MITIGATION

Overview

The term "mitigation", as defined in the National Preparedness Goal Capabilities, refers to those capabilities necessary to “Reduce the loss of life and property by lessening the impact of disasters”. This section of the Homeland Security Enterprise (HSE) Geospatial Concept of Operations (GeoCONOPs) describes how the whole geospatial community supports the Mitigation Mission. The context is meant to complement the Federal Interagency Operation Plans (FIOPs) by focusing on the geospatial part of the Mitigation Mission.

Geospatial technology plays an important role in supporting the Mitigation Mission. Decision Support enabled by geospatial capability allows situational awareness for understanding location, context, and inter-dependencies necessary for effective integration and information sharing to prepare for specific types of incidents that pose the greatest risk to the Nation’s security. Geospatial infrastructure, operators, and knowledge are critical components that cross all mission areas and operations. Examples of how geospatial technology supports the mission include:

- Global Positioning Systems (GPS) provide the ability to perform accurate location, tracking, orientation, timing, and measurements necessary to support the whole community.
- Reconnaissance and Remote Sensing provide for the collection and detection of ground and atmospheric conditions and imagery.
- The ability to analyze, model, process, exploit, display, and share data and information required to support the mission.
- Analysts allow for the knowledge, skills, and abilities necessary for effective use of geospatial capabilities to support decision making.

These types of geospatial capabilities supporting the Mitigation Mission are necessary to:

- Bolster information sharing and collaboration
- Improve the resilience of critical infrastructure and key resource lifelines
- Provide grants, plans and training to our homeland security and law enforcement partners
- Community-wide risk reduction projects and risk reduction for specific vulnerabilities from natural hazards or acts of terrorism
- Facilitate rebuilding and recovery in disaster hit areas

Stakeholders

Mitigation stakeholders can be considered in the following groups:

- Citizens and Communities
- Civil Society Organization
- Academics and Researchers
- Civilian Government at all levels (Federal, State, Local, Territorial and Tribal)
- Military, including National Guard
- International Partners

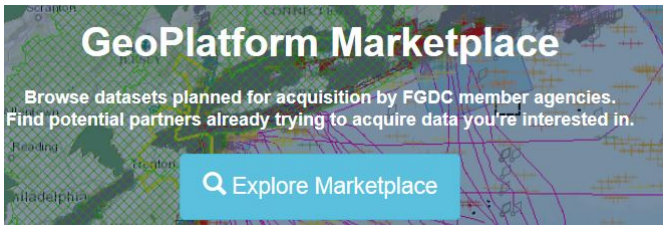
Who does Mitigation? A number of stakeholder organizations are involved in the Mitigation Mission to assist with the geospatial planning, information sharing, and operational coordination crucial to the mission. Some of the main stakeholders supporting geospatial mitigation activities include:

- Department of the Interior (DOI) – Provides information on land use as well as risk and hazard level data.
- Department of Homeland Security (DHS) – Assists in the operational coordination part of mitigation with the GII and NOC COP tools and provides critical infrastructure data available for use and download.
- Federal Emergency Management Agency (FEMA) – Serves as a main sources for historical flood data that can help determine where future flooding disasters may occur. Provides information on historical federally declared disasters to show typically vulnerable areas as well as hazard estimation and damage models.
- National Oceanic and Atmospheric Administration (NOAA) – Provides access to historical hurricane information and web mapping to analyze data. Works with DHS and FEMA to develop public alert and warning systems.
- United States Geological Society (USGS) – Makes elevation data available to view and download along with risk and hazard data pertaining to fires and flooding.

