Map-Quality Data" is tied to a sub-objective: "Risk MAP addresses riverine flood hazard data needs." The measure that will be used to determine whether inland flood hazard data needs are met is then stated. The percentage goals to be met and achieved are spelled out by quarter. Further, a Measure Definition Template describes the measure, relates it to the objective, describes the data collection time frame and methodology, includes who is to collect the data and where and how it is to be stored and reported. Then the process for evaluation is described as are any needed follow on steps.

As described in the Department of Homeland Security *Risk MAP Program Performance Measurement Plan*,[124] the Balanced Scorecard process has five steps:

1. Program measure identification
2. Measurement criteria definition
3. Performance review through Joint Programs Review on a quarterly basis for the regions and a monthly basis for headquarters
4. Corrective action, as deemed necessary
5. Progress reporting

The power of these steps is that they spell out and formalize the roles of the agency's most senior leaders in focusing regularly on progress being achieved.

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[122] GPRAMA includes structures and requirements designed to provide greater accountability for results throughout the government. Agencies must present long-term and annual goals in strategic and annual performance plans; set agency priority goals reflecting their highest priorities; conduct quarterly performance reviews for each agency priority goal; and post data on the status of efforts quarterly on Performance.gov.

[123] Partnership for Public Service. *From Data to Decisions: The Power of Analytics.* November 11, 2011.

[124] Department of Homeland Security. *Risk Mapping, Analysis, and Planning (Risk MAP) Program Performance Measurement Plan*. February 21, 2012.

Table 4: Balanced Scorecard Measures Used to Assess Regional Mapping Performance

Mission Perspective: Risk MAP is meeting its vision, key objectives			
Objective	**Sub-Objective**	**Performance Measure**	**Program Level Target**
Deploy Risk MAP	Risk MAP is widely delivered	FEMA will deploy Risk MAP to 50% of the population	50%
Operate Risk MAP- Quality Data	Risk MAP addresses riverine flood hazard data needs	Percentage of NVUE compliant mapped miles, where the FIRMS have been provided to the communities	56.%
		Percentage of NVUE compliant mapped miles that have been initiated	61%
		Percent of populated coastal miles with flood study initiated	100%
Operate Risk MAP – Awareness	Communities understand their flood hazard risk	Percentage of local officials in Risk MAP communities who are aware of the flood risk affecting their community after engagement with Risk MAP	70%
	Communities have mitigation plans	% of the U.S. population (excluding territories) have planned mitigation strategies	80%
Operate Risk MAP - Action	Communities have effective mitigation plans	Percentage of population where Risk MAP has helped identify new strategies or improved current planned mitigation actions	37%
		Percentage of populations that has advanced mitigation strategies	12%
Process Perspective: Risk MAP is performing efficiently			
Objective	**Sub-Objective**	**Performance Measure**	**Program Level Target**
Monitor, Control, and Manage the Program	Risk MAP is on schedule and on budget	Map Mod and Risk MAP studies are within the DHS tolerance of +/- 8% for schedule and cost performance	+/- 8%
	Risk MAP completes contracts on time	Percent of contract dollars obligated by August 1, 2013	80%

A review shows that Risk MAP Goals 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") and 5 ("Align risk analysis programs and develop synergies to enhance decision-making capabilities through effective risk communication and management") do not appear to be reflected on the Balanced Scorecard. The absence of clear measures related to these two goals may imply that they are less important than those being tracked and monitored in the Balanced Scorecard.

3.3 INSTITUTIONALIZE PRACTICES THAT CAN FACILITATE TRANSITION

In carrying out its mandate, FEMA engages in extensive and often effective coordination, but much of this coordination is informal and personality-driven. Some coordination will always be informal. For example, many interviews with coastal mapping experts indicated that they rely on personal relationships because there are so few people who work in the coastal field and they know each other. These relationships can be valuable: making and sustaining personal relationships cannot be prescribed and are an important ingredient of innovative projects and partnerships.

However, formalizing some of the relationships that are now personal will help FEMA assess the effectiveness of coordination activities, which will in turn guide decisions about how to allocate staff time and resources to coordination.

Including Coordination in Personnel Policies

Including coordination in personnel policies communicates expectations to employees and helps achieve the cultural change needed to sustain coordination into the future, regardless of changes in leadership and staff.

Finding 3d: Personnel practices to support coordination, such as job descriptions, performance metrics, and details have been implemented inconsistently.

FEMA employees at headquarters and in the regions indicate that coordination is not consistently included in the job descriptions and personnel performance plans of individuals who need to engage in coordination to do their jobs effectively. In addition, FEMA appears to utilize personnel exchanges (or details) as opportunities arise, rather than approach them systematically to facilitate coordination between agencies where there is need for improvement.

Job Descriptions

Including coordination in job descriptions helps recruit employees with the necessary skills to effectively carry out Risk MAP responsibilities. While some FEMA interviewees indicated that coordination was in their job descriptions, some of these respondents were referring to intra-agency coordination only. Specifying coordination in job descriptions will help FEMA establish necessary workforce competencies. Similarly, many of the interviewees that appeared to be most invested and engaged in coordination had previously worked at other agencies, like USACE. It may be beneficial to recruit candidates who have worked in partnering agencies so that FEMA can benefit from these individuals' relationships and understanding of the other agencies' missions, policies, and processes.

Personnel Performance Plans

Many interviewees indicated that their performance plans did not include metrics on coordination, even in cases where the individual was FEMA's designated representative on an interagency body. A subset of those who indicated their performance plans included coordination metrics indicated that the metrics include intra-agency coordination only. Coordination-related competencies or performance metrics against which an individual's

performance can be evaluated provide the means to recognize and reward accomplishments related to coordination, as well as explicitly communicate to individuals that coordination is an important part of the job.[125]

Furthermore, personnel performance plans ideally should be directly linked to the agency's mission and goals,[126] which can help align the organization in support of desired outcomes and demonstrate the relationship between individual performance and organizational success.[127] As described in Section 3.2 (page 47), FEMA's mission and goals of partnering with other federal agencies, states, localities, regions, tribes, and communities are articulated in a variety of FEMA strategic documents. These statements provide the basis for a line of sight between FEMA's mission and goals and individual performance metrics related to coordination.

Personnel Details

Under the Intergovernmental Personnel Act (IPA),[128] federal employees can be assigned temporarily to other agencies as "IPAs" or "detailees." Providing employees with the opportunity to work temporarily in another mission-relevant agency can enhance coordination by building relationships and bridging organizational cultures.[129] Recognizing the value of these arrangements, FEMA and USACE have exchanged IPAs. For example, a FEMA senior leader did a six-month stint at USACE to help improve coordination between the two agencies. Research has shown that senior leadership details can help support the execution of missions that span agency boundaries.[130] However, instances of temporary assignments between FEMA and agencies such as USGS and NOAA appear to be much less common. Also, FEMA appears to take an ad hoc approach to details, rather than systematically utilizing detailees in areas where there are gaps in coordination or if the stakes are particularly high. FEMA should continue to take advantage of temporary assignment opportunities as they arise, but this approach may not be systematic or comprehensive enough to fully meet agency needs.

Particularly as FEMA ventures further into developing and delivering non-regulatory products, detailees may help the agencies work more closely together and leverage each other's resources. For example, the Biggert-Waters Act contains language on including sea level rise and long-term coastal erosion on FIRMs. To do this, FEMA would have to enhance coordination with NOAA and USGS.

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[125] Government Accountability Office. *Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms*. September 2012.
[126] Office of Personnel Management. *Aligning Performance Plans with Organizational Goals: OPM's Eight-Step Process*. September 2005.
[127] General Accounting Office. *Results-Oriented Cultures: Implementation Steps to Assist Mergers and Organizational Transformations*. July 2003.
[128] P.L. 91-648.
[129] Government Accountability Office. *Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms*. September 2012.
[130] Partnership for Public Service. *Mission-Driven Mobility*. February 2012.

Formal Guidance on Coordination

Risk communication and mitigation occur at the state and local levels, making coordination by the regions—particularly with state and local governments—critical to the success of Risk MAP. Including coordination in formal guidelines, procedural memoranda, and other documents clearly communicates expectations regarding coordination to project teams, which consist of regional staff, contractors, and Cooperating Technical Partners (CTPs). These documents also provide an opportunity to formally capture and share best practices in coordination.

Finding 3e: FEMA has issued several formal guidance documents for project teams related to coordination. However, these are primarily related to Discovery and data collection and sharing. There are no FEMA guidelines on interagency or intergovernmental coordination related to larger Risk MAP goals, such as risk communication and hazard mitigation.

FEMA has issued formal guidance to project teams on coordinating with other federal, state, and local agencies in a variety of programmatic areas. However, there are many other areas of coordination that are not issued in guidance or even shared as best practices, and institutionalized as appropriate. As a result, interagency and intergovernmental coordination are not consistent across FEMA's ten regions. FEMA's approach to Risk MAP is to empower the regions to effectively manage and deliver Risk MAP. All regions are working in different environments and there is no "one size fits all" approach to coordination. However, additional guidance or systematic sharing of best practices could result in an improved basic framework, which would be beneficial.

<u>Existing Guidance to Regions</u>

Table 5 lists and provides a brief description of the documents FEMA has issued regarding coordination in carrying out various aspects of Risk MAP. In general, the emphasis of the guidance is on the community engagement and data-sharing aspects of Risk MAP. For a more detailed description of the guidance documents, see Appendix H.

Table 5: Headquarter Guidance to Regions Related to Coordination

Guidance	Purpose
Data Coordination Procedures[131]	Provides formal guidance on how to coordinate with other federal agencies and state and local governments to acquire data relevant to a flood risk project.
Risk MAP Meeting Guidance[132]	Provides guidance on engaging the community and other stakeholders throughout the Risk MAP process.
Discovery Guidelines	Appendix I of FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners[133] provides flexible guidance on Discovery, taking into account the different political and physical environments projects are operating in.
Annual Memoranda on Risk MAP Project Planning	FEMA headquarters communicates program priorities, regional allocation of funding, and the outline of how headquarters and regions should collaborate on finalizing regional plans each year through memoranda to the regions.
USACE/FEMA Memorandum: Joint Actions on Flood Risk Management	FEMA and USACE have issued a joint memorandum to FEMA regions and USACE Division Offices providing guidance on coordinating flood risk management activities related to levees.

Areas Where Guidance to Regions Could Be Improved

There is great variability among the regions in carrying out coordination activities related to Risk MAP. Most of the examples below are of activities that some, but not all, FEMA regions are carrying out effectively. While FEMA headquarters indicated that there are multiple mechanisms for regions to share best practices with headquarters and other regions, the regional officials who were interviewed indicated that the best practices that were discussed in various meetings were often captured only in meeting minutes. There does not appear to be a systematic effort by headquarters to capture and, as appropriate, institutionalize best practices. The practices of the different regions in the categories discussed below are variable.

- **Coordinating with State and Local Governments**—Coordination with state and local governments is uneven across the regions, both because of differences in resource levels and physical characteristics. One way FEMA works with states and localities is through the CTP Program. The CTP program was created in 1999 to help extend FEMA's flood mapping capacity by leveraging the resources and capabilities of state, local, and regional partners in the creation of FIRMs. The CTP program was also intended to engage communities more effectively in the mapping process.

[131] Federal Emergency Management Agency. *National Discovery Data Coordination Procedure Draft.* September 28, 2012.
[132] Federal Emergency Management Agency. *Risk MAP Meetings Guidance*, Operating Guidance 04-11. June 30, 2011.
[133] Federal Emergency Management Agency. *Guidelines and Standards for Flood Risk Analysis and Mapping, Appendix I: Discovery*. June 2, 2011.

Since the adoption of Risk MAP, FEMA's approach to CTPs has evolved to engage CTPs more in assisting with stakeholder outreach and risk communication efforts. Assistance with stakeholder outreach and coordination has become especially important for FEMA given the expanded number of stakeholders it must engage in the conduct of projects at the watershed level and in large coastal areas. To help address this need, FEMA has looked more to state-level entities as CTPs, which tend to have more resources and greater reach. The utilization of CTPs to engage stakeholders in the Risk MAP process is a ripe area for FEMA to collect and, as appropriate, institutionalize best practices. FEMA's ability to provide guidance about how best to utilize the CTP program is hindered by limited information at the headquarters level about the number, type, role, and performance of CTPs across FEMA regions. FEMA headquarters lacks even a current list of active CTPs. Performance information collected by headquarters is focused on contract management and not analyzed separately from information on the performance of contractors. Also, headquarters does not systematically collect information about the role of CTPs in stakeholder outreach and coordination.

Another way FEMA works with state and local governments is the Community Rating System (CRS), through which FEMA encourages communities to take additional risk mitigation actions by providing insurance premium discounts.[134] Currently, 1,211 communities participate. While this represents only 5.57 percent of the total NFIP communities, 67.69 percent of policyholders live in these communities.[135] They receive discounts ranging from a minimum of five percent to a maximum of 45 percent.[136] Guidance on how to better use Risk MAP products and services might help the regions increase participation in the CRS program, both in terms of new communities and having current participants take additional actions to receive higher discounts. Disseminating lessons learned about what actions communities have taken, what prompted these actions, and how these actions have been funded might facilitate additional mitigation work by communities.

- **Project Planning and Prioritization**—FEMA guidance includes direction to the regions on coordination with federal and state partners during the planning and budgeting phase of Risk MAP.[137] However, the level of coordination with partners during this phase varies across the regions. Some regions request state business plans and reach out to USACE and other federal agencies to learn about their priorities and try to align them with FEMA's Risk MAP priorities. Other regions indicate that they do not coordinate with other federal agencies and states when

[134] Federal Emergency Management Agency. *National Flood Insurance Program: Community Rating System Coordinator's Manual*. 2013.
[135] Federal Emergency Management Agency. Community Rating System National Map. http://www.fema.gov/media-library/assets/documents/27784?id=6200.
[136] National Flood Insurance Program Community Rating System, http://www.fema.gov/national-flood-insurance-program-community-rating-system.
[137] Federal Emergency Management Agency. *Operating Guidance 04-11: Risk MAP Meeting Guidance*. June 30, 2011.

setting priorities and sequencing Risk MAP projects because of lack of resources: budgets are small and variable, making planning difficult. Regions do not want to go through a lengthy planning process with federal, state, and local partners if the funding to carry out projects identified as priorities does not materialize.

There are several reasons why regions should at least try to obtain planning documents, such as business plans, from partners, as well as have conversations regarding prioritizing and sequencing of projects (without going through an involved planning process). It may be beneficial to delay studies if another federal agency is planning a project that would provide important input to a mapping study, or prioritize a project if another agency is working on mitigation activities with a community. The regions that indicated they reach out to other federal agencies appear to coordinate project scheduling most closely with USACE; there is more room for improvement in synchronizing planning with USGS and NOAA. For example, one region indicated that they were "bumping into" NOAA's Coastal Services Center (CSC) projects in the communities where they were working, but there was no alignment or understanding on the region's part of CSC's ongoing and planned projects due to lack of coordination.[138]

- **Silver Jackets[139]**—The Silver Jackets program, led by USACE and established in 39 states, is designed to bring together state agencies (particularly the NFIP Coordinator and the State Hazard Mitigation Officer), federal agencies, and sometimes local governments and tribes on a regular basis to discuss the flood risk management priorities in that state. As noted above, FEMA guidelines require regular, ongoing coordination with appropriate federal agencies and state stakeholders. Coordinating with federal agencies at the state level is important because some federal agencies are more decentralized and have a stronger state presence/focus than FEMA, state-level coordination is vital because a number of regions are seeing value in moving away from a focus on local CTPs in favor of state CTPs, because it is easier for the region to manage one large CTP that coordinates with the localities. Therefore, even though there has historically been a larger focus on coordination with communities than states on flood mapping in the past, coordination at the state level is becoming increasingly important.

  Most FEMA regions have embraced Silver Jackets and view it as a useful forum that has helped build strong partnerships and leverage resources. In some cases, FEMA contractors participate as well as, or instead of, regional staff. Some regions utilize the forum to share information on studies being planned or in process, collect and compile data, and conduct joint communication efforts. USACE also has utilized the Silver Jackets program to initiate 60 interagency pilot projects in 33 states. Examples of pilot projects that have been carried out to date have included providing online access to statewide digital floodplain maps and flood risk data;

[138] This region also indicated that it plans to reach out to CSC to explore opportunities to coordinate.
[139] US Army Corps of Engineers, Silver Jackets, http://www.nfrmp.us/state/

collecting and utilizing data on coastal estuary erosion; and a hydraulic failure analysis for bridges crossing streams, which will be incorporated into a non-regulatory Risk MAP product. However, in some regions, FEMA does not actively participate in Silver Jackets.

- **Risk Communication/Mitigation**—Much of FEMA's guidance to regions on coordinating with federal agencies focuses on including them in interactions with local communities and inviting them to appropriate meetings throughout the Risk MAP process. However, inviting other agencies to meetings is not adequate to address the current problem of multiple federal agencies communicating different messages regarding risk to the same communities. For example, due to different standards and terminology, FEMA and USACE messages regarding levees are often confusing to communities.[140] In addition to delivering a more unified message, coordinating with other agencies can help deliver the messages more effectively. For example, other federal agencies are more field-dispersed and place-based than FEMA and often have relationships with state and local officials that FEMA regions could leverage to enhance risk communication and mitigation. In turn, state and local officials often are trusted more by community members than the federal government. The regions are increasingly coordinating with other federal agencies to carry out risk communication activities. For example, in coastal areas, CSC has extensive experience in communicating with communities on coastal hazards and some regions have partnered with CSC to leverage their expertise. Given CSC's extensive experience in mitigation and resilience, there may be additional opportunities to coordinate with CSC to advance Risk MAP goals.

  As another example, USACE and FEMA outreach materials on levees mention both agencies. Unified and consistent federal messaging about risk, delivered from multiple sources only strengthens the communication and reduces community confusion. FEMA is also working more closely with state and local governments, including through the CTPs, to communicate risk to communities.

- **Levee Data Sharing**—While USACE Districts and FEMA regions exchange data related to levees, the exchange of information and the timing of the exchange are inconsistent, and neither agency has policy guidelines on how to use the information received from the other agency.[141] In recognition of this problem, USACE and FEMA are planning to develop policies and procedures specifying the types of information to be exchanged, frequency of exchange, and when actions of one agency trigger action in the other.[142] This guidance will be even more important as FEMA begins to implement new procedures for mapping unaccredited levees.

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[140] National Research Council. *Levees and the National Flood Insurance Program: Improving Policies and Practices*. 2013.
[141] Federal Emergency Management Agency and US Army Corps of Engineers. *Flood Protection Structure Accreditation Task Force: Interim Report*. January 2, 2013.
[142] Ibid.