GeoData and Products are a crucial component necessary to reduce loss of life and property by lessening the impact of disasters. Data help to explain where people and critical infrastructure are located, supply facts on historical events, and supply information on other factors that may drive in mitigating risk. There are a number of required data elements when supporting the Mitigation Mission that the Stakeholders are providing. Major examples include:

1. **Detailed elevation data** provide analysts with information that may assist in modeling and determining areas that may be at the greatest risk for specific disasters.
    a. USGS offers the 3D Elevation Program (3DEP) in response to needs for topographic data. The site collects LiDAR data over the United States.
    b. NGA's Geospatial Repository and Data (GRiD) Management System is a source that warehouses and distributes elevation data such as LiDAR and Digital Elevation Models.
    c. USGS provides TNM Data Services which supplies topographic and elevation data.
2. **A clear understating of critical infrastructure inventories, locations, relationships and independences** help with ensuring community-wide risk deduction and strengthen key resources that may be affected in a disaster.

a. The GeoPlatform Marketplace enables users to locate potential partners in acquiring similarly needed geospatial data used for Mitigation.



b. The Homeland Infrastructure Foundation Level Data (HIFLD) Open and Secure sites provide critical infrastructure data for geospatial analysts to use with over 500 resources in downloadable formats available.

c. The Depart of the Interior's Environmental Dataset Gateway (EDG) allows for search and discovery of publicly available data resources keys to protection such as agriculture, energy, health, waste, and water.

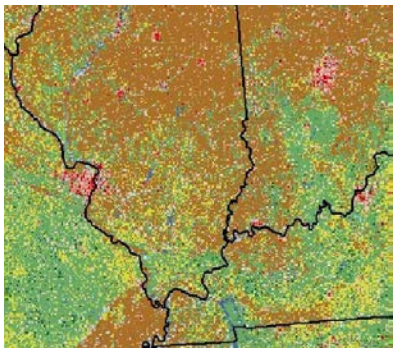
d. Topologically Integrated Geographic Encoding and Referencing (TIGER) contain critical infrastructure data such as roads and railroads as well as statistical geographical areas to help determine interdependencies and relationships of the data.

3. **Historical Data** assists decision makers and analysts determine the probability of disasters occurring at different locations.
    a. NOAA provides a number of resources for finding geospatial data important to the Mitigation Mission including its Geospatial Data and Services, which contains map viewers and data pertaining to natural hazards and historical declarations. Hurricane specific data is located at the Historical Hurricane Tracks site and the National Hurricane Center Data Archive.

    NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
    NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

    b. FEMA maintains GIS Data Feeds that have historic data for all types of natural disasters.
4. **Flood and Storm Data** help to show where flooding and hurricanes typically affect areas so that planners and decision makers can work to mitigate the losses caused by these disasters.
    a. FEMA Disaster Declaration Feeds provide data on current and historical disaster declarations in multiple formats.
    b. Flooding data can be found within FEMA's National Flood Hazard Layer (NFHL) GIS Services as well as the USGS Current Water Data for the Nation, which show stream flow conditions and are updated frequently.
    c. NOAA's National Hurricane Center GIS Data provides hurricane data in various GIS formats for download.
5. It is important to understand **Land Use** in order to comprehend the changing of environmental conditions regularly or after a disaster.
    a. USDA's Web Soil Survey provides soil data that can help determine flooding or other risks pertaining to natural disasters.

b. The Department of the Interior and USGS provide the National Land Cover Database, which delivers complete, current, consistent, and public domain information on the Nation's land cover.



6. **Risk and Hazard Maps** can help to show what areas are at the greatest risk for disasters.
    a. The Department of Interior's Active Fire Origins maps current large fire incidents and has fire data to download assisting in mitigating risks.
    b. The USGS National Burn Severity Mapping Project contains initial and extended assessments for fire support.

Capabilities include specific technical tools, models, and applications useful in satisfying requirements within the Mitigation Mission. These tools aid in modeling for risk and hazard, land use change analysis, and understanding of target populations at risk. Some of the required capabilities to support the Mitigation Mission and examples of tools that provide support include:

1. **Damage Estimation and Hazard Models** assist in attempting to prevent as much damage as possible as they help to understand potential loss of infrastructure and lives in a disaster.
    a. HAZUS is a model that creates estimates of damages and economic loss for buildings and infrastructure as well as the impacts of earthquakes, hurricanes, and floods on the population. The estimates can help to mitigate loss and risk of natural disasters.
    b. HURREVAC provides estimates on evacuation decisions using modeled hurricane track information and other data for the specific study areas. It also can help show potential storm surge for an area.

2. For the Mitigation Mission, **Public Information and Warning** is as much about sharing information and communicating mitigation messages between elements of the whole community as it is about a one-way provision of warnings.
    a. FEMA and its federal partners, the Federal Communications Commission (FCC), the NOAA NWS, and the DHS Science and Technology Directorate (DHS S&T), worked together to transform the national alert and warning system to enable rapid dissemination of authenticated alert information over as many communications channels as possible. Integrated Public Alert and Warning System (IPAWS) provides a broad range of message options and communications pathways for the delivery of alert and warning information to the American people during and after a disaster.

    b. The Geo-Targeted Alerting System (GTAS) is a collaboration from DHS, NOAA, and FEMA in partnership with IPAWS for plume modeling. It estimates the affected area during a HAZMAT incident and can provide guidance during the Mitigation Mission.

3. Under **Operational Coordination**, mitigation works effectively as part of all operational environments and brings risk informed decisions to support activity across the whole community of national preparedness. This can include being a part of command and control structures during response and recovery and decentralized structures during steady state operations.
    a. The DHS NOC COP Application provides Homeland Security Enterprise professionals with enhanced situational awareness and a common operating picture for the entire Federal Government.
    b. The DHS GII provides a shared Sensitive but Unclassified (SBU) platform for users to access and share trusted geospatial data, map services, and geospatial applications in order to plan and communicate with others supporting the Protection Mission.
    c. The Homeland Security Information Network (HSIN) Critical Infrastructure is a trusted network for homeland security operations allowing for the sharing SBU information.
    d. The FEMA Geospatial Platform is an online web platform that provides users access to publically available geospatial data and analytics in support of emergency management, recovery, response, and mitigation.

4. **Identifying Threats and Hazards** that may occur in a specific area and determining the frequency and magnitude is an important part of the Mitigation Mission. It promotes the refinement, sharing, and usage of best-available data on hazard likelihood, impacts, and vulnerabilities, as well as the ability to location this information on all levels.
    a. Risk MAP provides tools to better assess the risk from flooding and planning and outreach support to communities to help them take action to mitigate flood risk.
    b. The National Flood Hazard Layer is provided by FEMA through web mapping services and shows flood hazard information and supporting data to help understand flood risk.

    c. The HHS GeoHealth Portal incorporates information from numerous sources both internal and external to HHS and to help understand potential health risks.

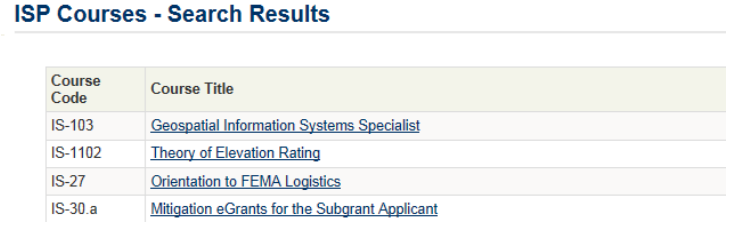
    d. The Census Data Mapper is a web mapping application focusing on demographics that allows users to understand who may be exposed to potential risks and hazards.
    e. USGS's Flood Event Viewer provides access to storm surge and other event based data from the USGS in order to understand threats and mitigate them.

Tradecraft includes items such as access to training, operating procedures/guides, templates, and other resources. These resources are valuable in the Mitigation Mission by providing guidelines on what to do, examples of what other agencies have done, and training for workers to be prepared. A list of types of resources available for the mission are below:

1. The FEMA Flood Map Service Center (MSC) is the official public **source for flood hazard information** produced in support of the National Flood Insurance Program (NFIP). Users have access to official flood maps, a range of other flood hazard products, and tools for better understanding flood risk.
2. **Grants and financial assistance** can supply essential funding for staffing, training, data, software and infrastructure necessary to support the Mitigation Mission. There are several ways of applying for grants and other financial agreements. The National Geospatial Intelligence Agency (NGA) overs several types of funding programs. DHS also has a grant program that distributes funds to aid in prevention attacks and disasters.