Participating in Interagency and Intergovernmental Coordination Bodies

FEMA participates in interagency and intergovernmental coordination bodies primarily at the headquarters level. Strategically evaluating participation in interagency and intergovernmental coordination bodies helps ensure that opportunities for coordination are maximized. The evaluation should include an assessment whether the suitable people, with the appropriate skills and authorities, are participating in the various interagency and intergovernmental coordination bodies; and that the appropriate level of resources is being expended.

Finding 3f: Staff often does not have the time or resources to participate effectively in federal interagency and intergovernmental coordination bodies involved in flood mapping. It does not appear that FEMA headquarters takes a strategic approach to coordination to ensure that opportunities are not being missed and that the appropriate individuals are participating.

As discussed in Section 2.2 (page 24), FEMA participates in a number of interagency and intergovernmental coordination bodies. None of these bodies has flood mapping as its primary focus, but all undertake some related activities. In most cases, feedback on FEMA's participation in these groups was positive—other agency representatives and FEMA staff believed their participation made a significant contribution. The National Digital Elevation Program (NDEP) and the National Digital Orthoimagery Program are prime examples.

Yet, it does not appear that FEMA has taken a strategic approach to participating in interagency and intergovernmental coordination bodies. Rather, employees have indicated that they participate as they are able, and because of lack of staff and resources, participation in these bodies is often a "luxury."

An example of an interagency and intergovernmental coordination body that has been affected by lack of resources is the Federal Interagency Floodplain Management Task Force (FIFM-TF). The FIFM-TF was established in 1975 as a result of the National Flood Insurance Act of 1968, which mandated the formation of a national floodplain management program.[143] FEMA leadership has demonstrated that they value this forum through co-chairing the meetings with USACE and providing financial contributions to FIFM-TF projects when other members were unable to do so. However, at the Working Group level, only one FEMA representative participates. The Working Group members have estimated that the total amount of time that members have to devote to the Working Group is approximately three FTEs. Considering that the FIFM-TF has adopted a Work Plan consisting of seven activities (one of which is a flood mapping activity), it appears FEMA's participation in the Working Group is understaffed. In addition, the Work Plan states that

[143] Federal Interagency Floodplain Management Task Force. *Charter and Organizational Rules*. October 14, 2010.

no funding is available for the activities, so implementation will occur as resources become available.[144] With staff and budget cuts, FEMA may not be able to address these issues.

Based on FEMA's expanded mission and vision due to Risk MAP, as well as the new requirements of the Biggert-Waters Act, FEMA may need to reexamine participation in some interagency and intergovernmental coordination bodies. The following are two examples of interagency and intergovernmental coordination bodies that may be more closely aligned with FEMA's current focus and activities than they were in the past. While FEMA has been involved in these bodies, other agency participants believe increased FEMA involvement would benefit both FEMA and the other participants.

- The Interagency Working Group on Ocean and Coastal Mapping[145] is working on topographic-bathymetric specifications for input into the 3D Elevation Program (3DEP) process to ensure it meets the needs of the coastal mapping community, as well as coordinating various stages of the life cycle of data, including validations, stewardship, dissemination, and archiving. While FEMA staff has participated substantially in the IWG-OCM in the past, participation has waned in the last couple of years due to lack of staff time and a perception that the value of participation for FEMA is very low.
- The Integrated Water Resource Science and Services[146] consortium is working together to develop inundation mapping standards and online, interactive inundation maps that show the floodplain at different river levels. These maps can be powerful educational tools that can guide mitigation action.

Formalizing Relationships with Federal, State, and Local Agencies

Written agreements with other agencies, such as memoranda of understanding (MOU) and interagency agreements (IAA), formalize relationships by articulating agreed-upon outcomes, establishing joint strategies, and clarifying roles and responsibilities.[147] These written agreements are most effective when they are monitored and updated on a regular basis.[148] Not all coordination needs written documentation, but formal written agreements can be a powerful tool for coordinating with federal, state, and local agencies.[149]

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[144] Federal Interagency Floodplain Management Task Force. *Federal Interagency Floodplain Task Force Work Plan*. January 24, 2013.

[145] According to its charter, the Interagency Working Group on Ocean and Coastal Mapping was established by the Subcommittee on Ocean Science and Technology of the National Science and Technology Council, Committee on Environment, Natural Resources and Sustainability. The Subcommittee on Ocean Science and Technology serves the role of the Interagency Committee on Ocean and Coastal Mapping mandated by Section 12203 of the Ocean and Coastal Mapping Integration Act of 2009.

[146] The Integrated Water Resource Science and Services consortium is led by NOAA in response to interest expressed by "multiple agencies and major water information customers." National Oceanic and Atmospheric Administration, US Army Corps of Engineers, and US Geological Survey. *Integrated Water Resources Science and Services: An Integrative and Adaptive Roadmap for Operational Implementation*. February 2009.

[147] Government Accountability Office. *Managing for Results: Key Considerations for Implementing Collaborative Mechanisms*. September 2012.

[148] Ibid.

[149] Ibid.

Finding 3g: Many activities carried out in coordination with other federal agencies are not formalized with memoranda of understanding or interagency agreements.

FEMA has entered into a number of formal agreements with federal agencies to accomplish a variety of goals. The existing agreements discussed below are not an exhaustive list, but rather illustrative examples.

- **United States Geological Survey**—FEMA and USGS have an MOU in place to integrate Risk MAP elevation data with other national elevation datasets to facilitate data accessibility and ease of use.

  Another MOU describes much broader coordination activities between the two agencies.[150] This MOU provides a framework for entering into agreements for specific activities programs, projects, and financial arrangements. The Memorandum lists priority areas for coordination, including information coordination about activities that could be leveraged for mutual benefit, public outreach and education, long-term mitigation, and data collection and preservation and notes that collaboration will continue in the areas of geospatial data and sharing of information.[151] The Memorandum states, "FEMA and USGS agree to encourage, coordinate, and enhance ongoing relationships between both entities and to hold periodic partnership meetings both at the national and regional levels…"[152]

  Through mission assignments, FEMA reimburses USGS for mobilizing and retrieving real time flood inundation and storm tide monitoring during hurricanes. Not having a more stable formal agreement at the national level, such as an MOU or IAA, has created uncertainty for USGS because they have to do the work and trust that they will be reimbursed. Usually, USGS is reimbursed, but there has been at least one case when they were not. A more reliable funding mechanism might facilitate work with USGS, not just on storm tide monitoring, but also other data and knowledge that USGS has that may be useful to FEMA.

- **US Fish and Wildlife Service**—FEMA has entered into an IAA with Fish and Wildlife that is renewed on an annual basis. The purpose of the IAA is to provide a mechanism for FEMA to reimburse Fish and Wildlife for depicting Coastal Barrier Resources System boundaries on FIRMs. This is an important service for Fish and Wildlife to provide, because federal financial assistance, including flood insurance, is prohibited in Coastal Barrier Resources System areas.

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[150] Federal Emergency Management Agency and US Geological Survey. *Memorandum of Understanding between the Federal Emergency Management Agency of the Department of Homeland Security and the U.S. Geological Survey of the Department of the Interior*. September 2011.
[151] Ibid.
[152] Ibid.

While these agreements appear to be working well, both FEMA personnel and employees of partnering agencies indicated that other joint activities would benefit from having a written agreement in place. Some examples include data sharing with USACE Engineer Research and Development Center and the informal interagency group working together to develop sea level rise tools.

Finding 3h: The Risk MAP project charter, co-signed by FEMA and affected local governments, has the potential to enhance community engagement by specifying project scope and clarifying roles and responsibilities.

With the introduction of Risk MAP, local governments are now asked to co-sign a project charter with FEMA that defines the scope of the project and describes expected changes as a result of the Risk MAP study (e.g., changes in the flood hazard area).[153] The project charter should also include:

- the regulatory and non-regulatory products the community will receive;
- the mitigation technical assistance that will be provided;
- roles and responsibilities of the co-signers;
- data to be provided, as well as deadlines;
- a projected timeline for the study; and
- what is expected from the FEMA project team.[154]

The communities review and provide input on the project charter before it is signed, providing an opportunity for coordination in the process itself. One Region indicated that having expectations and deadlines in writing has helped ensure that the project team receives necessary data from the communities.

Harnessing Technology to Facilitate Coordination

Technologies, such as information-sharing websites and integrated electronic reporting processes and procedures, can be utilized to enhance and sustain coordination.[155]

Finding 3i: FEMA is increasingly taking advantage of technology, such as shared databases and websites, to coordinate with other federal agencies.

FEMA and partner agencies are increasingly using shared databases and websites to facilitate and institutionalize coordination.

- **National Levee Database**—USACE is developing the National Levee Database (NLD), which is populated with data from both FEMA and USACE. FEMA will phase

[153] Federal Emergency Management Agency. *Risk Map Meeting Guidance*, Operating Guidance 04-11. July 20, 2011.
[154] Federal Emergency Management Agency. *Guidelines and Standards for Flood Risk Analysis and Mapping: Appendix I: Discovery*. June 2, 2011.
[155] Government Accountability Office. *Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms.* September 2012.

out its Mid-Term Levee Inventory and the NLD will become the primary mechanism for information exchange on levees and will allow levee sponsors to find all federally available information regarding their levees in one place.[156] The NLD will include data from all federal agencies, states, and tribes, with the ultimate goal of including data on all levees in the nation. Both agencies will have to develop policies and procedures on the information to exchange and the frequency of NLD updates.[157] An MOU on the NLD will also be developed.

- **NDEP Project Tracker**—FEMA has funded an online project tracker that is run by NDEP. The purpose is for federal agencies, states, and communities to input ongoing and planned elevation project activities to facilitate coordination and avoid duplication. The problem is that the tracker is difficult to use.

- **C-STORM**—USACE is developing C-STORM, a database for the Great Lakes that is now being expanded to include data from other Federal Agencies and other FEMA regions. C-STORM includes valuable data for use in storm surge modeling. C-STORM will make a large portion of FEMA's coastal data accessible to engineers and researchers, not to mention FEMA contractors. FEMA has a legal requirement to archive data, but often this translates to hard drives on shelves. This database has the potential to reduce duplication of effort, because contractors and other agencies will have access to existing storm surge data, rather than starting from scratch. Some FEMA regions have provided funding to support the population of the C-STORM database with storm surge data from their region. It may take some time for C-STORM to become the national storm surge database envisioned by USACE because the decision to provide funding and data is made by each region, rather than at FEMA headquarters.

FEMA's Websites

Providing user-friendly online access to products and information means that stakeholders have access whenever it is convenient for them. It can reduce inquiries and reinforce messages.

Finding 3j: While FEMA's websites are a mechanism for the most passive type of coordination, Risk MAP's emphasis on communicating risk and spurring mitigation action increases the importance of developing a website that is easy to use for the public; decision-makers; and other local, state, and federal agencies. It should provide the tools and information needed by these diverse audiences.

FEMA views its websites as an interface with the general public, and not as a tool for the full range of users, including federal, state, and local government agencies; private sector; or academics. However, interviewees and the study team's review of the websites indicate

[156] Federal Emergency Management Agency and US Army Corps of Engineers. *Flood Protection Structure Accreditation Task Force: Interim Report.* January 2, 2013.
[157] Ibid.

that FEMA's flood-related websites (including the Map Service Center, FloodSmart.gov, and the Risk MAP pages of FEMA's organizational website) could better meet the needs of the public. The current sites are either too difficult to use or are of limited utility. Improving the usability and utility of FEMA's websites would greatly enhance FEMA's ability to distribute products, tools, and information that will support decision-making to better prepare the nation for flood incidents. An improved website has the potential to serve as a useful single point of entry for a wide range of flood risk, mitigation, preparedness, response, and recovery information from both FEMA and partner agencies. This would tie together a broad range of FEMA's strategic goals. One model is BusinessUSA.gov, which serves as such a "one-stop shop" for small businesses to access government information and services.[158] This could present a valuable opportunity to help harmonize risk communication across multiple agencies to meet a shared goal of improving awareness to flood risks and facilitating risk reduction activities, Goal 5 of Risk MAP. The issue of improving the effectiveness of risk communication has been highlighted in recent studies as critical to prompting individuals and communities to take action to reduce exposure to flood risk.[159]

Goal 4 of Risk MAP is to "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." FEMA's vision for the future of Risk MAP includes improving tools and data delivery to make them easier to understand, use, and integrate with other information.[160] One of the ways FEMA plans to achieve this is to collaborate with major end users of the data to identify requirements and make appropriate changes to how FEMA delivers data.[161]

The regions and some states have launched their own websites to deliver data and information on the Risk MAP program. These websites are improvements over FEMA's current headquarters' websites and also could serve as models. But in the future, having a central website that provides user-friendly data, tools, and online training will likely be much more efficient and cost-effective than each region having its own website.

Another model that was brought up in multiple interviews is the Coastal Services Center's (CSC) Digital Coast website. Digital Coast delivers data that are easy to use by decision-makers and the general public. CSC works with associations of state and local officials to identify user requirements.

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[158] Business.USA.gov

[159] Congressional Research Service. *The National Flood Insurance Program: Status and Remaining Issues for Congress*. February 6, 2013; National Research Council. *Levees and the National Flood Insurance Program, Improving Policies and Practices*. 2013.

[160] Federal Emergency Management Agency. *Flood Data Delivery: Risk MAP Strategies for Increasing the Use of FEMA's Flood Data*. 2010.

[161] Ibid.

3.4 VALUING REGULATORY AND NON-REGULATORY PRODUCTS

Many of the interviews highlighted the importance of non-regulatory products and services in communicating flood risks to communities. These can include additional analyses or work through a variety of scenarios other than the 100-year and 500-year flood risk. Risk communication goes beyond simply delineating a floodplain by demonstrating to a community its economic, infrastructure, and other vulnerabilities to flooding. They may also demonstrate how certain mitigation activities could reduce those vulnerabilities and help FEMA achieve its stated vision of prompting actions to reduce risk to life and property, as well as factor in a community's preparedness activities.

In addition to increasing awareness with this information, FEMA has several incentives to prompt community action. FEMA provides grant funding for hazard mitigation assistance that can supplement a state, local, or tribal government's own resources.[162] Another important incentive is the Community Rating System (CRS).[163] By doing more than the minimum flood management activities required to participate in the NFIP, the community's property owners can be given discounts on insurance premiums.[164] By providing compelling information about flood risk, FEMA can precipitate action to reduce risk.

Finding 3k: FEMA's suite of regulatory and non-regulatory products and services are important to support both the insurance program and the communication of flood risk. FEMA should adequately and consistently convey the value of both types of products, provide the flexibility to produce them, and identify sources and appropriate levels of resources to apply them.

Despite the importance of non-regulatory products and services in meeting FEMA's goals for Risk MAP, many interviews indicated that there is not a proper balance between regulatory and non-regulatory efforts. Interviewees suggested that this is the result of several factors. Perhaps most notable is that property owners, communities, and Congress continue to focus on the FIRMs because of their financial impact and statutory requirements to update and review them every five years. This focus can be expected to increase over the next several years as map update efforts initiated several years ago come to completion at the same time the insurance program is phasing out subsidies and grandfather provisions, per the Biggert-Waters Act.

FEMA regional staff noted that while non-regulatory products and services are less expensive than map updates, in a time of declining budgets tradeoffs have to be made. FEMA has already pushed back targets for Risk MAP implementation and map updates. Current program performance measures reinforce the priority of regulatory products. On

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[162] Information on the Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance can be found on http://www.fema.gov/hazard-mitigation-assistance.

[163] National Flood Insurance Program Community Rating System, http://www.fema.gov/national-flood-insurance-program-community-rating-system

[164] Federal Emergency Management Agency. *National Flood Insurance Program: Community Rating System Coordinator's Manual*. 2013.

the Balanced Scorecard, FEMA currently tracks the percentage of NVUE compliant mapped miles that have been attained or initiated and the percentage of coastal miles with flood studies initiated. There is no comparable measure for non-regulatory products. Interviewees indicated that this factors into decisions about resource allocations.

FEMA delivers non-regulatory products and services directly to communities, often as part of the roll out of a map update. Unlike FIRMs, these products are not currently posted online. The expectation is that communities will use them in their efforts to improve floodplain management, as they deem appropriate. However, this limits their impact. Communities miss opportunities to see how others facing similar risks respond to the challenges. Regional and national groups can't easily assess trends or get this information to develop or update management practices. Only community members present at the delivery meeting may get to see them. This may short-circuit community-based efforts to build support for additional risk reduction. This practice unnecessarily limits the value of these non-regulatory products. FEMA has indicated that it is developing a system to post these products online and this should improve access and utility.

Given Risk MAP's emphasis on precipitating action to reduce risk to lives and property, reinforcing the importance of non-regulatory products and services may facilitate the implementation of this new approach. FEMA should update performance measures and guidance to allow for the flexibility needed to provide both regulatory and non-regulatory products and services.

3.5 The Technical Mapping Advisory Council Can Help Enhance Coordination

The Biggert-Waters Act also re-established the Technical Mapping Advisory Council (TMAC). The National Flood Insurance Reform Act of 1994 established TMAC for a five-year period and it was sunset after submitting a final report in 2000.[165] The TMAC will provide recommendations to FEMA on a wide range of issues, including:

- improving and maintaining FIRMs and risk data accuracy;
- enhancing interagency and intergovernmental coordination;
- developing joint funding strategies; and
- incorporating future conditions, such as sea level rise and future development, into FIRMs and non-regulatory products.

Finding 3l: The re-established Technical Mapping Advisory Council can be a valuable coordination mechanism for surfacing strategic and operational issues and developing recommendations that can improve coordination of flood mapping programs and funding.

[165] P.L. 103-325, Section 576.

The focus on evaluating the production process, quality, and distribution of flood maps along with communication of flood risks mirrors the topics of the previous TMAC.[166] Since the TMAC sunset in 2000, there have been sufficient advancements in technology, modeling, and communication platforms to warrant additional evaluation. The 20 members of the Council will be appointed by the FEMA Administrator and will include representatives from federal, state, and local governments along with technical experts. The Administrator must report to Congress on recommendations made by the TMAC, and include an explanation of what FEMA has done to address the recommendations or why the agency has chosen to defer or not act on any recommendation.[167]

Multiple interviewees pointed to the re-establishment of the TMAC as an important means of enhancing flood mapping coordination. They noted that the TMAC can help FEMA and partners enhance coordination on both strategic and operational levels. Formalized mechanisms with clear roles and responsibilities, shared goals, and requisite resources have proven successful in improving coordination.[168] It will be important for FEMA to adequately resource the Council with staff and/or technical support for it to be effective.