3. It is important to **assess and understand an agency's current geospatial abilities** in order to determine geospatial strengths and weaknesses. The NAPSG Foundation's CARAT Tool is designed to serve as a roadmap to understand an agency's readiness to support geospatial functions.

4. **Training** for analysts and those supporting the mission is essential in preparing for any type of event. The FEMA Emergency Management Institute has courses to help prepare for the potential effects of all types of disaster and emergencies.



ISP Courses - Search Results

Course Code	Course Title
IS-103	Geospatial Information Systems Specialist
IS-1102	Theory of Elevation Rating
IS-27	Orientation to FEMA Logistics
IS-30.a	Mitigation eGrants for the Subgrant Applicant

5. **Standard Operating Procedures** may supply guidance and direction to analysts and decision makers on proper steps to take when supporting the Mitigation Mission. The NAPSG Foundation's Geospatial Standard Operating Guides (SOG) include templates and guidelines for coordinating geospatial emergency support efforts.

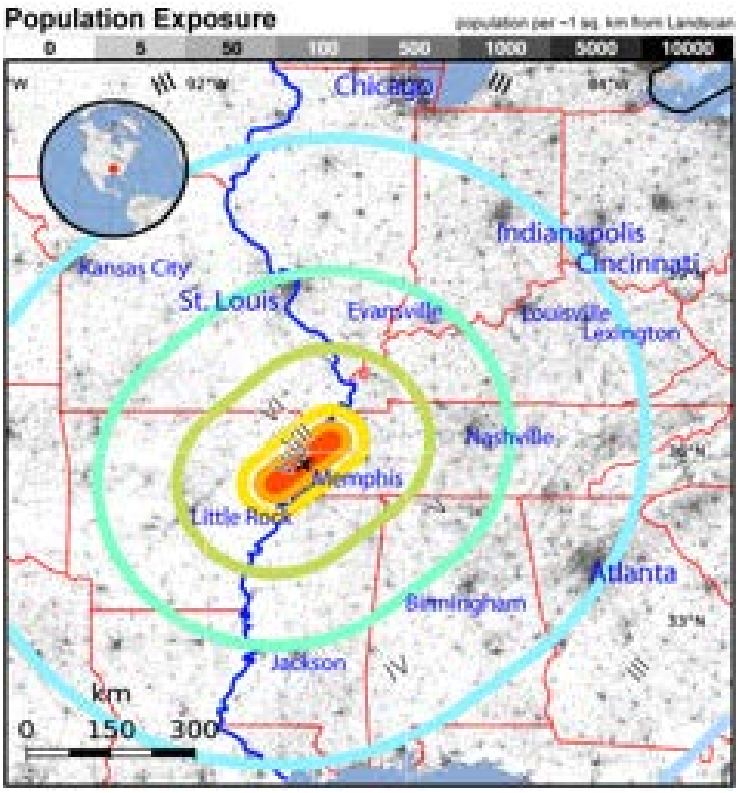
Use-Case Scenarios - Understand the how the geospatial community works to unify operations that integrate and synchronize existing geospatial capabilities to support the Mitigation Mission.

Threats and Hazard Identification Scenario

In this scenario, analysts in earthquake prone areas need to assess the threats and hazards that an earthquake presents so that decision makers, responders, and community members can take informed action to lessen the damage in future events.

Steps to take when assessing threats and hazards include:

1. Identify what threats and hazards occur in a projected, specific geographic area.
2. Determine the potential frequency and magnitude.
3. Incorporate these factors into the analysis and planning process in order to clearly understand the needs of a community or entity.



Data should be gathered in a timely and accurate manner in order to effectively identify the threats and hazards. Analysts must ensure the data are received by the right people at the time needed and can be used by the entire community (i.e. proper format, associated metadata). Natural hazard data should be shared in a transparent and accessible way across all communities. Using agency's geospatial portals, COPs, etc. make for the best use of easily sharing data. Finally, the data need to be translated into meaningful and actionable information through appropriate analysis and collection tools.

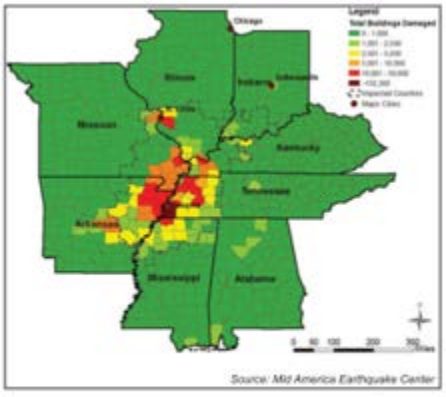


Figure 5–3: Estimated Damage to General Building Stock

Figure 5–4: Major Damage to River Crossing Bridges in NMSZ

These efforts help to promote the refinement, sharing, and usage of the best-available "ground truth" data on hazard likelihood, impacts, and vulnerabilities, as well as the ability to localize this information to use on all levels.

Threat and Hazard Identification Suggested Requirements:

Essential Elements of Information	Geospatial Product/Analysis
Demographics	Estimated Exposed Population
	Impact Upon Groups by Income, Ethnicity, and Age
	Impacted Population Estimates
Predictive Modeling	USGS Ground Shaking
	HAZUS
	Economic Impact Modeling
	HAZMAT Locations
	USACE Post Earthquake Flood Modeling
	USACE Debris Estimates
	FEMA Post-Event Flood Modeling
	USACE Dam Failure Impacts
Damage Assessments	IA Applicant Locations
	SBA Applicant Locations
	River Transportation Status
	General Imagery Analysis
	IDP - Structure Damages
	IDP - Transportation Damages
	FEMA PDA Team Reports
	ARC Damage Assessment Team Reports
	Debris Removal Status
	FEMA PA Inspection Locations
	FEMA MAT Reports
	Imagery Analysis (pre vs. post-event imagery)

Risk and Disaster Resilience Scenario

It is critical to assess risk and disaster resilience so that decision makers, responders, and community members can take informed action to reduce their entity's risk and increase their resilience. The risk and disaster resilience assessment activities put into practice broadly compatible approaches to prioritizing vulnerabilities in this area.

There are a few priorities to take into consideration when conducting analysis on risk and disaster resilience:

1. It is important to incorporate vulnerability datasets including population, infrastructure inventory and condition assessment information, critical infrastructure, lifelines, building stock, etc. in order to calculate the risk from the identified hazards.
2. Updating the risk assessments periodically to reassess the risk from hazards is also important for a number or reasons. Aging infrastructure, new development, new mitigation projects and initiatives, post event/verification/validation, new technologies, and improved methodologies all may factor into a previous assessment and would change the results.
3. A consolidation of analysis efforts with various groups and agencies will reduce redundancy and provide a more uniform picture of the risks from threats and hazards.
4. Ensure that users of data and assessment stakeholders know where to get data and how the use the data provided.

Table 1: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	14,060	12,484.90
	Segments	2,808	49,994.90
	Tunnels	2	9.60
	Subtotal		**62,489.40**
Railways	Bridges	68	12.20
	Facilities	69	130.90
	Segments	3,460	3,365.10
	Tunnels	5	10.00
	Subtotal		**3,518.20**
Light Rail	Bridges	0	0.00
	Facilities	7	13.30
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		**13.30**
Bus	Facilities	18	17.10
	Subtotal		**17.10**
Ferry	Facilities	3	2.80
	Subtotal		**2.80**
Port	Facilities	103	195.30
	Subtotal		**195.30**
Airport	Facilities	335	1,588.40
	Runways	238	6,435.40
	Subtotal		**8,023.80**
	Total		**74,259.90**

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	750,948	66.92	921	30.42	77	13.39	176	62.43	44	66.19
Steel	23,341	2.08	55	1.82	20	3.57	8	2.67	2	2.45
Concrete	13,921	1.24	28	0.92	6	1.10	3	1.15	1	1.17
Precast	6,527	0.58	17	0.57	7	1.27	2	0.63	0	0.51
RM	5,623	0.50	9	0.29	4	0.62	2	0.54	0	0.53
URM	235,088	20.95	1218	40.23	265	46.21	69	24.35	14	21.29
MH	86,666	7.72	779	25.75	194	33.85	23	8.23	5	7.85
Total	**1,122,114**		**3,026**		**573**		**283**		**66**	