The duties the Biggert-Waters Act assigned to the TMAC touch on a wide range of flood mapping activities, including both traditional efforts and the new requirements, such as future conditions.[169]

Of particular note is that the Biggert-Waters Act specified that the TMAC shall make recommendations both to FEMA and to the participating federal agencies on the following:

- methods for improving interagency and intergovernmental coordination on flood mapping and flood risk determination; and
- a funding strategy to leverage and coordinate budgets and expenditures across federal agencies.[170]

Having the scope of the TMAC's responsibility include more than just FEMA's activities and programs means that the Council can impact coordination efforts across the federal government. This presents a valuable opportunity to examine more closely the various agencies' contributions to flood mapping and ensure that the capabilities and capacities of each are being leveraged appropriately. Data and products are often developed by other local, state, and federal partners for a primary purpose other than flood mapping. Understanding and accommodating those other requirements may help FEMA expand coordinated efforts with those partners and leverage additional resources.

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[166] Technical Mapping Advisory Council. *Final Report to the Honorable James Lee Witt: A Summary of Accomplishments and Recommendations*. 2000.
[167] P.L. 112-141, Section 100215.
[168] Government Accountability Office. *Results-Oriented Government: Practices That Can Help Enhance and Sustain Collaboration among Federal Agencies*. October 2005; Fountain, Jane. *Implementing Cross-Agency Collaboration: A Guide for Federal Managers. IBM Center for the Business of Government*. 2013.
[169] P.L. 112-141, Section 100215(c) and Section 100215(d).
[170] P.L. 112-141, Section 100215(c)(5).

Chapter Two included an illustrative outline of the flood mapping process and how various partners contribute to it. A more thorough examination of this process by the members of the TMAC who have the requisite technical knowledge of flood mapping requirements and the capabilities of various participants could yield recommendations on how to better leverage those capabilities. This could include the identification of new data sources, how to synchronize activities more effectively, or recommendations on how to fill gaps.

The TMAC is also tasked with making recommendations on funding strategies. As a group with non-federal participants, it will not be privy to pre-decisional federal budget information needed to fully develop a national funding strategy. However, it can make recommendations about activities to prioritize, how to better align mission activities, and how to synchronize these with the activities of state and local partners. These recommendations could help inform the development of the government-wide strategy discussed in Section 4.2 (page 76).

The TMAC is different from the other flood-related coordinating entities identified in Figure 2 in that its sole focus is on flood-mapping and flood risk determination. Some of the issues surfaced during TMAC discussion may be best addressed by one of the other interagency or intergovernmental coordination entities. Likewise, these groups may encounter issues best referred to the TMAC. For example, the Federal Interagency Flood Management Task Force highlights the value flood maps have in flood management in its current Work Plan. It includes activities designed to improve awareness of flood mapping efforts planned or underway and to improve coordination to reduce duplication and enhance use of data.[171] This Work Plan was drafted prior to the re-establishment of the TMAC, but participants acknowledged that this is something that would be better addressed through the TMAC once it is re-established. Similarly, as the TMAC deliberates on how best to address future conditions associated with climate change, it may find that it has issues that should be referred to the US Global Climate Change Research Program. This program coordinates climate change research across federal agencies. It could be a valuable resource to help the TMAC as it develops recommendations on how to ensure that FIRMs incorporate the best available climate science to assess flood risks.[172]

The TMAC has not yet begun its work. FEMA indicated to the Panel that efforts to re-establish the TMAC under the procedures set forth by the Federal Advisory Committee Act[173] are well underway: a charter has been drafted; a website to help interested stakeholders keep informed about meetings, reports, and agency responses to recommendations is being developed; and the selection process for members has been initiated. FEMA indicated that the target is to have the first meeting before the end of 2013.

[171] Federal Interagency Flood Management Task Force. *Work Plan*. January 24, 2013.
[172] For more information about the US Global Change Research Program, see globalchange.gov.
[173] P.L. 92-463.

3.6 RECOMMENDATIONS

Based on the findings discussed, the Panel has recommendations for actions that may be taken to enhance interagency and intergovernmental coordination on flood mapping activities. While some of the recommendations focus on federal level action, they will also impact coordination at the state and local government levels as well.

Recommendation 1: FEMA leadership should continue to facilitate and/or accelerate the full implementation of Risk MAP.

To implement this recommendation, FEMA should:

- Complete the ongoing analysis of the new flood mapping requirements in the Biggert-Waters Act.
- Assess whether the existing allocation of resources is sufficient to meet these new requirements, whether re-aligning current resources is needed, or identify the new resources needed.
- As part of this assessment, FEMA should identify and prioritize cost-effective mechanisms and creative funding strategies to meet the five goals of Risk MAP.

Recommendation 2: FEMA should develop additional guidance and prioritize coordination to help advance Risk MAP goals.

To implement this recommendation, FEMA should:

- Engage in an ongoing national dialogue with other local, state, and federal agencies to identify additional opportunities for coordination on risk communication and mitigation. This dialogue might leverage existing venues such as professional association meetings.
- Continue working with USACE to develop and implement policies for sharing levee data.
- Develop guidance on consulting and coordinating with states and other federal agencies when prioritizing and sequencing projects.
- Study existing coordination of regions with CTPs to identify most effective models for outreach and for risk communication; collect information on the pros and cons of state-level versus local-level CTPs; provide a forum for regions to share success stories around CTP coordination; and issue guidance to Regions that helps institutionalize CTP best practices.
- Encourage active participation in Silver Jackets and provide pilot project success stories to enhance interest and spark action.
- At the headquarters level, explore ways FEMA could coordinate with other federal agencies to advance Risk MAP and develop joint policies for regions and state/district/local federal agency offices. For example, enhance opportunities to coordinate with CSC on resilience and mitigation in the coastal context and to leverage USGS's and NOAA's online inundation map libraries.
- Identify opportunities to coordinate on risk communication and mitigation to the regions.

- Assess the efficacy and cost effectiveness of various outreach methods by CTPs, Silver Jackets, the CRS, and state and local governments, and use this assessment to provide guidance to project teams on the development and delivery of risk communication products and services.

Recommendation 3: FEMA should revise the Risk MAP Balanced Scorecard to reflect all Risk MAP goals.

To implement this recommendation, FEMA should:

- Revisit the five stated goals of Risk MAP to reaffirm that each can be effectively portrayed and measurable objectives specified in the Balanced Scorecard.
- Work through the established process in the Risk MAP Program Performance Measurement Plan for developing objectives, sub-objectives, and measures around those Risk MAP goals not already in the Balanced Scorecard.
- Ensure that in the GPRAMA-required quarterly reviews of progress against Balanced Scorecard objectives, FEMA leaders regularly focus on coordination and its effectiveness.

Recommendation 4: FEMA should consistently apply personnel policies at headquarters and in the regions that foster coordination.

To implement this recommendation, FEMA should:

- Include coordination in job descriptions and personnel performance plans related to coordination, as appropriate.
- Explore opportunities to bridge organizational cultures through IPAs with agencies that FEMA needs to work with more closely in the implementation of Risk MAP and new requirements of the Biggert-Waters Act (e.g., NOAA, USGS).
- Include expectations in personnel performance plans to work with communities to identify and provide Risk MAP products and services.

Recommendation 5: FEMA should collect, disseminate, and, as appropriate, institutionalize best practices on coordinating with state and local governments, including utilizing Cooperating Technical Partners and the Community Rating System to enhance state and local engagement.

To implement this recommendation, FEMA should:

- Evaluate existing and consider possible additional CTP performance metrics where appropriate.
- Systematically collect information on CTP performance both through reported metrics and discussions with CTP leads, to capture more qualitative performance information that may not be amenable to standardized measures.
- Develop strategies to increase participation in the CRS including the communication of its benefits, best practices, and options for funding assistance for mitigation projects.
- Provide guidance to the regions on coordinating with state and local governments based on collected best practices.

Recommendation 6: FEMA should assess and prioritize its participation in interagency and intergovernmental coordination bodies in support of Risk MAP to ensure that opportunities are not being missed, appropriate staff are participating, and the appropriate amount of resources are being expended. FEMA should also review the work of interagency and intergovernmental coordination bodies and consider proposing changes to these bodies in support of Risk MAP objectives.

To implement this recommendation, FEMA should:

- Assess the effectiveness of current engagement with interagency and intergovernmental coordination bodies, and make adjustments in terms of staff assignments and resources, as appropriate.
- Reassess the missions and activities of interagency and intergovernmental coordination bodies that FEMA is currently not participating in to determine if participation would be appropriate.
- Review all the coordinating bodies related to Risk MAP to determine if consolidation or change in scope might make coordination more effective and cost-efficient.

Recommendation 7: FEMA should identify interagency and intergovernmental partnerships that would benefit from formalizing a well-defined opportunity for coordination.

To implement this recommendation, FEMA should:

- Discuss ongoing activities with agency partners to determine whether a formal agreement would facilitate coordination and implementation. For example, assess—in partnership with USACE, NOAA, and the US Global Change Research Program—the advantages and disadvantages of formalizing the group that has been coordinating to develop sea level rise tools.
- Develop MOUs and IAAs with partner agencies, as appropriate.

Recommendation 8: FEMA should continue to explore and develop shared technologies to facilitate interagency coordination and avoid duplication of effort.

To implement this recommendation, FEMA should:

- Continue to work with USACE to populate the NLD and add state and local data.
- Address the usability issues of the NDEP Project Tracker or implement a new solution.
- Help populate USACE's C-STORM database by providing data and funding support to reduce duplication of effort by making existing data easily accessible.
- Explore additional opportunities for coordination through technology with agency partners.

Recommendation 9: FEMA should coordinate with other federal, state, and local agencies to leverage their unique experience and competencies to improve Risk MAP products and services and to understand how they could more broadly support other agencies' missions.

To implement this recommendation, FEMA should:

- Review other agencies' risk communication efforts and identify opportunities to improve and reinforce multi-agency risk communication.
- Review other agencies' products and their delivery to identify best practices that can enhance Risk MAP products and their delivery.
- Solicit input on how Risk MAP services and products can help meet the needs of other agencies.
- Develop guidance on coordinating with other federal agencies when developing and delivering Risk MAP products.

Recommendation 10: FEMA should improve its websites to achieve the goal of providing an enhanced digital platform that improves management of Risk MAP, 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. FEMA should also consider a single portal for entry to FEMA flood hazard and risk information.

To implement this recommendation, FEMA should:

- Provide tools and online training to help maximize the usefulness of Risk MAP data and products to states, communities, and other federal agencies.
- To the extent possible, develop shared databases and link websites to provide a single point of access for all flood hazard data and information. At a minimum, FEMA websites should be linked and users should be able to navigate between them with ease. FEMA's websites should also link to websites of other federal agencies and state, local, and regional entities, as appropriate. FEMA should explore opportunities to develop joint databases, similar to the National Levee Database and C-Storm efforts.
- Consider models for identifying user requirements, such as Digital Coast's model of working with a wide range of associations representing state and local officials to determine user requirements to improve the utility and user-friendliness of FEMA websites.
- Learn from model "one-stop shop" federal websites, such as BusinessUSA.gov and Digital Coast, to improve the Risk MAP digital platform.

Recommendation 11: FEMA should reinforce the importance of non-regulatory products as a means to precipitate community action to reduce flood risk.

To implement this recommendation, FEMA should:

- Update annual guidance to ensure sufficient flexibility in resource allocations to address both regulatory and non-regulatory needs. This should include some allowance for tradeoffs in performance to best achieve all of the Risk MAP goals.

- Develop a performance measure for non-regulatory products and services to balance those used for regulatory products. The TMAC may be able to assist FEMA with this task.
- Make non-regulatory products available online.

Recommendation 12: FEMA should use the Technical Mapping Advisory Council to drive continued improvements in interagency and intergovernmental coordination.

To implement this recommendation, FEMA should:

- Work with the Office of Management and Budget and the General Services Administration to expedite the remaining steps needed to re-establish the Council.
- Work with the Chair of the TMAC to set an agenda that will provide a cohesive review of the flood mapping process, including existing and new mapping requirements. This may include the use of working groups to cover the range of topics with appropriate stakeholders.
- Provide adequate resources to support the work of the TMAC.
- Involve both headquarters and regional staff in the TMAC meetings to ensure appropriate coverage of strategic and operational issues.

CHAPTER FOUR: ENHANCED COORDINATION OF FUNDING

This chapter focuses on opportunities to improve flood mapping work through strategies and mechanisms for coordinating funding across agencies and levels of government. It reviews factors hindering FEMA's further progress in coordination, opportunities to overcome or mitigate these challenges, and recommendations for action that FEMA, as well as the Office of Management and Budget (OMB) and Congress might take to realize these opportunities.

4.1 FACTORS HINDERING FURTHER PROGRESS ON FUNDING COORDINATION

Flood mapping projects are inherently complex operations that require coordination on a variety of technical engineering dimensions, as well as multi-party synchronization of funding resources that link with contract specifications.

FEMA, like its other federal, state, and local partners, has particular mission requirements. Even though there may be significant overlap between the mission requirements of FEMA and its federal, state, and local partners in a given geographic area, funding limitations not infrequently prevent FEMA from making the additional investments needed to realize opportunities to advance the "greater good." For example, it may be more efficient to partner with USGS to collect elevation data for an entire state, but FEMA may only have the resources needed to collect elevation data for the specific watersheds it has prioritized for flood mapping.

The coordination required to meet its mission requirements and to realize "greater good" opportunities has always been difficult. One major complicating factor is funding uncertainty. The long-term planning required for effective coordination is hindered by an annual budget cycle, as well as different planning and budget cycle timeframes of federal, state, and local partners. Increased uncertainty about future federal budget funding levels and the timing of appropriations has made coordination even more challenging.

Despite these difficulties, FEMA has worked to improve both interagency and intergovernmental coordination. For example, FEMA, together with the broader mapping community, has made progress in coordinating to achieve efficiencies and avoid duplication in data collection, especially elevation data, which promises the greatest improvements in the accuracy of flood maps in riverine areas, where most flood mapping projects are conducted.[174] FEMA is aided in these efforts by its unusual flexibility to engage in joint funding provided by Congress in the National Flood Insurance Act of 1968 and later through amendments to the Economy Act.[175] The added budgeting flexibilities pertaining to

[174] National Research Council, *Mapping the Zone.* 2009.

[175] The National Flood Insurance Act of 1968 (P.L. 90-448) is the primary section addressing flood mapping, authorizing FEMA to "enter into agreements or other arrangements with… [list includes agreements with private federal, state, and local agencies, individuals and private firms]…., in order to identify and publish information with respect to all flood plain areas…., and establish or update flood-risk zone data…" The Economy Act of 1932 (P.L. 72-212) as amended addresses how interagency acquisition of goods and services

FEMA are tempered by the fact that agencies entering into project-related agreements with FEMA are more accustomed to establishing agreements under the Economy Act and often approach agreements with FEMA under that framework instead.

In recent years, the normal challenges to effective coordination have been exacerbated by declining budgets together with expanding mission requirements.

Finding 4a: Current funding levels do not provide FEMA with the resources needed to meet its mission requirements in a timely manner, including its commitments under Risk MAP and activities mandated by the Biggert-Waters Act of 2012.

Total funding for Risk MAP has dropped significantly each year since fiscal year 2010, declining from $324.7 million to $207.5 million in fiscal year 2013. This reflects significant declines in appropriations (consistent with the President's budget requests), while appropriated fee income from flood insurance premiums has remained relatively stable after more than doubling in 2009. (Risk MAP budget and appropriations data for fiscal years 2004-2013 are provided in Table 3 on page 24.)

Reduced budgets have forced FEMA to delay significantly its efforts to update flood maps and to make tradeoffs between the production of traditional regulatory products (FIRMs and Flood Insurance Study reports) and its newer Risk MAP initiatives to improve the communication and mitigation of risk, including the development and delivery of various non-regulatory products and services. The increasing challenge of meeting its own mission requirements has made it even more difficult for FEMA to address "greater good" opportunities. This challenge will be become even more acute as FEMA takes actions needed to address additional Biggert-Waters Act requirements.

At the same time budgets have declined, FEMA's mission requirements have significantly expanded, including the broader set of goals to which FEMA is committed under Risk MAP and the activities mandated by the Biggert-Waters Act. While the Biggert-Waters Act authorized appropriations of $400 million a year to help meet the cost of new requirements, increased appropriations have not yet been made. This authorization, which is nearly double the size of Risk MAP's current budget clearly indicates a large gap between current funding and what is needed to meet mission requirements. Under current funding levels FEMA will be required to make essential tradeoffs among an expanding set of mission requirements.

4.2 Opportunities for Improving Funding Coordination

The study identified six opportunities for improving coordination on a funding strategy to leverage and coordinate budgets and expenditures and to establish joint funding

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are to be effected. In short, federal agencies that order goods and services from another federal agency must pay the actual costs of those goods and services. Unless a specific exception is granted by Congress, the terms of the Economy Act apply to all acquisition of goods and services from other agencies.

mechanisms to share the cost of the collection and utilization of data among all governmental users:

1. Developing a government-wide strategy for investment in the collection and use of data and the development of advanced modeling capabilities that support the mapping requirements of multiple agencies;
2. Using the budget crosscut mandated by the Biggert-Waters Act to identify opportunities for funding coordination;
3. The 3DEP strategy for the joint funding of nationwide collection of elevation data;
4. Working with the re-established TMAC to prioritize opportunities for funding coordination;
5. Collecting information at FEMA headquarters needed to guide future investments in the CTP program; and
6. Exploring alternative cost-sharing arrangements with state and local partners.

A Government-wide Strategy for Investment in Priority Mapping Capabilities

Improvements in flood mapping depend on an interrelated set of capabilities that also support a range of mapping activities by other federal agencies. These include accurate, high-resolution orthoimagery and elevation data, and related collection and processing capabilities, as well as advanced modeling capabilities. Advances in these capabilities depend on and stimulate the need for advancement in others. For example, realizing the opportunities provided by rapid advances in digital orthoimagery has required more accurate elevation data.[176] No single agency has the ability or incentive to support the development of these capabilities given limited resources and mandates. Nor would it be efficient.

Finding 4b: The efficiency and effectiveness of flood mapping efforts and other federal government mapping activities could be advanced by a government-wide strategy for investment in multi-purpose mapping capabilities.