Table 11: Building-Related Economic Loss Estimates

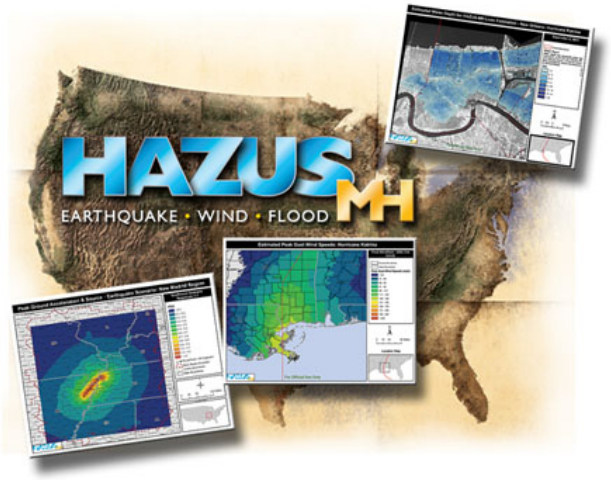
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.04	1.49	0.06	0.25	1.83
	Capital-Related	0.00	0.02	1.32	0.04	0.05	1.43
	Rental	0.86	0.49	0.92	0.02	0.07	2.37
	Relocation	2.94	0.59	1.28	0.09	0.61	5.52
	Subtotal	**3.81**	**1.13**	**5.02**	**0.21**	**0.97**	**11.15**
Capital Stock Losses							
	Structural	4.99	0.97	1.73	0.31	0.76	8.77
	Non_Structural	45.94	13.20	17.18	8.26	7.73	92.30
	Content	31.54	6.22	15.28	7.12	7.36	67.51
	Inventory	0.00	0.00	0.52	1.66	0.28	2.46
	Subtotal	**82.46**	**20.39**	**34.70**	**17.35**	**16.13**	**171.04**
	Total	**86.27**	**21.52**	**39.73**	**17.56**	**17.11**	**182.18**

HAZUS

HAZUS is a nationally applicable standardized based model for estimating potential losses from earthquakes, floods, and hurricanes and is available at no cost to the government geospatial community Developed by FEMA, HAZUS uses GIS technology to estimate physical, economic, and social impacts of disasters thus mitigating the impact of disasters. It graphically illustrates the limits of identified high-risk locations due to earthquake, hurricane, and floods. Users can then visualize the spatial relationships between populations and permanently fixed geographic assets or resources for the specific hazard being modeled.

HAZUS has been utilized to support post-disaster impact assessments and response operations. Government planners, GIS specialists, and emergency managers use HAZUS to estimate losses and assess beneficial mitigation approaches to take to minimize them. It can be used in the assessment step in the mitigation planning process, which is the foundation for a community's long term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage.

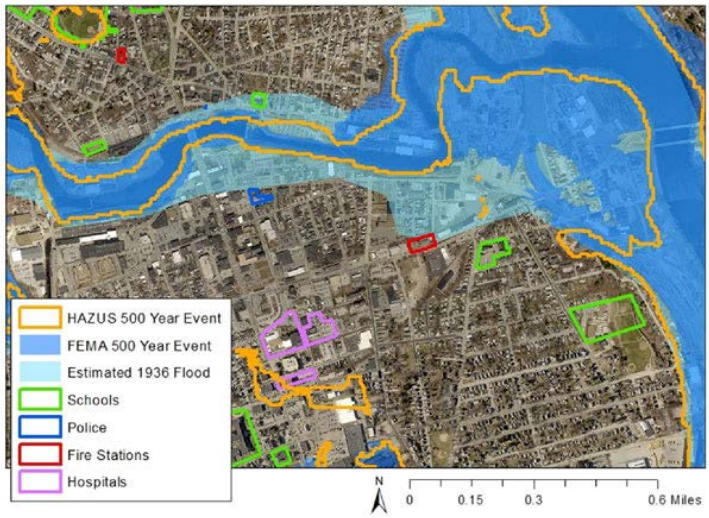


HAZUS uses GIS technology to estimate physical, economic, and social impacts of disasters and graphically illustrates the limits of identified high-risk. As a regional, multi-hazard loss estimation tool, HAZUS has become an important geospatial application in support of planning efforts for the following event types:

- Earthquakes: HAZUS has been widely used for pre-event earthquake preparedness, including the use of loss estimates to support damage assessments, social losses (casualties, displaced households, and shelter requirements), loss of functionality of essential facilities, and damage to the general building stock. For post-event, the HAZUS earthquake model has been used with ShakeMap (USGS data product) to depict seismic activity intensity and the boundaries of potential damage. The products derived from HAZUS are used to support situational awareness and analysis of Essential Elements of Information. To support response operations and decision making, FEMA has developed a series of HAZUS loss estimation templates that provide standardized maps and data layers, organized by ESF.
- Hurricanes**:** HAZUS has been used by FEMA Headquarters (HQ) and Region IV to estimate the potential impacts of hurricane winds and storm surge on the general building stock, essential facilities, and the general population. As with the earthquake model, templates have been developed for the hurricane model, including estimates of short-term shelter requirements, displaced households, debris generated, damage and loss of functionality to essential facilities, and population exposure to wind and surge.
- Floods: The HAZUS flood model consists of two components that support planning and operations: flood hazard analysis and flood loss estimation analysis. The flood hazard analysis module uses characteristics such as frequency, discharge, and ground elevation to estimate flood depth, flood elevation, and flow velocity. The flood loss estimation module calculates potential loss estimates from the results of the hazard analysis to include: physical damage to residential, commercial, industrial and other buildings; debris generation, including the

distinction between different types of materials; and social impacts, including estimates of shelter requirements, displaced households, and population exposed to scenario floods.

Modeled results are compiled into two standard reports and can be accessed in map based formats by information theme. Information packaged within HAZUS includes:



- Building and essential facilities inventories, which are aggregated at census block and census tract levels
- Detailed scenarios (hurricane, flood, earthquake) that depict estimates of building damage, social losses (displaced households, casualties), economic losses, and damage and loss of functionality to essential facilities and lifelines
- Inventory (national datasets) of essential facilities (police, fire, schools, EOCs, medical facilities), general building stock (occupancy and structural types), and lifelines (transportation and utilities).

In the future, FEMA's Risk MAP (Mapping, Assessment, Planning) products (non-regulatory) will include a series of datasets generated by using HAZUS to estimate losses for multiple percent annual chance events (i.e., 10%, 4%, 2%, 1% and 0.2%) for general building stock types and (optionally) for user defined facilities. These products are intended to assist in communicating flood risk to communities and assist with implementation of local mitigation activities.

Map Modernization Program

The focus of FEMA's Map Modernization Program is Risk MAP, which integrates flood hazard mapping, risk assessment tools, and mitigation planning into one program. This allows FEMA to leverage the current digital flood map inventory and enhance the usability of flood hazard data and mapping. Through the Risk Analysis Division, FEMA is developing a National Digital Elevation and Acquisition and Utilization Plan for floodplain map updates. This plan presents FEMA's national elevation strategy for Risk MAP.

As one of the most robust mapping efforts in the country, the Risk MAP program provides the authoritative flood hazard data for the US. This data is used in support of floodplain insurance, building permit approval, zoning, and land use planning. The Risk Map program provides products and analysis relevant to all aspects of emergency management, which include:

- Use of products from regional flood map production to guide post-disaster support for temporary housing and other IA programs
- Technical assistance in the use of Risk MAP products to support ESF #14 (Long-Term Recovery), including flood hazard risk reduction.

The Map Modernization Program continues to generate products and data across the U.S which may include local and regional reports, watershed-based flood hazard studies, Riverine Flood Hazard Studies, Coastal Flood Hazard Analysis (pre- and post-disaster), regional flood maps and data, and an inventory of Levee-Impact Areas. Products are classified as regulatory (e.g., FIS, FIRM, FIRM Database) and non-regulatory (e.g., Flood Risk Database, Flood Risk Map, Flood Risk Report).