The Biggert-Waters Act charges OMB with the development of an interagency budget crosscut. To maximize the effectiveness of such a crosscut, it is important to first develop a government-wide strategy to guide investments. As outlined earlier in this report, there are many agencies that conduct activities that can contribute to flood maps. These activities, however, are conducted for a wide array of missions. A government-wide strategy can align mission requirements, set priorities, and clarify roles and responsibilities. There are interagency and intergovernmental coordination bodies concerned with the advancement of these capabilities through such activities as standard setting. In the case of elevation data, there is a major interagency planning effort to enable joint funding of data collection on a nationwide basis that promises great increases in efficiency, as well as large economic benefits for the nation. However, these interagency efforts have been undertaken in the absence of a coordinated approach to oversight and funding by OMB and Congress, whose attentions are divided among different sets of agencies and mission areas.

[176] National Research Council. *Mapping the Zone*. 2009.

OMB has issued guidance that provides a general framework for coordinating investments in geospatial data assets across the federal government.[177] However, OMB has no regular process for coordinating its budgeting and oversight of the multiple agencies engaged in flood mapping activities. More active and continuing engagement by OMB would be required to drive a government-wide strategy.

Two coordinating entities were identified as groups that OMB could work in conjunction with to develop such a strategy: the Federal Interagency Flood Management Task Force (FIFM-TF) and the Technical Mapping Advisory Council (TMAC). Both groups have the federal agencies that would need to be involved in developing such a strategy.

Using the FIFM-TF as the forum for developing this strategy would maintain the link between mapping strategy and investments to the floodplain management activities they support. Both OMB and the Council on Environmental Quality (CEQ) are designated advisors to the FIFM-TF, providing the potential to strengthen the link between flood mapping and management policy and budget. With only federal agency participants, the group would be privy to pre-decisional information related to policy and budget, with the ability to use the information from the strategy to inform budget development and the budget crosscut discussed in the next section. However, there are some limitations. As noted in Section 3.3 (page 52), while flood mapping is an activity covered in the FIFM-TF work plan, it is a small part of what it has done and participants indicated that this function is expected to transfer to the TMAC.

The Biggert-Waters Act charges the TMAC with activities that could serve as the foundation for the development of a government-wide strategy such as making recommendations on how to improve the quality of maps, improve the coordination of mapping activities, and on a funding strategy to leverage and coordinate budgets across federal agencies. The TMAC has flood mapping as its sole focus. The TMAC includes both federal and non-federal participants that would bring local, state, and other technical expertise into the strategy discussion. This has the potential to broaden the strategy to include coordination with state and local government to leverage their activities and clarify roles and responsibilities. However, this also presents a significant limitation as non-federal members of the TMAC will not be privy to pre-decisional policy and budget information; its role is advisory. This could be overcome by having the federal participants in the TMAC serve as a core group to work with OMB on this strategy. Neither OMB nor CEQ are named as members of the TMAC and it doesn't have that same connection between policy and budget as the FIFM-TF.

FEMA plays an important role with each group and it would be important for the agency to ensure adequate communication between them if either was selected as the group to work with OMB on the development of the government-wide strategy. There may be merit in involving both in some capacity.

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[177] Office of Management and Budget. *Circular A-16, Coordination of Geographic Information and Related Spatial Data Activities.* August 19, 2002; *Circular A-16 Supplemental Guidance*. November 10, 2010.

The Budget Crosscut Mandated in the Biggert-Waters Act of 2012

Section 100220 of the Biggert-Waters Act calls for a budget crosscut for the proposed budgets of federal agencies working on flood risk determination and digital elevation models, including interagency transfers. OMB collected data from several agencies, including FEMA, USACE, USGS, NOAA, Tennessee Valley Authority, and the National Aeronautics and Space Administration for fiscal years 2011, 2012, 2013, and the President's budget request for fiscal year 2014. (Summary data are provided in Appendix I). The results of this initial effort were reported to Congress on August 21, 2013.

Finding 4c: The budget crosscut mandated in the Biggert-Waters Act offers an opportunity to identify areas that would benefit from greater funding coordination across agencies. However, the crosscut delivered to Congress does not provide sufficient information to guide improvements in funding coordination.

The crosscut provides only an accounting of expenditures. It lacks common categories and it is not sufficiently detailed to drive greater funding and flood mapping coordination. While this might be deemed a reasonable first step, more information will be needed to enable Congress or OMB to guide further actions on coordination.

An interagency crosscut is a management instrument used by OMB to encourage joint federal agency cooperation for activities: that benefit from an interagency approach; streamlining of roles and responsibilities; and increased cost-effectiveness. The collection of this information also helps identify broad trends in funding over time. Given the complex nature of the federal budget process as well as the particular budgetary cultures of individual agencies, the budget crosscut illustrates the difficulties of achieving a comprehensive interagency analysis and is therefore designed to present a conservative estimate of expenditures.

While there is not a set frequency as to how often a budget crosscut is employed, in general, budget crosscuts are not a common occurrence. Furthermore, a budget crosscut may be required by Congress (as in the case of the Biggert-Waters Act), or it may be prompted by OMB.

A crosscut provides greater transparency and offers the potential for enhanced accountability among agencies when used as an instrument to drive greater coordination. As one might expect, some budget crosscuts have had modest, if not minimal, impact on the coordination of interagency funding and mission implementation. Several aspects of budget crosscuts were identified that can influence its quality and usefulness to drive enhanced coordination. While not an exhaustive list, the following aspects are worthy of note.

- Articulated OMB interagency strategy—A clearly defined strategy (plan) with milestones or performance measures that OMB has, at least tacitly, agreed to with agencies enhances the potential for its success. These need not be GPRA measures.

- Agency perception of crosscut's intent—Agency program officers or financial officers who are contacted to provide data may interpret the request as boding well for the agency and its interagency mission. Others may interpret the request as a potential threat – likely to have a negative future impact on agency funding. There is no rule to draw from this point, except to raise awareness to this dynamic.

- Terms of reference—OMB sets the terms of reference communicated to the agencies involved, defining what data are being requested, the purpose, and other guidance for budget officers to ensure that there is specificity around the data so that they are comparable across agencies. The more detailed and specific the data request, and the clearer its purpose, the better chance that this effort will yield meaningful data that can guide coordination beyond funding, to even include strategy and other measures important to mission achievements. Optimal budget crosscuts often reflect data requests that link funding to cross-cutting goals and objectives.

- Importance of issue to White House—Agencies are much more likely to move beyond mere data sharing in a budget crosscut toward demonstrable and meaningful coordination when either senior OMB and/or White House officials are clearly involved in the effort.

- Senior agency level of involvement—Besides OMB and White House involvement, budget crosscuts have a greater likelihood to drive coordination when senior executives of agencies involved in the crosscut can communicate the importance of the exercise. Agency leadership clear endorsement, thus underscoring the strategic importance of the crosscut, is important.

The 3-D Elevation Program Strategy for Joint Funding of Nationwide Collection of Elevation Data

In recent years, FEMA and the larger federal mapping community have made significant progress in improving interagency and intergovernmental coordination in the collection of geospatial data. Progress has been most notable in the case of elevation data.

Improved coordination in this area is due to a number of factors, including the relative importance of elevation data to the accuracy of maps and the high cost of collection. The importance of elevation data to improved map accuracy came to be broadly recognized following the publication of the National Research Council report, *Mapping the Zone* (2009), which was funded by FEMA and NOAA. This report focused the community on elevation as a priority.[178] While new technologies such as Light Detection and Ranging (LiDAR) have made the collection much more cost-effective, the collection of elevation data remains expensive. This expense, together with a constrained budget environment, has provided agencies with a strong incentive to avoid duplication and share cost whenever possible.

[178] National Research Council. *Mapping the Zone.* 2009.

Interagency coordination has also been facilitated by the creation of the Interagency Elevation Inventory built as part of the National Enhanced Elevation Assessment, which was funded by USGS, NOAA, FEMA, the National Geospatial-Intelligence Agency, and the National Resources Conservation Service following the recommendations of an earlier National Research Council report, *Elevation Data for Flood Plain Mapping* (2007). The inventory provides a systematic source of information on elevation data available for different parts of the country.

FEMA coordinates with other agencies at the national level through the National Digital Elevation Program. This interagency body has been involved in developing common standards and sharing information about agency data collection plans to avoid duplication and identify opportunities for cost-sharing. To assist in information sharing, FEMA funded the development of an online project tracker.

FEMA also has issued systematic guidance on the coordination of geospatial data collection for mapping project teams in the regions. This guidance includes steps for coordinating with state and local entities to ensure that existing data and new data collection efforts are leveraged. Geospatial data coordination is incentivized through FEMA performance metrics that credit regional offices with the value of locally collected data used in mapping projects as leverage.

Finding 4d: The 3DEP plan for a jointly funded program to collect elevation data systematically on a nationwide basis offers a significantly more cost effective alternative to current piece-meal efforts, and will benefit not only FEMA's flood mapping efforts, but also users across the federal government, as well as states and localities.

Despite these coordination efforts, the efficiency of current data collection efforts is constrained by how agencies are funded. The yearly budget cycle, as well as budget uncertainty, and diverse stakeholder business requirements and priorities, limits lead time for the coordination of agency collection plans. This situation also makes coordination with state-level data collection efforts difficult.

The 3DEP program aims to surmount these difficulties by providing for the joint funding of nationwide elevation data collection based on a uniform plan over time. The 3DEP program is an interagency effort with state-level participation, led by USGS, to develop a more systematic approach to collecting and managing elevation data for the nation. The program has developed a plan to collect a comprehensive set of high-accuracy national elevation data over a period of eight years.[179]

By collecting elevation data systematically, on a nationwide scale, 3DEP can acquire the data more cost effectively. This benefits both individual agency users and the federal

[179] The *3D Elevation Program Plan* has not yet been publicly released. Details of the plan discussed here are based on interviews.

government generally, as well as state and local governments. Also, uniform nationwide elevation data opens up new business opportunities that promise large benefits to the nation beyond government mission needs.

The 3DEP has worked to develop agreement among agencies and other stakeholders on a common quality level of data to be collected that will satisfy most business requirements. The plan also provides mechanisms for participants to "buy-up" to higher quality levels they may require beyond the agreed standard.

This plan was developed based on the National Enhanced Elevation Assessment. The Assessment has two key features that set it apart from previous proposals to collect various types of geospatial data on a nationwide basis:

- An assessment of the business requirements of federal agencies, as well as states, the private sector, and non-profit organizations.
- A cost-benefit analysis of nationwide elevation collection.

The 3DEP plan addresses 602 business requirements, including flood mapping. Flood mapping is identified as the biggest near-term beneficiary of systematic nationwide collection.[180]

The 3DEP plan represents an extraordinary interagency effort to develop a mechanism for more efficiently funding the collection of a key input to more accurate flood mapping as well as other important federal, state, and local mapping activities. USGS, FEMA, other federal agency partners and state-level representatives have laid the essential groundwork for a viable joint funding mechanism. However, this plan cannot be realized without the active engagement of OMB in developing a strategy for coordinated budgeting.

The Re-establishment of the TMAC

The Biggert-Waters Act charged the TMAC with making recommendations to the Administrator of FEMA and other federal agencies participating in the TMAC on a funding strategy to leverage and coordinate budgets and expenditures across Federal agencies.[181]

Finding 4e: A re-established TMAC could provide an important forum for FEMA and its partner agencies to identify and prioritize opportunities for greater funding coordination across agencies to improve flood risk reduction mission capabilities.

The TMAC provides a venue for federal, state, and local stakeholders to identify and address obstacles to coordination that inhibit the effective and efficient expenditure of resources. It also presents an opportunity to identify activities that could improve flood mapping and prioritize them for funding.

[180] Dewberry. *National Enhanced Elevation Assessment*. 2012.
[181] P.L. 112-141, Section 100215(c)(5).

CTPs and Other Intergovernmental Mechanisms for Cost-sharing

FEMA's flood mapping projects are inextricably intertwined with state and local government engagement in planning, execution, and funding. FEMA has two basic approaches to resource projects–either through CTPs, or by means of individual Risk MAP projects that bring various governmental units together (perhaps with another federal agency as well) with a common goal.

Given current resource constraints and the high cost of projects, securing multiple sources of funds is imperative to Risk MAP's success. Cost sharing is one factor used by FEMA in prioritizing flood mapping projects.[182] Section 100219 of the Biggert-Waters Act lifts the 50 percent limit on state contributions for updating flood maps, which may enable FEMA to leverage additional state funding in some cases.[183]

Finding 4f: Limited information at the headquarters level about the number, type, role, and performance of Cooperating Technical Partners across the country hinders FEMA's ability to make informed decisions about future investments in the CTP program.

CTPs offer the potential to significantly extend the capacity of FEMA in terms of leveraging state and local resources both in map production and stakeholder outreach and coordination. The CTP program has demonstrated an ability to leverage cash and in-kind resources through cost-sharing arrangements with state and local partners. Table 6 below, which shows program accomplishments annually for fiscal years 2012-2014, indicates that applicant funding match as a percentage of total FEMA grant award amounts was 36 percent in 2012, 11 percent in 2013, and is projected to be 15 percent in 2014. While the cost-share performance of CTPs appears to be declining in percentage terms, it still represents an important multiplier in a period of constrained budgets.

[182] In its fiscal year 2013 congressional budget justification, FEMA clearly indicates the importance of cost sharing in its prioritization of Risk MAP projects: "When targeted at known flood hazard data update needs and included in the partnership agreement, FEMA will give its highest investment priority to capable partners who provide a 25-percent cash match." See the Federal Emergency Management Agency. *Flood Hazard Mapping and Risk Analysis Fiscal Year 2013 Congressional Justification*. 2012.

[183] There have been only a few cases where states have been willing and able to contribute more than 50 percent to projects, but lifting the cap on state cost-sharing will facilitate possible future opportunities.

Table 6: CTP Federal Funding and Match Amounts[184]

Fiscal Year	Total Approximate Federal Award	Total Approximate Applicant Match
2008	$62.3 million	$26 million
2009	$77 million	$19 million
2010	$76 million	$19 million
2011	$68 million	$17 million
2012	$35.5 million	$12.9 million
2013	$24.2million	$3.3 million
2014*	$33.0 million	$5.0 million

* *Projected* award and match amounts for fiscal year 2014

As noted earlier in Section 3.3 (page 52), FEMA does not have sufficient information about how CTP participation influences and impacts Risk MAP project success, how they perform, and how this differs across regions. At the same time, officials indicate that FEMA is looking to work more with state-level CTPs, which tend to have more resources and greater reach than local CTPs. Also, FEMA regional offices indicate that CTPs have played an important role in stakeholder outreach and coordination. However, the willingness and ability of state and local entities to play these roles in the mapping process varies within and across FEMA regions.

Any decision about future investments in the CTP program should be careful to consider the willingness and ability of existing CTPs and potential candidates to perform map development, stakeholder outreach, and coordination roles. In the absence of such information, the dedication of additional funding to CTPs risks foregoing more productive uses of FEMA's increasingly scarce mapping funds.

Finding 4g: Joint funding mechanisms involving state and local governments are essential instruments for FEMA to efficiently and cost effectively achieve Risk MAP goals.

While important, identifying and expanding local and state funding sources to bolster FEMA's investment for joint projects is not within the scope of this Report. Therefore, neither an analysis of state and local sources of funding nor recommendations to state and local entities for how to work with FEMA are presented.

That said, FEMA could benefit from exploring alternative cost sharing opportunities with state and local partners in the regions. More can be done to identify and build upon alternative cost-sharing arrangements.

FEMA can also serve state and local governments by communicating successful project concepts and funding strategies. A few examples are provided:

[184] Information provided from FEMA.

- The Iowa Flood Center developed the Iowa Flood Information System to provide web-based access to flood inundation maps, real-time flood conditions, flood forecasts and other pertinent information. This initiative was resourced from federal and state funds, and received support from academia as well.
- The State of California's Natural Resources Agency received voter approval in 2006 to issue $5.4 billion in bonds to provide additional resources to address a variety of water-related issues. Part of the proceeds of this bond may be used to fund California's flood plain mapping.
- The funding of the State of North Carolina's Floodplain Mapping Program, which is a part of the North Carolina Department of Public Safety, is accomplished by allocating a portion of county-level recording fees to this work. This funding source provides a steady stream of funds to support flood mapping. The State of North Carolina is one of FEMA's CTPs, and works closely with FEMA Region IV in jointly funding flood mapping and achieving Risk MAP goals.
- Special taxing authorities enable many localities and counties an opportunity to raise funds to complete flood mapping projects.

4.3 RECOMMENDATIONS

Based on the findings discussed, the Panel has recommendations for actions that may be taken to improve funding coordination and thereby improve the performance and cost efficiency of FEMA's flood mapping efforts.

Recommendation 13: The Office of Management and Budget should work with, the core group of federal agencies that have flood mapping-related mission responsibilities to develop a government-wide strategy for advancing multi-purpose mapping capabilities that will increase the efficiency and effectiveness of flood mapping, among other benefits. This strategy should be used to guide investments.

To implement this recommendation, OMB should:

- Convene a meeting of FEMA and its partner agencies to obtain broad input on multi-agency mapping priorities, appropriate categorization to ensure flood mapping focus is consistent, and to discuss possible approaches to an improved government-wide strategic planning and funding process. The FIFM-TF or the federal participants in the TMAC might provide an appropriate venue for such a meeting and assist with the development of the strategy.
- Work with FEMA and the TMAC to identify multi-purpose mapping capabilities that would do the most to advance the efficiency and effectiveness of flood mapping.
- Link the strategic planning process to future iterations of the flood risk budget crosscut.
- Name a senior level individual, preferably at the level of Program Associate Director or above, to lead the development of the strategy and the budget crosscut in order to ensure interagency focus and quality results.

Recommendation 14: The Office of Management and Budget, in consultation with FEMA and its partner agencies, should work to refine the initial budget crosscut so it can be used to identify and communicate opportunities for improved funding coordination. The budget crosscut should be informed by the government-wide strategy.

To implement this recommendation, OMB should:

- Continue to employ an annual budget crosscut over time to institutionalize a focus on interagency coordination.
- Use the common terms of reference developed as part of the government-wide strategy to improve the quality and utility of the budget crosscut.
- Use the budget crosscut to communicate with the congressional committees with oversight responsibility for agencies that contribute to flood mapping efforts on how these efforts are coordinated and how resources are being leveraged.

Recommendation 15: The Office of Management and Budget should use the 3DEP implementation plan for nationwide elevation data collection to guide the development of the President's annual budget request.

To implement this recommendation, OMB should:

- Work with USGS and other agencies to define joint funding mechanisms to support the 3DEP implementation plan.

Recommendation 16: FEMA leadership should work in coordination with its partner agencies to lay the groundwork for leveraging the re-established Technical Mapping Advisory Council to help identify and prioritize opportunities for improved funding coordination.

To implement this recommendation, FEMA should:

- Seek advice from TMAC on issues pertaining to strategic interagency funding coordination including sharing the cost of collection and utilization of data among all governmental users.
- Identify and justify what it deems to be top priorities for improved funding coordination for consideration by the TMAC.
- Ask the TMAC to develop reporting and evaluative metrics to track the degree of success achieved in driving more coordinated budgets and expenditures related to flood mapping and flood risk determination.
- Provide the TMAC's recommendations to OMB to inform government-wide strategy and budget crosscut efforts.

Recommendation 17: FEMA should systematically explore and evaluate with state, local, and federal stakeholders alternative joint funding mechanisms to further enhance efficiencies and identify innovative options with respect to sharing the cost of the collection and utilization of data.

To implement this recommendation, FEMA should:

- Methodically collect and evaluate uses of joint funding mechanisms, especially in states and localities with high flood risk hazard.
- Use data collected on the performance of CTPs to guide future investment decisions related to CTPs.
- Systematically circulate joint funding best practices to all regions, and share with state and local governments, for potential application or adaptation.
- Employ the re-established TMAC to focus on joint funding mechanisms that will optimize leverage of state and local funding resources.
- Assemble best practices across states in database and website development for flood maps and non-regulatory products.

Appendices

APPENDIX A: PANEL AND STAFF

PANEL

Beverly A. Cigler, *Chair**—Professor of Public Policy and Administration, Penn State Harrisburg; Specializes in intergovernmental relations, especially state-local relations, multi-community collaboration, alternative service delivery, emergency management, public finance, and general issues of governance. Was a NASPAA-FEMA Fellow (Network of Schools of Public Policy, Affairs and Administration-Federal Emergency Management Agency). Chairs the American Society for Public Administration's Katrina Task Force, which has evolved to deal with a broader range of hazards. Among her 160 peer reviewed articles and chapters, more than two dozen are in emergency management and others involve intergovernmental relations. Has edited seven journal symposia on emergency management published two co-authored books on flood hazards. Has presented approximately 210 speeches, workshops and testimony to national, regional, and state associations of officials, government organizations, and state legislatures in her areas of expertise—many on emergency management topics.

Gerald Galloway*—Glenn L. Martin Institute Professor of Engineering, Department of Civil and Environmental Engineering, and Affiliate Professor, School of Public Policy, University of Maryland, College Park; Brigadier General, US Army- Retired. Former positions include Dean of the Academic Board, U.S. States Military Academy; Dean of the Faculty, Industrial College of the Armed Forces; Executive Director, Interagency Floodplain Management Review, Executive Office of the President; Member, Mississippi River Commission. He is currently a member of the Louisiana Governor's Advisory Commission of Coastal Protection, Restoration and Conservation, a Senior Fellow of the Department of State Energy and Climate Partnership of the Americas, and a member of the National Academy of Engineering. He recently chaired a National Research Council Study on Levees and the National Flood Insurance Program and has been chair or a member of 13 National Research Council Studies, including Disaster Resilience: A National Imperative and Mapping the Zone. He holds Master's degrees from Princeton, Penn State (Capitol Campus), the US Army Command and General Staff College and a PhD from the University of North Carolina (Chapel Hill).

Mary Glackin*—Future Commissioner of the Weather and Climate Enterprise, American Meteorological Society. Former positions with the National Oceanic and Atmospheric Administration, Department of Commerce: Deputy Under Secretary for Operations; Assistant Administrator for Program Planning and Integration; Acting Director, National Weather Service; Deputy Assistant Administrator for Satellite Data and Information Services; Program Manager, Advanced Weather Interactive Processing System; Various Supervisory Meteorologist and Project Management Positions, National Weather Service.

Scott Quehl*—Senior Principal, Accenture Federal Services. Former positions include: Chief Financial Officer and Assistant Secretary for Administration, U.S. Department of Commerce; Senior Managing Director, Public Resources Advisory Group; Managing

Director, Head of Tax-Exempt Capital Markets Mid-Atlantic Group and Co-Head Infrastructure Advisory Group, JPMorgan Securities, Inc.; Managing Director, Public Financial Management Group; Chief Financial Officer, Metropolitan Police Department, Washington, DC.; Special Assistant to Controller, Office of Federal Financial Management, Executive Office of the President, Office of Management and Budget; Country Officer, Dominican Republic and Consultant, The World Bank; Volunteer, Peace Corps, Sabanagrande, Honduras.

Christine Gibbs Springer*—Executive Director, M.S. Program in Emergency and Crisis Management, Department of Public Administration University of Nevada Las Vegas; CEO, Red Tape, Ltd., LLC. Former Manager, State-Local Government and Community Relations, Salt River Project; Manager, Economic Development Planning, State of Arizona Governor's Office; Treasurer, Investors United Life Insurance Company.

ACADEMY STUDY TEAM

Joseph P. Mitchell, III, *Director of Project Development*—Leads and manages the Academy's studies program and serves as a senior advisor to the Academy's President and CEO. He has served as Project Director for past Academy studies for the Government Printing Office, the U.S. Senate Sergeant at Arms, USAID/Management Systems International, the National Park Service's Natural Resource Stewardship and Science Directorate, and the USDA Natural Resources Conservation Service. During his more than ten years at the Academy, Dr. Mitchell has worked with a wide range of federal cabinet departments and agencies to identify changes to improve public policy and program management, as well as to develop practical tools that strengthen organizational performance and assessment capabilities. He holds a Ph.D. from the Virginia Polytechnic Institute and State University, a Master of Public Administration from the University of North Carolina at Charlotte, and a BA in History from the University of North Carolina at Wilmington.

Roger Kodat, *Project Director*—Works as a financial professional and Principal of The Kodat Group LLC, with offices in Herndon, VA. He brings 20 years of commercial and investment banking experience with JPMorganChase and six years of senior level government experience at the Department of the Treasury. Mr. Kodat has led four projects for the National Academy of Public Administration: two of these focused on application of public-private partnerships to the US Postal Service. He was appointed by President George W. Bush in 2001 to serve as Deputy Assistant Secretary of Treasury, responsible for Federal Financial Policy. Some of his tasks at Treasury during six years in office included: policy formulation for both the 2003 Postal Pension Reform Act and the 2006 Postal Accountability and Enhancement Act; rule-making and oversight of Federal loan and loan guarantee programs; and managing the Federal Financing Bank (a $32 billion bank at that time). Mr. Kodat holds a BS in Education from Northwestern University and both an MBA in Finance and MA in Political Science from Indiana University.

Stephanie Bailenson, *Senior Advisor*—Served on past Academy studies for the National Oceanic and Atmospheric Administration, Government Printing Office, Office of Management and Budget, Federal Emergency Management Agency, National Coalition to End Childhood Lead Poisoning, and the Federal Bureau of Investigation, and the National Oceanic and Atmospheric Administration. Former Director, Office of Coastal and Aquatic Managed Areas, Florida Department of Environmental Protection; Senior Policy Advisor, National Oceanic and Atmospheric Administration; Professional Staff Member, U.S. Senate Committee on Commerce, Science, and Transportation, Research Assistant, University of Hawaii, Department of Zoology; and Teaching Fellow, Harvard University, Department of Government. Holds a Master of Public Administration from Harvard University, John F. Kennedy School of Government and a BA in Biology/Political Science from Duke University.

Sarah (Sally) F. Jaggar, *Senior Advisor*—As Strategic Advisor with the Partnership for Public Service since 2005, led projects resulting in reports entitled, *Building the Enterprise: Nine Strategies for More Integrated, Effective Government (August 2013); Making Smart Cuts: Lessons from the 1990s Budget Front (September 2011); Leading Innovation in the Federal Government (March 2011); Keeping Talent in the Government: Strategies for Retaining Valued Federal Employees (January 2011); Cyber INSecurity: Strengthening the Federal Cybersecurity Workforce (July 2009); Great Expectations: What Students Want in an Employer and How Federal Agencies Can Delivery It (January 2009).* Formerly at the U.S. Government Accountability Office, was Managing Director, Human Capital Office; Managing Director of Operations, Accounting and Information Management Division; Managing Director, Health Financing and Public Health Issues. Adjunct professor at School of Public Health, University of North Carolina at Chapel Hill. Holds an MA in Sociology from The American University and a BA from Duke University.

Maria Rapuano, *Senior Advisor*—Previously served as Deputy Project Director on the Academy's U.S. Government Printing Office review and on the study team for past Academy studies for the Department of Homeland Security Science and Technology Directorate and the Defense Civilian Intelligence Personnel System. Board Member, Trust for Lead Poisoning Prevention. Former Project Director, Alliance for Healthy Homes. Holds an MA in International Affairs from The American University and a BA in Government from the College of William and Mary.

Lisa Warnecke, *Senior Advisor*—Current positions include Adjunct Professor at the State University of New York, College of Environmental Science and Forestry and President of GeoManagement Associates, Inc., which is an organization that does consulting and research on Geographic Information Technology, natural resources and public lands policy and management, and emergency management. Began her professional career in Colorado and later served the States of Wyoming and Colorado as a Budget Analyst and Geographic Information Technology (GIT) Coordinator. Previous positions include Senior Consultant and Researcher for the General Accounting Office and National Academy of Public Administration. Holds a Ph.D. in Natural Resources Management and Policy from the State University of New York, College of Environmental Science and Forestry, an MBA in Information Technology from Colorado State University, and a BS in Public Administration from Virginia Polytechnic Institute and State University.

Jonathan Tucker, *Senior Research Analyst*—Joined the Academy staff in 2004, Dr. Tucker is a Senior Analyst with expertise in policy analysis, program evaluation, organizational design and management assessment, strategic planning, and information technology management. Dr. Tucker has worked as a Senior Analyst on a wide range of projects with ten different federal agencies, including several projects with FEMA partner agencies, such as the Army Corps of Engineers and NOAA, related to flood risk reduction investments and the creation of a climate service, respectively. He also has worked on a project with the DHS Science and Technology Directorate focused on improving interagency and intergovernmental coordination in the R&D investment process. Holds a Ph.D. in Public Policy from George Mason University, an MS in Science and Technology from Rensselaer Polytechnic Institute and a BA in Public Policy from New College of the University of South Florida.

Amanda Mullan, *Research Associate*—Joined the Academy in summer of 2012 after having spent time as an intern for the Congressional Research Service in 2011 and the New York State Assembly in 2010. Has recently completed work on a study for the National Weather Service. Holds a Master of Public Administration from Cornell University and a BA in Political Science from the State University of New York at Cortland.

Jonathan Wigginton, *Research Associate*—Joined in the Academy in the spring of 2012 after having spent time as a research volunteer at the Smithsonian's National Museum of American History. Worked on a number of studies while at the Academy, including the United States Postal Reform Study. Helped lead the *Memos to National Leaders* project which culminated in spring 2013, and helped launch the 2013 Edition of the *Survivor's Guide for Presidential Appointees*. Currently serves as the Content Manager for the Academy's homepage. Holds a BA in History from the University of Mary Washington.

APPENDIX B: PARTICIPATING INDIVIDUALS AND ORGANIZATIONS

The Panel and study team met with nearly 150 stakeholders through formal interviews, and meetings to gain a thorough understanding of FEMA's interagency and intergovernmental coordination on flood mapping and use of joint funding mechanisms. The Academy would like to thank these individuals for their contributions.

Aslaksen Jr., Michael: Chief, Remote Sensing Division, National Geodetic Survey, National Ocean Service, National Oceanic and Atmospheric Administration

Bales, Jerad: Acting Associate Director for Water, US Geological Survey

Bascom, David: Program Specialist, Engineering Management Branch, Risk Analysis Division, Federal Emergency Management Agency

Beik, Siavash: Vice President, Christopher B. Burke Engineering

Bellomo, Doug: Director, Risk Analysis Division, Federal Emergency Management Agency

Berginnis, Chad: Executive Director, Association of State Floodplain Managers

Blackburn, Gregor: Branch Chief, Floodplain Management and Insurance, Region IX, Federal Emergency Management Agency

Blanton, William: Senior Advisor, Engineering Management Branch, Risk Analysis Division, Federal Emergency Management Agency

Blyler, Nancy: Geospatial Coordinator, US Army Corps of Engineers

Bowe, Ryan Elizabeth: Vanguard Cabinet Member, Urban and Regional Information Systems Association; Geographic Information Systems Specialist, Photo Science

Bray, Stephanie: Environmental Engineer, US Army Corps of Engineers

Butler, Al: President, Urban and Regional Information Systems Association; Geographic Information Systems Professional, City of Ocoee, Florida

Byrd, John (JB): Government Affairs Manager, Management Association for Private Photogrammetric Surveyors

Cackley, Alicia: Director, Financial Markets and Community Investment, Government Accountability Office

Cameron, Scott: Fellow, National Academy of Public Administration; Senior Vice President and Partner, R3 Government Solutions

Carrier, Alysia: Contractor, Booz Allen Hamilton

Chappell, Ashley: Physical Scientist, National Oceanic Service, National Oceanic and Atmospheric Administration

Claggett, Benjamin: Civil Engineer, Technical Services Center, Bureau of Reclamation

Cobb, Erin: Program Specialist, Risk Analysis Division, Federal Emergency Management Agency

Conforti, Tammy: Levee Safety Program Manager, US Army Corps of Engineers

Conner, Krista: Coastal Scientist, Michael Baker Jr., Inc.

Cooper, Beth: Professional Staff Member, Committee on Banking, Housing, and Urban Affairs, US Senate

Cotter, Daniel: Chief Technology Officer, Department of Homeland Security

Cribbs, Carol: Professional Staff Member, Subcommittee on Homeland Security, Committee on Appropriations, US Senate

Crowell, Mark: Physical Scientist, Federal Emergency Management Agency

Czerwinski, Stanley: Director of Strategic Issues, Government Accountability Office

Davidson, Margaret: Acting Director, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration

Davison, Todd: Director, Gulf Coastal Services Center, National Ocean Service, National Oceanic and Atmospheric Administration

Del Toro, Peter: Assistant Director of Strategic Issues, Government Accountability Office

Dhingra, Emily: Senior Coastal Engineer, Risk Assessment, Mapping, and Planning Partners

Dorman, John: Director of Geospatial and Technology Management Office, Division of Emergency Management, North Carolina

Dudley, Drenan: Professional Staff Member, Subcommittee on Homeland Security, Committee on Appropriations, US Senate

Dunn, Jennifer: Silver Jackets Program Manager, US Army Corps of Engineers

Dyer, Jim: Principal, Podesta Group

England, John: Researcher, Technical Service Center, Bureau of Reclamation

Esfandiary, Siamak: Program Specialist, Engineering Management Branch, Risk Analysis Division, Federal Emergency Management Agency

Fitzpatrick, Daniel: State National Floodplain Insurance Program Coordinator, Department of Community and Economic Development, Pennsylvania

Folger, Peter: Specialist in Energy and Natural Resources Policy, Congressional Research Service

Gallagher, Kevin: Associate Director, Core Science Systems, US Geological Survey

Garrison, David: Fellow, National Academy of Public Administration; Former Nonresident Senior Fellow, Metropolitan Policy Program, The Brookings Institution

Gesch, Dean: Research Scientist, Earth Resources Observation Science Center, US Geological Survey

Godesky, Michael: Program Specialist, Risk Analysis Division, Federal Emergency Management Agency

Graziano, Thomas: Chief, Hydrological Services Division, National Weather Service, National Oceanic and Atmospheric Administration

Green, Clair: Acting Director, Cultural Resource Office Lower Brule Sioux Tribe, Lower Brule, South Dakota

Greenwood, David: Executive Vice President of Marketing, Michael Baker Jr., Inc.

Groves, Jessica: Program Manager, National Wetlands Reserve Program, National Resources Conservation Service

Gruber, Gene: Director, Mitigation Division, Region III, Federal Emergency Management Agency

Hainly, Robert: Assistant Director, Pennsylvania Water Science Center, US Geological Survey

Hall, Shirley: GIS Program Manager, Farm Service Agency

Hanson, Jeffrey: Research Oceanographer, Field Research Facility, US Army Corps of Engineers

Hardin, Allison: Planner, City of Myrtle Beach, Planning Department, South Carolina

Healy, Patricia: Fellow, National Academy of Public Administration; Former Deputy Chief Financial Officer, Department of Agriculture

Hillier, Tim: Coastal Process Lead, Strategic Alliance for Risk Reduction

Hoeft, Claudia: National Hydraulic Engineer, National Resources Conservation Service

Hom, Victor: National Flood Inundation Mapping Services Leader and Hydrologist, Hydrological Services Division, National Weather Service, National Oceanic and Atmospheric Administration

Honeycutt, Maria: Coastal Hazards Specialist, Coastal Services Center, National Ocean Service, National Oceanic and Atmospheric Administration

Huang, Paul: Branch Chief, Data and Dissemination Management Branch, Risk Analysis Division, Federal Emergency Management Agency

Hughes, Tom: State Hazard Mitigation Officer, Pennsylvania Emergency Management Agency

Inderfurth, Meredith: Washington Liaison, Association of State Floodplain Managers

James, Andrew: Acting Program Manager, Floodplain Easement, National Resources Conservation Service

Janowicz, Jan: Branch Chief, Risk Analysis Division, Region III, Federal Emergency Management Agency

Jiwani, Suzanne: Floodplain Engineer, Department of Natural Resources, Minnesota

Johnson, Stacy: Civil Engineer, Technical Services Center, Bureau of Reclamation

Jones, Clinton: Senior Counsel, Committee on Financial Services, US House of Representatives

Keisling, Chris: Assistant Director, Homeland Security and Justice, Government Accountability Office

Knipe, David: Engineering Section Manager, Department of Natural Resources, Indiana
Krest, Lisa: Manager, Technical Services Center, Bureau of Reclamation

Kuklewski, Eric: Branch Chief, Risk Analysis Division, Region V, Federal Emergency Management Agency

Landgraf, Ingrid: Geospatial Liaison for Kansas, US Geological Survey

Larson, Larry: Director Emeritus, Association of State Floodplain Managers

LaVoi, Anthony: Geospatial Information Officer and Integrated Information Services Division Chief, Coastal Services Center, National Ocean Service, National Oceanic and Atmospheric Administration

Lee, George: Cartographer, Product and Services Lead for Orthoimagery, United States Geological Survey

Lee, Michael: Professional Staff Member, Committee on Banking, Housing, and Urban Affairs, United States Senate

Leidner, Alan: President, New York State GIS Association

Lenaburg, Ray: Branch Chief, Risk Analysis Division, Region IX, Federal Emergency Management Agency

Lowe, Robert: Branch Chief, Risk Analysis Division, Region VI, Federal Emergency Management Agency

Lowe, Stephen: Geospatial Information Officer, Department of Agriculture

Lukas, Vicki: Chief, Partner and User Engagement, US Geological Survey

Lulloff, Alan: Science Services Program Director, Association of State Floodplain Managers