FEMA Mitigation Planning

FEMA's Multi-Hazard Mitigation Planning provides guidance and technical assistance to states and communities developing hazard mitigation plans. The plans utilize risk assessments, which involve a four-step process: identify hazards, profile hazard events, inventory assets, and estimate losses. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards. Local hazard mitigation plans establish the broad community vision and guiding principles for reducing hazard risk and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities. A hazard mitigation plan typically contains the following sections:

- Community Profile: Describes the makeup of the community, including geographic, demographic, and economic characteristics.
- Hazard Identification and Analysis and Vulnerability Assessment: Identifies, analyzes, and assesses hazards that pose a threat to the community.
- Risk Assessment: Builds on historical data from past hazard occurrences, establishes detailed risk profiles for each hazard, and produces a hazard risk ranking based on analysis of frequency of occurrence, spatial extent, and potential impact of each hazard.
- Capability Assessment: Examines a community's capacity to implement meaningful mitigation strategies and identifies opportunities to enhance that capacity
- Mitigation Strategy: Links specific mitigation actions to be implemented by various local government agencies.

National Dam Safety Program

The National Dam Safety Program (NDSP) is managed by FEMA's Risk Analysis Division. The program provides research, information, and technical assistance to states, localities, and dam owners/operators on dam safety practices. The NDSP is a partnership with states, federal agencies, and other stakeholders supporting individual and community responsibilities for dam safety. This is accomplished through Grant Assistance to the states, Dam Safety Research, and Dam Safety Training.

The Dam Safety Program maintains the National Inventory of Dams, which includes approximately 80,000 dams. Of these, one third poses a high or significant hazard to life and property if failure occurs.

Data and analysis from the NDSP can be used to support assessments of risk from potential failure of high and significant risk dams in the US. Risk analysis can be used to determine the exposure of communities and their populations to dam breach.

NDSP's Risk Prioritization Tool is a standards-based decision-making tool for risk-based dam safety prioritization. This application is used by state dam safety regulators to identify dams that most urgently need attention. The analysis performed looks at key themes potentially exposed to the failure of high risk dams. Specifically, the models characterize key populations, properties, and public infrastructure.

The output assists in the development and implementation of appropriate protective measures, including warning, evacuation, and sheltering.

National Earthquake Hazards Reduction Program

The National Earthquake Hazards Reduction Program (NEHRP) seeks to mitigate earthquake losses in the United States through research and implementation activities in the fields of earthquake science and engineering. NEHRP is the federal government's coordinated approach to addressing earthquake risks. Congress established the program in 1977 as a long-term, nationwide program to reduce the risks to life and property in the United States resulting from earthquakes. NEHRP is managed as a collaborative effort among FEMA, the National Institute of Standards and Technology (NIST), the National Science Foundation (NSF), and the U.S. USGS. The NEHRP agencies have established three overarching, long-term strategic goals: to improve understanding of earthquake processes and impacts; to develop cost-effective measures to reduce earthquake impacts on individuals, the built environment, and society-at-large; and to improve the earthquake resilience of communities nationwide.

Following an earthquake, NEHRP agencies (FEMA, NIST, and USGS) can provide subject matter expertise for FEMA response operations to assess building and lifeline performance in effort to focus SAR operations to areas with high probabilities of damage and fatalities. In addition, many of the earthquake specific EEIs can be addressed through interpretation of USGS geospatial data and analysis and other event-related products

NEHRP stores publications and data related to past earthquakes damages in their NEHRP Clearinghouse. The NEHRP Clearinghouse contains over 2,000 earthquake-related documents dating back to 1977. NEHRP also produces (through FEMA and NIST) a range of technical studies related to building and lifeline performance, building collapse (in support of ESF 9 – SAR), casualty models (in support of ESF 8 – Public Health and Medical), performance of energy lifelines (in support of ESF 12 – Energy), and other functional studies that contribute to improved performance of ESFs.