Mahoney, Tucker: Coastal Engineer, Region IV, Federal Emergency Management Agency

Maidment, David: Professor-Hussein M. Alharthy Centennial Chair in Civil Engineering, University of Texas, Austin

Malcolm, Jeffrey: Assistant Director, Natural Resources and Environment, Government Accountability Office

Mallard, Kris: Staff Assistant, Subcommittee on Homeland Security, Committee on Appropriations, US House of Representatives

Marcy, Doug: Coastal Hazard Specialist, Coastal Services Center, National Ocean Service, National Oceanic and Atmospheric Administration

Marken, Bill: Acting National Elevation Leader, Natural Resources Conservation Service

Mason, Robert: Supervisory Hydrologist, Office of Surface Water, US Geological Survey

Maties, Diana: Vanguard Cabinet Member, Urban and Regional Information Systems Association; Geographic Information Systems Specialist, CDM Smith

Maune, David: Senior Project Manager, Dewberry

Maurstad, David: Senior Vice President, OST, Inc.; Former Assistant Administrator for Mitigation, Federal Emergency Management Agency

Mausolf, Gregory: Hydrologic Engineer, Detroit District, US Army Corps of Engineers

McCallum, Brian: Assistant Director, Georgia Water Science Center, US Geological Survey

McConkey, Sally: Head, Coordinated Hazard Assessment and Mapping Program, Illinois State Water Survey, Prairie Research Institute, University of Illinois at Urbana-Champaign

McDowell, Bruce: Fellow, National Academy of Public Administration; President, Intergovernmental Management Associates

McNabb, Sean: Hazard/Risk Analyst, Region VIII, Federal Emergency Management Agency

Medlock, Samantha: Policy and Partnerships Manager, Association of State Floodplain Managers

Megrail, Andy: Floodplain Program Specialist, Region VII, Federal Emergency Management Agency

Mullusky, Mary: Chief, Hydrologic Services Branch, National Weather Service, National Oceanic and Atmospheric Administration

Naamane, Jill: Assistant Director, Financial Markets and Community Investment, Government Accountability Office

Nechero, J. Steven: Chief, Geospatial Data Management Branch, National Resources Conservation Service

Neidig, Craig: Geospatial Liaison for West Virginia, US Geological Survey

Newby, Darek: Professional Staff Member, Subcommittee on Homeland Security, Committee on Appropriations, US House of Representatives

Norton, Beth: Program Specialist, Engineering Management Branch, Risk Analysis Division, Federal Emergency Management Agency

O'Brien, Dan: Program Manager, Office of Emergency Management, New York State Division of Homeland Security and Emergency Services

Obermeyer, Nancy: Board of Directors, Urban and Regional Information Systems Association; Associate Professor of Geography, Indiana State University

Palatiello, John: Executive Director, Management Association for Private Photogrammetric Surveyors

Perkins, Ted: Regional Engineer, Region X, Federal Emergency Management Agency
Pietramali, Ryan: Branch Chief, Risk Analysis Division, Region VIII, Federal Emergency Management Agency

Plasencia, Doug: Vice President, Michael Baker, Jr., Inc.

Posner, Paul: Fellow, National Academy of Public Administration; Director, Public Administration Program, George Mason University

Rabbon, Peter: Special Assistant, National Flood Risk Management Program, Institute for Water Resources, US Army Corps of Engineers

Rabinowitz, Brenda: Assistant Director of Strategic Issues, Government Accountability Office

Rodriguez, Luis: Chief, Engineering Management Branch, Risk Analysis Division, Federal Emergency Management Agency

Romley, Meredith: Program Examiner, Office of Management and Budget

Rooney, Paul: Geospatial Information System Specialist, Risk Analysis Division, Federal Emergency Management Agency

Rooney, Stuart: Program Specialist, Engineering Management Branch, Risk Analysis Division, Federal Emergency Management Agency

Rubin, Fay: GRANIT Project Director, Earth Systems Research Center, University of New Hampshire

Saghy, David: Elevation Data Acquisition Coordinator, National Geospatial Program, US Geological Survey

Sanders, Jerimiah: Environmental Specialist, Office of Environment and Energy, Department of Housing and Urban Development

Sarri, Kristen: Associate Director for Legislative Affairs, Office of Management and Budget

Schmitt, Nicholas (Miki): Coastal Geospatial Services Division Chief, Coastal Services Center, National Ocean Service, National Oceanic and Atmospheric Administration

Scholz, Paul: Acting Deputy Director, Budget Management Division, Coastal Services Center, National Ocean Service, National Oceanic and Atmospheric Administration

Schuckman, Karen: Professor of Geography, Penn State

Schwab, James: Manager, Hazards Planning Research Center, American Planning Association
Simley, Jeff: Manager, National Hydrography Dataset, US Geological Survey

Smith, Dru: Chief Geodesist, National Geodetic Survey, National Ocean Service, National Oceanic and Atmospheric Administration

Smith, Josh: Program Management Lead, Engineering Management Branch, Risk Analysis Division, Federal Emergency Management Agency

Sorensen, Grant: Emergency Management Planner, Technical Services Center, Bureau of Reclamation

Stearrett, David: Branch Chief, Floodplain Management Branch, Federal Emergency Management Agency

Stone, Kelly: Risk Analyst, Region X, Federal Emergency Management Agency

Strauss, Cecilia: National Flood Insurance Program Coordinator, Department of Natural Resources, Minnesota

Sugarbaker, Larry: Senior Advisor, National Geospatial Program, US Geological Survey

Tierney, Mary Ann: Regional Administrator, Region III, Federal Emergency Management Agency

Tucker, Christopher: Principle, Yale House Ventures; Chairman and CEO, The MapStory Foundation

Turner, Robert: Regional Director, Southeast Louisiana Flood Protection Authority

Vaughan, Christopher: Geospatial Information Officer, Federal Emergency Management Agency

Wamsley, Ty: Civil Engineer, Engineer Research and Development Center, US Army Corps of Engineers

Ward, Patrick: Assistant Director, Natural Resources and Environment, Government Accountability Office

Waters, Kirk: Coastal Remote Sensing Program Manager, Coastal Services Center, National Oceanic Service, National Oceanic and Atmospheric Administration

Weaver, Christopher: Deputy Executive Director, US Global Change Research Program; Environmental Protection Agency

Weghorst, Karen: Manager, Flood Hydrology and Consequences Group, Bureau of Reclamation

Westcott, Jonathan: Program Specialist, Engineering Management Branch, Risk Analysis Division, Federal Emergency Management Agency

White, Kathleen: Senior Lead, Global and Climate Change, US Army Corps of Engineers

Williams, Kent: Deputy Director, Ariel Photo Field Program, Farm Service Agency

Williams, Matt: GIS Technician, Department of Geology and Mineral Industries, Oregon

Worrall, Phillip: Executive Director, Indiana Geographic Information Council; Indiana State Representative, National States Geographic Information Council

Wozencraft, Jennifer: Research Physical Scientist, Coastal and Hydraulics Laboratory, US Army Corps of Engineers

Wright, Roy: Deputy Associate Administrator, Mitigation, Federal Emergency Management Agency

Zimmerer, Gary: Branch Chief, Risk Analysis Division, Region VI, Federal Emergency Management Agency

Zulick, Carl: Geospatial Information Officer and Assistant Director, Engineering, US Forest Service

APPENDIX C: GLOSSARY

Flood or Flooding: As defined by 44 CFR §59.1, flooding is:

"(a) A general and temporary condition of partial or complete inundation of normally dry land areas from:

1. The overflow of inland or tidal waters.
2. The unusual and rapid accumulation or runoff of surface waters from any source.
3. Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

(b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (a)(1) of this definition."

Flood Insurance Rate Map (FIRM): As defined by 44 CFR §59.1: "An official map of a community, on which the Federal Insurance Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community."

Flood Insurance Study (FIS): As defined by 44 CFR §59.1, (denoted as a flood elevation study therein): "…an examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e. mudflow) and/or flood related erosion hazards."

Flood mapping: This study uses the term flood mapping to include not just the production Flood Insurance Rate Maps (FIRMs), but also maps that include information about flood hazards that can be used to communicate flood risk to NFIP participating communities and stimulate risk mitigation actions.

Floodplain: As defined in 44 CFR §59.1 (also denoted as flood-prone area therein): "Any land area susceptible to being inundated by water from any source."

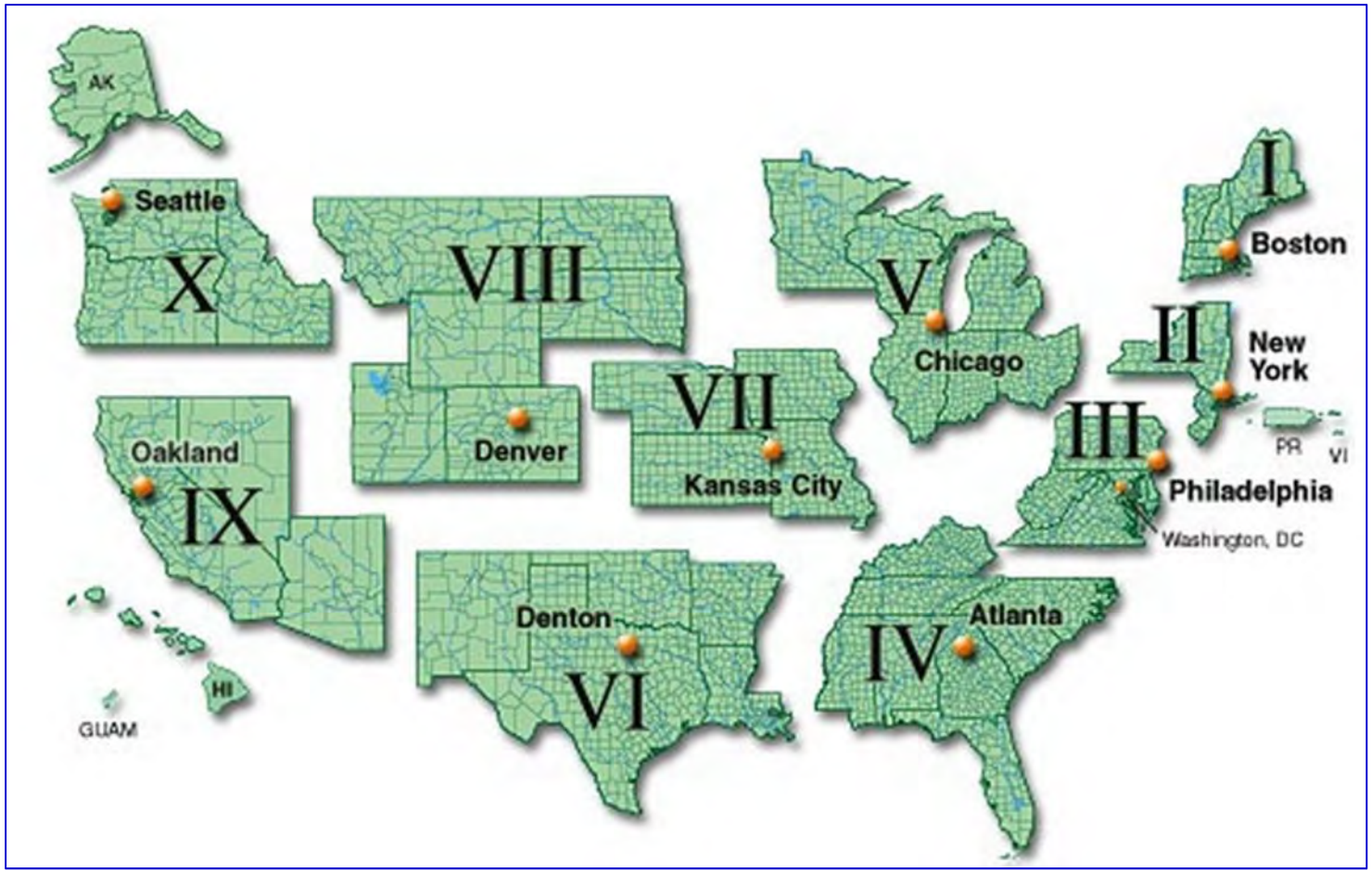
Flood Risk Reduction: As defined by FEMA, 145 "The goal of flood risk reduction is to reduce the risk to life and property, which includes existing structures and future construction, in the pre and post-disaster environments. This is achieved through regulations, local ordinances, land use and building practices, and mitigation projects that reduce or eliminate long-term risk from flood hazards and their effects."

Flood Zone: A geographic area defined by FEMA according to risk and designated by a community's FIRM.

Hazard Mitigation: As defined by the Federal Insurance Mitigation Administration, "sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects."

Risk MAP projects: Risk MAP projects may include the production of regulatory as well as non-regulatory products.

APPENDIX D: FEMA REGIONAL OFFICE MAP



APPENDIX E: REFERENCED SECTIONS OF THE BIGGERT-WATERS FLOOD INSURANCE REFORM ACT OF 2012

Administrator, beginning 6 months after the date on which such funds are borrowed, and continuing every 6 months thereafter until such borrowed funds are fully repaid, shall submit a report on the progress of such repayment to—

"(1) the Secretary of the Treasury;

"(2) the Committee on Banking, Housing, and Urban Affairs of the Senate; and

"(3) the Committee on Financial Services of the House of Representatives.".

(b) REPORT.—Not later than the expiration of the 6-month period beginning on the date of enactment of this Act, the Administrator shall submit a report to the Congress setting forth options for repaying within 10 years all amounts, including any amounts previously borrowed but not yet repaid, owed pursuant to clause (2) of subsection (a) of section 1309 of the National Flood Insurance Act of 1968 (42 U.S.C. 4016(a)(2)).

SEC. 100214. PAYMENT OF CONDOMINIUM CLAIMS.

Section 1312 of the National Flood Insurance Act of 1968 (42 U.S.C. 4019), as amended by section 100210, is amended by adding at the end the following:

"(c) PAYMENT OF CLAIMS TO CONDOMINIUM OWNERS.—The Administrator may not deny payment for any damage to or loss of property which is covered by flood insurance to condominium owners who purchased such flood insurance separate and apart from the flood insurance purchased by the condominium association in which such owner is a member, based solely, or in any part, on the flood insurance coverage of the condominium association or others on the overall property owned by the condominium association.".

SEC. 100215. TECHNICAL MAPPING ADVISORY COUNCIL.

(a) ESTABLISHMENT.—There is established a council to be known as the Technical Mapping Advisory Council (in this section referred to as the "Council").

(b) MEMBERSHIP.—

(1) IN GENERAL.—The Council shall consist of—

(A) the Administrator (or the designee thereof);

(B) the Secretary of the Interior (or the designee thereof);

(C) the Secretary of Agriculture (or the designee thereof);

(D) the Under Secretary of Commerce for Oceans and Atmosphere (or the designee thereof); and

(E) 16 additional members appointed by the Administrator or the designee of the Administrator, who shall be—

(i) a member of a recognized professional surveying association or organization;

(ii) a member of a recognized professional mapping association or organization;

(iii) a member of a recognized professional engineering association or organization;

(iv) a member of a recognized professional association or organization representing flood hazard determination firms;

(v) a representative of the United States Geological Survey;

(vi) a representative of a recognized professional association or organization representing State geographic information;

(vii) a representative of State national flood insurance coordination offices;

(viii) a representative of the Corps of Engineers;

(ix) a member of a recognized regional flood and storm water management organization;

(x) 2 representatives of different State government agencies that have entered into cooperating technical partnerships with the Administrator and have demonstrated the capability to produce flood insurance rate maps;

(xi) 2 representatives of different local government agencies that have entered into cooperating technical partnerships with the Administrator and have demonstrated the capability to produce flood insurance maps;

(xii) a member of a recognized floodplain management association or organization;

(xiii) a member of a recognized risk management association or organization; and

(xiv) a State mitigation officer.

(2) QUALIFICATIONS.—Members of the Council shall be appointed based on their demonstrated knowledge and competence regarding surveying, cartography, remote sensing, geographic information systems, or the technical aspects of preparing and using flood insurance rate maps. In appointing members under paragraph (1)(E), the Administrator shall, to the maximum extent practicable, ensure that the membership of the Council has a balance of Federal, State, local, tribal, and private members, and includes geographic diversity, including representation from areas with coastline on the Gulf of Mexico and other States containing areas identified by the Administrator as at high risk for flooding or as areas having special flood hazards.

(c) DUTIES.—The Council shall—

(1) recommend to the Administrator how to improve in a cost-effective manner the—

(A) accuracy, general quality, ease of use, and distribution and dissemination of flood insurance rate maps and risk data; and

(B) performance metrics and milestones required to effectively and efficiently map flood risk areas in the United States;

(2) recommend to the Administrator mapping standards and guidelines for—

(A) flood insurance rate maps; and

(B) data accuracy, data quality, data currency, and data eligibility;

(3) recommend to the Administrator how to maintain, on an ongoing basis, flood insurance rate maps and flood risk identification;

(4) recommend procedures for delegating mapping activities to State and local mapping partners;

(5) recommend to the Administrator and other Federal agencies participating in the Council—

(A) methods for improving interagency and intergovernmental coordination on flood mapping and flood risk determination; and

(B) a funding strategy to leverage and coordinate budgets and expenditures across Federal agencies; and

(6) submit an annual report to the Administrator that contains—

(A) a description of the activities of the Council;

(B) an evaluation of the status and performance of flood insurance rate maps and mapping activities to revise and update flood insurance rate maps, as required under section 100216; and

(C) a summary of recommendations made by the Council to the Administrator.

(d) FUTURE CONDITIONS RISK ASSESSMENT AND MODELING REPORT.—

(1) IN GENERAL.—The Council shall consult with scientists and technical experts, other Federal agencies, States, and local communities to—

(A) develop recommendations on how to—

(i) ensure that flood insurance rate maps incorporate the best available climate science to assess flood risks; and

(ii) ensure that the Federal Emergency Management Agency uses the best available methodology to consider the impact of—

(I) the rise in the sea level; and

(II) future development on flood risk; and

(B) not later than 1 year after the date of enactment of this Act, prepare written recommendations in a future conditions risk assessment and modeling report and to submit such recommendations to the Administrator.

(2) RESPONSIBILITY OF THE ADMINISTRATOR.—The Administrator, as part of the ongoing program to review and update National Flood Insurance Program rate maps under section 100216, shall incorporate any future risk assessment submitted under paragraph (1)(B) in any such revision or update.

(e) CHAIRPERSON.—The members of the Council shall elect 1 member to serve as the chairperson of the Council (in this section referred to as the "Chairperson").

(f) COORDINATION.—To ensure that the Council's recommendations are consistent, to the maximum extent practicable, with national digital spatial data collection and management standards, the Chairperson shall consult with the Chairperson of the Federal Geographic Data Committee (established pursuant to Office of Management and Budget Circular A–16).

(g) COMPENSATION.—Members of the Council shall receive no additional compensation by reason of their service on the Council.

(h) MEETINGS AND ACTIONS.—

(1) IN GENERAL.—The Council shall meet not less frequently than twice each year at the request of the Chairperson or a majority of its members, and may take action by a vote of the majority of the members.

(2) INITIAL MEETING.—The Administrator, or a person designated by the Administrator, shall request and coordinate the initial meeting of the Council.

(i) OFFICERS.—The Chairperson may appoint officers to assist in carrying out the duties of the Council under subsection (c).

(j) STAFF.—

(1) STAFF OF FEMA.—Upon the request of the Chairperson, the Administrator may detail, on a nonreimbursable basis, personnel of the Federal Emergency Management Agency to assist the Council in carrying out its duties.

(2) STAFF OF OTHER FEDERAL AGENCIES.—Upon request of the Chairperson, any other Federal agency that is a member of the Council may detail, on a nonreimbursable basis, personnel to assist the Council in carrying out its duties.

(k) POWERS.—In carrying out this section, the Council may hold hearings, receive evidence and assistance, provide information, and conduct research, as it considers appropriate.

(l) REPORT TO CONGRESS.—The Administrator, on an annual basis, shall report to the Committee on Banking, Housing, and Urban Affairs of the Senate, the Committee on Financial Services of the House of Representatives, and the Office of Management and Budget on the—

(1) recommendations made by the Council;

(2) actions taken by the Federal Emergency Management Agency to address such recommendations to improve flood insurance rate maps and flood risk data; and

(3) any recommendations made by the Council that have been deferred or not acted upon, together with an explanatory statement.

SEC. 100216. NATIONAL FLOOD MAPPING PROGRAM.

(a) REVIEWING, UPDATING, AND MAINTAINING MAPS.—The Administrator, in coordination with the Technical Mapping Advisory Council established under section 100215, shall establish an ongoing program under which the Administrator shall review, update, and maintain National Flood Insurance Program rate maps in accordance with this section.

(b) MAPPING.—

(1) IN GENERAL.—In carrying out the program established under subsection (a), the Administrator shall—

(A) identify, review, update, maintain, and publish National Flood Insurance Program rate maps with respect to—

(i) all populated areas and areas of possible population growth located within the 100-year floodplain;

(ii) all populated areas and areas of possible population growth located within the 500-year floodplain;

(iii) areas of residual risk, including areas that are protected by levees, dams, and other flood control structures;

(iv) areas that could be inundated as a result of the failure of a levee, dam, or other flood control structure; and

(v) the level of protection provided by flood control structures;

(B) establish or update flood-risk zone data in all such areas, and make estimates with respect to the rates of probable flood caused loss for the various flood risk zones for each such area; and

(C) use, in identifying, reviewing, updating, maintaining, or publishing any National Flood Insurance Program rate map required under this section or under the National Flood Insurance Act of 1968 (42 U.S.C. 4011 et seq.), the most accurate topography and elevation data available.

(2) MAPPING ELEMENTS.—Each map updated under this section shall—

(A) assess the accuracy of current ground elevation data used for hydrologic and hydraulic modeling of flooding sources and mapping of the flood hazard and wherever necessary acquire new ground elevation data utilizing the most up-to-date geospatial technologies in accordance with guidelines and specifications of the Federal Emergency Management Agency; and

(B) develop National Flood Insurance Program flood data on a watershed basis—

(i) to provide the most technically effective and efficient studies and hydrologic and hydraulic modeling; and

(ii) to eliminate, to the maximum extent possible, discrepancies in base flood elevations between adjacent political subdivisions.

(3) OTHER INCLUSIONS.—In updating maps under this section, the Administrator shall include—

(A) any relevant information on coastal inundation from—

(i) an applicable inundation map of the Corps of Engineers; and

(ii) data of the National Oceanic and Atmospheric Administration relating to storm surge modeling;

(B) any relevant information of the United States Geological Survey on stream flows, watershed characteristics, and topography that is useful in the identification of flood hazard areas, as determined by the Administrator;

(C) any relevant information on land subsidence, coastal erosion areas, changing lake levels, and other flood-related hazards;

(D) any relevant information or data of the National Oceanic and Atmospheric Administration and the United States Geological Survey relating to the best available science regarding future changes in sea levels, precipitation, and intensity of hurricanes; and

(E) any other relevant information as may be recommended by the Technical Mapping Advisory Committee.

(c) STANDARDS.—In updating and maintaining maps under this section, the Administrator shall—

(1) establish standards to—

(A) ensure that maps are adequate for—

(i) flood risk determinations; and

(ii) use by State and local governments in managing development to reduce the risk of flooding; and

(B) facilitate identification and use of consistent methods of data collection and analysis by the Administrator, in conjunction with State and local governments, in developing maps for communities with similar flood risks, as determined by the Administrator; and

(2) publish maps in a format that is—

(A) digital geospatial data compliant;

(B) compliant with the open publishing and data exchange standards established by the Open Geospatial Consortium; and

(C) aligned with official data defined by the National Geodetic Survey.

(d) COMMUNICATION AND OUTREACH.—

(1) IN GENERAL.—The Administrator shall—

(A) work to enhance communication and outreach to States, local communities, and property owners about the effects—

(i) of any potential changes to National Flood Insurance Program rate maps that may result from the mapping program required under this section; and

(ii) that any such changes may have on flood insurance purchase requirements;

(B) engage with local communities to enhance communication and outreach to the residents of such communities, including tenants (with regard to contents insurance), on the matters described under subparagraph (A); and

(C) upon the issuance of any proposed map and any notice of an opportunity to make an appeal relating to the proposed map, notify the Senators for each State affected and each Member of the House of Representatives for each congressional district affected by the proposed map of any action taken by the Administrator with respect to the proposed map or an appeal relating to the proposed map.

(2) REQUIRED ACTIVITIES.—The communication and outreach activities required under paragraph (1) shall include—

(A) notifying property owners when their properties become included in, or when they are excluded from, an area covered by the mandatory flood insurance purchase requirement under section 102 of the Flood Disaster Protection Act of 1973 (42 U.S.C. 4012a);

(B) educating property owners regarding the flood risk and reduction of this risk in their community, including the continued flood risks to areas that are no longer subject to the flood insurance mandatory purchase requirement;

(C) educating property owners regarding the benefits and costs of maintaining or acquiring flood insurance, including, where applicable, lower-cost preferred risk policies under the National Flood Insurance Act of 1968 (42 U.S.C. 4011 et seq.) for such properties and the contents of such properties;

(D) educating property owners about flood map revisions and the process available to such owners to appeal proposed changes in flood elevations through their community, including by notifying local radio and television stations; and

(E) encouraging property owners to maintain or acquire flood insurance coverage.

(e) COMMUNITY REMAPPING REQUEST.—Upon the adoption by the Administrator of any recommendation by the Technical Mapping Advisory Council for reviewing, updating, or maintaining National Flood Insurance Program rate maps in accordance with this section,

a community that believes that its flood insurance rates in effect prior to adoption would be affected by the adoption of such recommendation may submit a request for an update of its rate maps, which may be considered at the Administrator's sole discretion. The Administrator shall establish a protocol for the evaluation of such community map update requests.

(f) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Administrator to carry out this section $400,000,000 for each of fiscal years 2013 through 2017.

SEC. 100217. SCOPE OF APPEALS.

Section 1363 of the National Flood Insurance Act of 1968 (42 U.S.C. 4104) is amended—

(1) in subsection (a)—

(A) by inserting "and designating areas having special flood hazards" after "flood elevations"; and

(B) by striking "such determinations" and inserting "such determinations and designations"; and

(2) in subsection (b)—

(A) in the first sentence, by inserting "and designations of areas having special flood hazards" after "flood elevation determinations"; and

(B) by amending the third sentence to read as follows: "The sole grounds for appeal shall be the possession of knowledge or information indicating that (1) the elevations being proposed by the Administrator with respect to an identified area having special flood hazards are scientifically or technically incorrect, or (2) the designation of an identified special flood hazard area is scientifically or technically incorrect.".

SEC. 100218. SCIENTIFIC RESOLUTION PANEL.

(a) ESTABLISHMENT.—Chapter III of the National Flood Insurance Act of 1968 (42 U.S.C. 4101 et seq.) is amended by inserting after section 1363 (42 U.S.C. 4104) the following:

"SEC. 1363A. SCIENTIFIC RESOLUTION PANEL.

"(a) AVAILABILITY.—

"(1) IN GENERAL.—Pursuant to the authority provided under section 1363(e), the Administrator shall make available an independent review panel, to be known as the Scientific Resolution Panel, to any community—

"(A) that has—

"(i) filed a timely map appeal in accordance with section 1363;

"(ii) completed 60 days of consultation with the Federal Emergency Management Agency on the appeal; and

"(iii) not allowed more than 120 days, or such longer period as may be provided by the Administrator by waiver, to pass since the end of the appeal period; or

"(B) that has received an unsatisfactory ruling under the map revision process established pursuant to section 1360(f).

"(2) APPEALS BY OWNERS AND LESSEES.—If a community and an owner or lessee of real property within the community

appeal a proposed determination of a flood elevation under section 1363(b), upon the request of the community—

"(A) the owner or lessee shall submit scientific and technical data relating to the appeals to the Scientific Resolution Panel; and

"(B) the Scientific Resolution Panel shall make a determination with respect to the appeals in accordance with subsection (c).

"(3) DEFINITION.—For purposes of paragraph (1)(B), an 'unsatisfactory ruling' means that a community—

"(A) received a revised Flood Insurance Rate Map from the Federal Emergency Management Agency, via a Letter of Final Determination, after September 30, 2008, and prior to the date of enactment of this section;

"(B) has subsequently applied for a Letter of Map Revision or Physical Map Revision with the Federal Emergency Management Agency; and

"(C) has received an unfavorable ruling on their request for a map revision.

"(b) MEMBERSHIP.—The Scientific Resolution Panel made available under subsection (a) shall consist of 5 members with expertise that relates to the creation and study of flood hazard maps and flood insurance. The Scientific Resolution Panel may include representatives from Federal agencies not involved in the mapping study in question and from other impartial experts. Employees of the Federal Emergency Management Agency may not serve on the Scientific Resolution Panel.

"(c) DETERMINATION.—

"(1) IN GENERAL.—Following deliberations, and not later than 90 days after its formation, the Scientific Resolution Panel shall issue a determination of resolution of the dispute. Such determination shall set forth recommendations for the base flood elevation determination or the designation of an area having special flood hazards that shall be reflected in the Flood Insurance Rate Maps.

"(2) BASIS.—The determination of the Scientific Resolution Panel shall be based on—

"(A) data previously provided to the Administrator by the community, and, in the case of a dispute submitted under subsection (a)(2), an owner or lessee of real property in the community; and

"(B) data provided by the Administrator.

"(3) NO ALTERNATIVE DETERMINATIONS PERMISSIBLE.—The Scientific Resolution Panel—

"(A) shall provide a determination of resolution of a dispute that—

"(i) is either in favor of the Administrator or in favor of the community on each distinct element of the dispute; or

"(ii) in the case of a dispute submitted under subsection (a)(2), is in favor of the Administrator, in favor of the community, or in favor of the owner or lessee of real property in the community on each distinct element of the dispute; and

"(B) may not offer as a resolution any other alternative determination.

"(4) EFFECT OF DETERMINATION.—

"(A) BINDING.—The recommendations of the Scientific Resolution Panel shall be binding on all appellants and not subject to further judicial review unless the Administrator determines that implementing the determination of the panel would—

"(i) pose a significant threat due to failure to identify a substantial risk of special flood hazards; or

"(ii) violate applicable law.

"(B) WRITTEN JUSTIFICATION NOT TO ENFORCE.—If the Administrator elects not to implement the determination of the Scientific Resolution Panel pursuant to subparagraph (A), then not later than 60 days after the issuance of the determination, the Administrator shall issue a written justification explaining such election.

"(C) APPEAL OF DETERMINATION NOT TO ENFORCE.—If the Administrator elects not to implement the determination of the Scientific Resolution Panel pursuant to subparagraph (A), the community may appeal the determination of the Administrator as provided for under section 1363(g).

"(d) MAPS USED FOR INSURANCE AND MANDATORY PURCHASE REQUIREMENTS.—With respect to any community that has a dispute that is being considered by the Scientific Resolution Panel formed pursuant to this subsection, the Federal Emergency Management Agency shall ensure that for each such community that—

"(1) the Flood Insurance Rate Map described in the most recently issued Letter of Final Determination shall be in force and effect with respect to such community; and

"(2) flood insurance shall continue to be made available to the property owners and residents of the participating community.".

(b) CONFORMING AMENDMENTS.—

(1) ADMINISTRATIVE REVIEW.—Section 1363(e) of the National Flood Insurance Act of 1968 (42 U.S.C. 4104(e)) is amended, in the second sentence, by striking "an independent scientific body or appropriate Federal agency for advice" and inserting "the Scientific Resolution Panel provided for in section 1363A".

(2) JUDICIAL REVIEW.—The first sentence of section 1363(g) of the National Flood Insurance Act of 1968 (42 U.S.C. 4104(g)) is amended by striking "Any appellant" and inserting "Except as provided in section 1363A, any appellant".

SEC. 100219. REMOVAL OF LIMITATION ON STATE CONTRIBUTIONS FOR UPDATING FLOOD MAPS.

Section 1360(f)(2) of the National Flood Insurance Act of 1968 (42 U.S.C. 4101(f)(2)) is amended by striking ", but which may not exceed 50 percent of the cost of carrying out the requested revision or update".

SEC. 100220. COORDINATION.

(a) INTERAGENCY BUDGET CROSSCUT AND COORDINATION REPORT.—

(1) IN GENERAL.—The Secretary of Homeland Security, the Administrator, the Director of the Office of Management and Budget, and the heads of each Federal department or agency carrying out activities under sections 100215 and 100216 shall work together to ensure that flood risk determination data and geospatial data are shared among Federal agencies in

order to coordinate the efforts of the Nation to reduce its vulnerability to flooding hazards.

(2) REPORT.—Not later than 30 days after the submission of the budget of the United States Government by the President to Congress, the Director of the Office of Management and Budget, in coordination with the Federal Emergency Management Agency, the United States Geological Survey, the National Oceanic and Atmospheric Administration, the Corps of Engineers, and other Federal agencies, as appropriate, shall submit to the appropriate authorizing and appropriating committees of the Senate and the House of Representatives an interagency budget crosscut and coordination report, certified by the Secretary or head of each such agency, that—

(A) contains an interagency budget crosscut report that displays relevant sections of the budget proposed for each of the Federal agencies working on flood risk determination data and digital elevation models, including any planned interagency or intra-agency transfers; and

(B) describes how the efforts aligned with such sections complement one another.

(b) DUTIES OF THE ADMINISTRATOR.—In carrying out sections 100215 and 100216, the Administrator shall—

(1) participate, pursuant to section 216 of the E–Government Act of 2002 (44 U.S.C. 3501 note), in the establishment of such standards and common protocols as are necessary to assure the interoperability of geospatial data for all users of such information;

(2) coordinate with, seek assistance and cooperation of, and provide a liaison to the Federal Geographic Data Committee pursuant to the Office of Management and Budget Circular A–16 and Executive Order 12906 (43 U.S.C. 1457 note; relating to the National Spatial Data Infrastructure) for the implementation of and compliance with such standards;

(3) integrate with, leverage, and coordinate funding of, to the maximum extent practicable, the current flood mapping activities of each unit of State and local government;

(4) integrate with, leverage, and coordinate, to the maximum extent practicable, the current geospatial activities of other Federal agencies and units of State and local government; and

(5) develop a funding strategy to leverage and coordinate budgets and expenditures, and to maintain or establish joint funding and other agreement mechanisms with other Federal agencies and units of State and local government to share in the collection and utilization of geospatial data among all governmental users.

SEC. 100221. INTERAGENCY COORDINATION STUDY.

(a) IN GENERAL.—The Administrator shall enter into a contract with the National Academy of Public Administration to conduct a study on how the Federal Emergency Management Agency—

(1) should improve interagency and intergovernmental coordination on flood mapping, including a funding strategy to leverage and coordinate budgets and expenditures; and

(2) can establish joint funding mechanisms with other Federal agencies and units of State and local government to share

the collection and utilization of data among all governmental users.

(b) TIMING.—A contract entered into under subsection (a) shall require that, not later than 180 days after the date of enactment of this subtitle, the National Academy of Public Administration shall report the findings of the study required under subsection (a) to—

(1) the Committee on Banking, Housing, and Urban Affairs of the Senate;

(2) the Committee on Financial Services of the House of Representatives;

(3) the Committee on Appropriations of the Senate; and

(4) the Committee on Appropriations of the House of Representatives.

SEC. 100222. NOTICE OF FLOOD INSURANCE AVAILABILITY UNDER RESPA.

Section 5(b) of the Real Estate Settlement Procedures Act of 1974 (12 U.S.C. 2604(b)), as amended by section 1450 of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Public Law 111–203; 124 Stat. 2174), is amended by adding at the end the following:

"(14) An explanation of flood insurance and the availability of flood insurance under the National Flood Insurance Program or from a private insurance company, whether or not the real estate is located in an area having special flood hazards.".

SEC. 100223. PARTICIPATION IN STATE DISASTER CLAIMS MEDIATION PROGRAMS.

Chapter I of the National Flood Insurance Act of 1968 (42 U.S.C. 4011 et seq.) is amended by inserting after section 1313 (42 U.S.C. 4020) the following:

"SEC. 1314. PARTICIPATION IN STATE DISASTER CLAIMS MEDIATION PROGRAMS.

"(a) REQUIREMENT TO PARTICIPATE.—In the case of the occurrence of a major disaster, as defined in section 102 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5122), that may have resulted in flood damage covered under the national flood insurance program established under this title and other personal lines residential property insurance coverage offered by a State regulated insurer, upon a request made by the insurance commissioner of a State (or such other official responsible for regulating the business of insurance in the State) for the participation of representatives of the Administrator in a program sponsored by such State for nonbinding mediation of insurance claims resulting from a major disaster, the Administrator shall cause representatives of the national flood insurance program to participate in such a State program where claims under the national flood insurance program are involved to expedite settlement of flood damage claims resulting from such disaster.

"(b) EXTENT OF PARTICIPATION.—In satisfying the requirements of subsection (a), the Administrator shall require that each representative of the Administrator—

"(1) be certified for purposes of the national flood insurance program to settle claims against such program resulting from such disaster in amounts up to the limits of policies under such program;

"(d) PROHIBITION ON OFFSETTING COLLECTIONS.—Notwithstanding any other provision of this title, amounts made available pursuant to this section shall not be subject to offsetting collections through premium rates for flood insurance coverage under this title.

"(e) CONTINUED AVAILABILITY AND REALLOCATION.—Any amounts made available pursuant to subparagraph (A), (B), or (C) of subsection (b)(1) that are not used in any fiscal year shall continue to be available for the purposes specified in the subparagraph of subsection (b)(1) pursuant to which such amounts were made available, unless the Administrator determines that reallocation of such unused amounts to meet demonstrated need for other mitigation activities under section 1366 is in the best interest of the National Flood Insurance Fund.".

(f) INCREASED COST OF COMPLIANCE COVERAGE.—Section 1304(b)(4) of the National Flood Insurance Act of 1968 (42 U.S.C. 4011(b)(4)) is amended—

(1) by striking subparagraph (B); and

(2) by redesignating subparagraphs (C), (D), and (E) as subparagraphs (B), (C), and (D), respectively.

SEC. 100226. FLOOD PROTECTION STRUCTURE ACCREDITATION TASK FORCE.

(a) DEFINITIONS.—In this section—

(1) the term "flood protection structure accreditation requirements" means the requirements established under section 65.10 of title 44, Code of Federal Regulations, for levee systems to be recognized on maps created for purposes of the National Flood Insurance Program;

(2) the term "National Committee on Levee Safety" means the Committee on Levee Safety established under section 9003 of the National Levee Safety Act of 2007 (33 U.S.C. 3302); and

(3) the term "task force" means the Flood Protection Structure Accreditation Task Force established under subsection (b).

(b) ESTABLISHMENT.—

(1) IN GENERAL.—The Administrator and the Secretary of the Army, acting through the Chief of Engineers, in cooperation with the National Committee on Levee Safety, shall jointly establish a Flood Protection Structure Accreditation Task Force.

(2) DUTIES.—

(A) DEVELOPING PROCESS.—The task force shall develop a process to better align the information and data collected by or for the Corps of Engineers under the Inspection of Completed Works Program with the flood protection structure accreditation requirements so that—

(i) information and data collected for either purpose can be used interchangeably; and

(ii) information and data collected by or for the Corps of Engineers under the Inspection of Completed Works Program is sufficient to satisfy the flood protection structure accreditation requirements.

(B) GATHERING RECOMMENDATIONS.—The task force shall gather, and consider in the process developed under subparagraph (A), recommendations from interested persons in each region relating to the information, data, and accreditation requirements described in subparagraph (A).

(3) CONSIDERATIONS.—In developing the process under paragraph (2), the task force shall consider changes to—

(A) the information and data collected by or for the Corps of Engineers under the Inspection of Completed Works Program; and

(B) the flood protection structure accreditation requirements.

(4) RULE OF CONSTRUCTION.—Nothing in this section shall be construed to require a reduction in the level of public safety and flood control provided by accredited levees, as determined by the Administrator for purposes of this section.

(c) IMPLEMENTATION.—The Administrator and the Secretary of the Army, acting through the Chief of Engineers, shall implement the process developed by the task force under subsection (b) not later than 1 year after the date of enactment of this Act and shall complete the process under subsection (b) not later than 2 years after the date of enactment of this Act.

(d) REPORTS.—The Administrator and the Secretary of the Army, acting through the Chief of Engineers, in cooperation with the National Committee on Levee Safety, shall jointly submit to the Committee on Banking, Housing, and Urban Affairs and the Committee on Environment and Public Works of the Senate and the Committee on Financial Services, the Committee on Transportation and Infrastructure, and the Committee on Natural Resources of the House of Representatives reports concerning the activities of the task force and the implementation of the process developed by the task force under subsection (b), including—

(1) an interim report, not later than 180 days after the date of enactment of this Act; and

(2) a final report, not later than 1 year after the date of enactment of this Act.

(e) TERMINATION.—The task force shall terminate on the date of submission of the report under subsection (d)(2).

SEC. 100227. FLOOD IN PROGRESS DETERMINATIONS.

(a) REPORT.—

(1) REVIEW.—The Administrator shall review—

(A) the processes and procedures for determining that a flood event has commenced or is in progress for purposes of flood insurance coverage made available under the National Flood Insurance Program;

(B) the processes and procedures for providing public notification that such a flood event has commenced or is in progress;

(C) the processes and procedures regarding the timing of public notification of flood insurance requirements and availability; and

(D) the effects and implications that weather conditions, including rainfall, snowfall, projected snowmelt, existing water levels, and other conditions, have on the determination that a flood event has commenced or is in progress.

(2) REPORT.—Not later than 6 months after the date of enactment of this Act, the Administrator shall submit a report to Congress that describes—

(A) the results and conclusions of the review under paragraph (1); and

APPENDIX F: RISK MAP STATUS CHART[185]

Sum of Miles	Approximate	Detailed	Grand Total
Modernized	**705,521**	**201,764**	**907,285**
Unknown	**310,779**	**10,887**	**321,666**
Being Assessed	23	251	274
Being Studied	18	0	18
Deferred	12	0	12
To Be Assessed	310,726	10,636	321,362
Unverified	**20,609**	**47,419**	**68,028**
Being Studied	8,983	8,009	16,992
To Be Studied	11,626	39,410	51,036
Valid	**374,133**	**143,458**	**517,591**
Being Studied	19	49	68
NVUE Compliant	374,114	143,409	517,523
Paper	**193,492**	**29,163**	**222,655**
Unknown	**132,990**	**10,266**	**143,256**
Being Assessed	0	0	0
Being Studied	63	0	63
Deferred	0	4	4
To Be Assessed	132,927	10,262	143,189
Unverified	**56,144**	**14,820**	**70,964**
Being Studied	7,417	11,645	19,062
To Be Studied	48,727	3,175	51,902
Valid	**4,358**	**4,077**	**8,435**
Being Studied	0	0	0
NVUE Compliant	4,358	4,077	8,435
Unmapped	**720**	**145**	**865**
Assessed	**720**	**145**	**865**
Being Studied	720	145	865
Deferred	0	0	0
To Be Studied	0	0	0
Grand Total	**899,733**	**231,072**	**1,130,805**

[185] Data provided from the Coordinated Needs Management Strategy website on August 19, 2013. Information may have changed since that time.

Definitions of Chart Terms

Validation Status	Status Type	Description
"UNKNOWN"	To Be Assessed	Requires Regional input to either defer, perform a CNMS evaluation, or use other info for Zone A's validation.
	Being Assessed	Studies currently being assessed per CNMS stream reach level validation described in this document.
	Deferred	Low risk areas that will not be evaluated in Risk MAP.
	Not Being Assessed	NHD Streams that are not part of FEMA's inventory (Public Lands, National Parks).
"UNVERIFIED"	To Be Studied	Studies that need to be addressed and are planned for a future Fiscal Year.
	Being Studied	Studies are currently being studied or have been allocated funding for the current Fiscal Year captured during the Discovery process.
"VALID"	NVUE Compliant	New study performed or stream reach level validation completed and reflects existing conditions.
"ASSESSED"	To Be Studied	Miles prioritized to be mapped with a SFHA within Risk MAP.
	Being Studied	Unmapped streams that are currently being studied or have been allocated funding for the current Fiscal Year.
	Deferred	Miles investigated by Region for possible map project, but analysis resulted in low priority study.

APPENDIX G: LIST OF STUDIES AND REPORTS REQUIRED IN THE BIGGERT-WATERS ACT

Study By	Description of Study
NAPA	Conduct a study on ways to improve interagency and intergovernmental coordination and funding strategies.
FEMA	Report setting forth options for repaying within 10 years all amounts owed pursuant to the National Flood Insurance Act of 1968.
FEMA	Report on the recommendations of the Technical Mapping Advisory Committee, actions taken by FEMA to address such recommendations, and any recommendations made by the Council that have been deferred or not acted upon, together with an explanatory statement.
FEMA	Report on the Write Your Own program containing specific rationale and purposes of such rules, the reasons for the adoption of the policies contained in, and the degree this accurately represents the operating costs of the property/casualty insurance companies participating.
FEMA	Joint study with Secretary of the Army on activities and implementations of the Flood Protection Structure Accreditation Task Force.
FEMA	Report that describes the results and conclusions from the review of the processes and procedures for determining that a flood event has commenced or is in progress for purposes of flood insurance coverage made available under the National Flood Insurance Program (NFIP).
FEMA	Conduct a study to assess a broad range of options, methods, and strategies for privatizing the NFIP. GAO to perform a similar separate study.
FEMA	Conduct a study and submit a report regarding the impact, effectiveness, and feasibility of amending section 1361 of the National Flood Insurance Act of 1968 to include widely-used and nationally-recognized building codes as part of the floodplain management criteria.
FEMA	Study on the methods to encourage and maintain participation in the NFIP, methods to educate consumers about the NFIP and the flood risk, methods for establishing an affordability framework for the NFIP, and the implications for the NFIP and the Federal budget of using each such method. National Academy of Sciences (NAS) will provide support with an economic analysis.
FIO	Report providing an assessment of the current state of the market for natural catastrophe insurance in the United States.
GAO	Study and report addressing the efficacy, adequacy, and sufficiency of the final rules issued by the Write Your Own Program.
GAO	Study on improving the NFIP including the number of current flood insurance policy holders, the availability for private flood insurance coverage, and what effect raising the current limits of coverage would have on private insurers' ability to provide flood insurance coverage.
GAO	Study on the composition of the remaining Pre-FIRM structures, respective income level of the owners of such structures, total cost of foregone premiums since the establishment of the NFIP, as well as the annual cost as a result of the subsidies provided to such structures.
GAO	Review and report on the three largest contractors the Administrator uses in administering the NFIP.
GAO	Study and report on the availability of additional living expenses and business interruption coverage in the private marketplace for flood insurance, the estimated cost to consumers if the NFIP priced such optional coverage at true actuarial rates, the impact such optional coverage would have on consumer participation, and the fiscal impact such optional coverage would have upon the National Flood Insurance Fund.
GAO	Study and report concerning the participation of Indian tribes and members of Indian tribes in the NFIP describing the steps that the Administrator should take to increase awareness and encourage participation by Indian tribes and members of Indian tribes in the NFIP, and identifying any legislative changes that would encourage increased participation.
NAS	Study exploring methods for understanding graduated risk of levees and associated land development, insurance, and risk communication.

APPENDIX H: GUIDANCE TO REGIONS ON IMPLEMENTING RISK MAP

Data Coordination Procedure

FEMA provides formal guidance to regions on how to coordinate with other federal agencies and state and local governments to acquire data relevant to a flood risk project.[186] The procedure supports FEMA's policies of avoiding all unnecessary duplication of federal, state, or local mapping activities, and that all geospatial data used in developing FIRMs be coordinated, collected, documented, and reported according to federal geospatial data reporting standards.[187]

The procedure directs regions to utilize federal, state, and local public inventories and includes a comprehensive list of the inventories, the data they contain, and contact information. Regions are also instructed to contact federal, state, and local partners to share data acquisition plans. In addition, regions are required to maintain documents specific to each state that provide details on datasets within the state and how they should be used for flood hazard mapping and Discovery projects. Project teams must use both the national and state-specific procedures when conducting Discovery.

There is also an implementation guide that accompanies this procedure. The Implementation Guide provides the goals of this procedure, an overview of roles and responsibilities, and goes through the implementation steps in detail.[188]

Risk MAP Meeting Guidance

FEMA has issued guidance on engaging the community and other stakeholders throughout the Risk MAP process.[189] The Meeting Guidance includes information on meetings that are both required and "strongly recommended," as well as engagement that should occur before, between, and following meetings.[190] Stakeholder engagement should begin with state and federal partners during the Planning and Budgeting phase of the project.[191] Local officials must be brought into the process beginning with the Discovery phase.[192] As the project progresses, meetings are held for different purposes, and different stakeholders are invited. The Guidance describes the purposes of the different meetings; the timing of the meetings; and lists meeting attendees, which vary depending on the meeting objectives.

Of particular note is the Resilience Meeting, which is designed to help communities understand their flood risk and mitigation options[193], and the Proposed NFIP Map Changes

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[186] Federal Emergency Management Agency. *Geospatial Data Coordination Policy*. August 23, 2005.
[187] Ibid.
[188] Federal Emergency Management Agency. *Geospatial Data Coordination Implementation Guide Version 3*. January 2011.
[189] Federal Emergency Management Agency. *Risk MAP Meetings Guidance*, Operating Guidance 04-11. June 30, 2011.
[190] Ibid.
[191] Ibid.
[192] Ibid.
[193] Ibid.

and Impacts Meeting, which takes place before the preliminary NFIP map is released. The purposes of this meeting includes providing the community with changes since the previous FIRM and planning for the preliminary NFIP map release.[194] This gives the community an opportunity to provide input before the preliminary FIRM is issued.

Regions report that communications and relationships with communities have greatly improved as a result of the community engagement aspects of Risk MAP. For example, one region noted that even though adding the Proposed NFIP Map Changes and Impact Meeting adds time to the project, it has helped to provide some flexibility to the program, allowing communities to feel that they have been heard, and providing an opportunity to resolve disagreements before the preliminary map is issued. Once the preliminary FIRM is issued, the regulatory process begins and there is no opportunity for communities to provide input.

Discovery Guidelines

Appendix I of FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners[195] provides flexible guidance on Discovery, taking into account the different political and physical environments projects are operating in. The guidelines describe the objectives and outcomes of Discovery. The guidelines list the specific federal and state agencies and officials that are considered FEMA partners, and coordination is expected to be continuous and ongoing. Coordination with these stakeholders should take place on a state or regional level and should occur before Discovery to inform project prioritization and sequencing.[196]

Annual Memoranda on Risk MAP Project Planning

FEMA headquarters communicates program priorities, regional allocation of funding, and the outline of how headquarters and regions should collaborate on finalizing regional plans each year through memoranda to the regions. The FY 2013 Memorandum communicates that projects in areas where communities are committed to taking mitigation actions should be prioritized. Regions are also directed to develop work plans for these projects that include specific steps that have been or will be taken to support community action. The project plans should include at least these steps:

- convening cross-Mitigation Division team meetings on a regular basis to define and refine a holistic community understanding;
- identifying key champions in the community and plans for building relationships with them; and
- working with community champions to identify mitigation actions and develop implementation plans.

[194] Ibid.
[195] Federal Emergency Management Agency. *Guidelines and Standards for Flood Risk Analysis and Mapping, Appendix I: Discovery*. June 2, 2011.
[196] Ibid.

The Memorandum also instructs regions that use of the Project Planning and Purchase Portal (P4) will be mandatory in fiscal year 2013. The purpose of the P4 tool is to support fiscal management, analysis, and planning capabilities across the Risk MAP program.[197]

USACE/FEMA Joint Memorandum on Joint Actions on Flood Risk Management

FEMA and USACE have issued a joint memorandum to FEMA regions and USACE Division Offices providing guidance on coordinating flood risk management activities related to flood risk reduction infrastructure (levees).[198] Among other things, the memorandum directs regions and Divisions to:

- coordinate communication with communities when there are levee issues that cross agency lines of authority; and
- hold meetings that include FEMA Regional Offices, USACE Division Offices, and headquarters as least two times per year to resolve issues and develop collaboration strategies.

[197] Federal Emergency Management Agency. *Fiscal Year 2013 Performance, Funding, and Regional Allocations*. March 8, 2013.

[198] FEMA, USACE. *Federal Emergency Management Agency (FEMA)/U.S. Army Corps of Engineers (USACE) Joint Actions on Flood Risk Managemen.*, June 3, 2011.

APPENDIX I: INTERAGENCY BUDGET CROSSCUT

Department	Agency	2011 Enacted	2012 Enacted	2012 Enacted/CR	2014 President's Request	Description
Agriculture	Natural Resources Conservation Service	0.3	2.7	2.0	2.0	Geospatial Science products and services to support NRCS mission, Landscape Conservation initiatives, and the Conservation Effects Assessment Projects (CEAP).
Army	U.S. Army Corps of Engineers	181.0	213.8	200.3	209.3	Funding supports planning, development and coordination of studies and data collection as well as the operation and maintenance of various flood risk management programs. Work is done in collaboration with local, state and Federal stakeholders/partners.
Commerce	National Oceanic and Atmospheric Administration	30.2	31.7	TBD	43.5	Funding supports observations and references to determine flood risk; development of DEMs and data integration tools to facilitate DEM sharing; and the collection and development or data, information, and tools to support flood risk assessment.
Homeland Security	Federal Emergency Management Agency	298.6	215.4	205.3	205.3	Funding supports planning, development, coordination, and distribution of flood risk products to support the National Flood Insurance Program. Work is done collaboratively with the U.S. Army Corps of Engineers, U.S. Geological Survey, the National Oceanic and Atmospheric Administration, other Federal agencies, and state and local governments.
Interior	Bureau of Reclamation	1.6	1.3	1.1	1.2	Funding supports research to better understand the influence of climate change on flood frequency and magnitudes; dam project-specific flood risk identification studies and for frisk reduction modification.
Interior	National Parks Service	0.1	0.2	0.0	0.0	
Interior	US Geological Survey	12.5	16.6	15.3	27.7	Fund supports acquisition, processing, and analysis of elevation data from LiDAR and integration of data into the National Elevation Dataset which is used for multiple applications, such as flood risk analyses and numerous infrastructure, ecological, and other uses; development of Coastal National Elevation Data (CoNED) services; and flood frequency and risk analysis and inundation mapping.
—	National Aeronautics and Space Administration	30.0	28.7	28.4	28.6	Research activities concerning Terrestrial Hydrology and understanding of the Water Cycle; Precipitation measurements from satellites; development of a laser altimeter system to provide land surface topography; development of a Digital Elevation Model based on Shuttle Radar Topography Mission data; and applied science application in Water Resources, Disasters, and the Gulf of Mexico.
—	Tennessee Valley Authority	0.0	0.0	0.8	0.8	Funding supports a project to update inundations maps for 36 TVA dams, to reflect current information and technological advancements. These maps are used by TVA and state/local Emergency Management Agencies to understand the downstream area potentially impacted by a dam break and to develop evacuation plans accordingly.
	Total	**554.3**	**510.3**	**453.2**	**518.4**	

APPENDIX J: INFORMATION SOURCES

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National Academy of Public Administration ®

900 7th Street, N.W.
Suite 600
Washington, D.C. 20001
Phone: (202) 347-3190
Fax: (202) 393-0993
Website: www.napawash.org