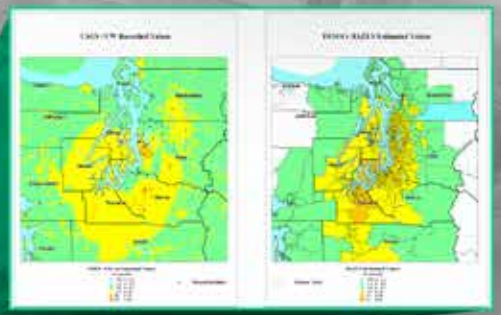
Homeland Security Geospatial Concept of Operations (GeoCONOPS)



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Preface

This Homeland Security (HLS) Geospatial Concept of Operations (GeoCONOPS) is a strategic roadmap to understand, and improve, the coordination of geospatial activities across the entire spectrum of the

Nation: from federal, to state, and local governments, to private sector and community organizations, academia, the research and development industry and citizens in support of Homeland Security and Homeland Defense (HD). The intended audience for this document is the entire geospatial community within the Homeland Security Enterprise that supports the missions of the federal government under The Stafford Act, the National Response Framework (NRF) and Presidential Policy Directives (PPD-8), and (PPD-21). This includes stakeholders and actors representing the Emergency Support Functions (ESFs), the Joint Field Offices (JFO), Federal Operations Centers, the disaster preparedness exercise and evaluation community, and those involved in other NRF missions. Individuals representing these groups and activities have been extensively engaged in providing input for this document.

When finalized, this GeoCONOPS is intended to serve as a guide to federal departments and agencies providing geospatial support under the Stafford Act. The Stafford Act describes the programs and processes by which the federal government provides disaster and emergency assistance to state and local governments, tribal nations, eligible private nonprofit organizations, and individuals affected by a declared major disaster or emergency.

Revision Register

Version	Date	Summary of Changes	Name
1.0	06/30/09	Final Draft	Department of Homeland Security, Office of Chief Information Officer (DHS OCIO)
2.0	06/28/10	Final Draft	Department of Homeland Security, Office of Chief Information Officer, Office of Applied Technology, Geospatial Management Office (DHS/OCIO/OAT/GMO)
3.0	06/29/2011	Final Draft	Department of Homeland Security, Office of Chief Information Officer, Office of Applied Technology, Geospatial Management Office (DHS/OCIO/OAT/GMO)
3.1	12/02/2011	Final Draft	Department of Homeland Security, Office of Chief Information Officer, Office of Applied Technology, Geospatial Management Office (DHS/OCIO/OAT/GMO)
4.0	06/30/2012	Final Draft	Department of Homeland Security, Office of Chief Information Officer, Office of Applied Technology, Geospatial Management Office (DHS/OCIO/OAT/GMO)
4.1	02/14/2013	Final Draft	Department of Homeland Security, Office of Chief Information Officer, Office of Applied Technology, Geospatial Management Office (DHS/OCIO/OAT/GMO)
5.0	06/28/2013	Final Draft	Department of Homeland Security, Office of Chief Information Officer, Office of Applied Technology, Geospatial Management Office (DHS/OCIO/OAT/GMO)
6.0	06/27/2014	Final Draft	Department of Homeland Security, Office of Chief Information Officer, Geospatial Management Office (DHS/OCIO /GMO)

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Team Members

The Geospatial Interagency Oversight Team (GIOT) is comprised of federal geospatial leads who discuss and guide the process of the GeoCONOPS while ensuring true federal interagency oversight. The following list includes GIOT member representatives from participating departments, agencies, supporting offices and key programs.

GIOT Team Members

Department of Agriculture (USDA)

- Office of the Chief Information Office
  - *Enterprise Geospatial Management Office*
- Office of Homeland Security & Emergency Coordination
  - *Emergency Operation Center*
- Forest Service
  - *National Interagency Fire Center*

Department of Commerce (DOC)

- National Oceanic & Atmospheric Administration (NOAA)
- US Census Bureau

Department of Defense (DoD)

- Office of the Deputy Undersecretary for Defense
  - *National Geospatial-Intelligence Agency (NGA)*
  - *National Guard Bureau*
  - *NORTHCOM*
  - *US Army Corps of Engineers (USACE)*

Department of Energy (DOE)

Department of Health & Human Services (HHS)

Department of Homeland Security (DHS)

- Office of the Chief Information Officer/Geospatial Management Office (GMO)
- Customs and Border Protection (CBP)
- Federal Emergency Management Agency (FEMA)
  - *Federal Insurance & Mitigation Administration (FIMA)*
  - *Office of Response & Recovery (ORR)*
  - *National Preparedness Directorate (NPD)*
  - *National Exercise and Simulation Center (NESC)*
  - *National Integration Center (NIC)*
- Mission Support Bureau (MSB)
  - *Office of the Chief Information Officer (CIO)/ Geospatial Solutions Branch*
- Federal Law Enforcement Training Center (FLETC)
- Immigration & Customs Enforcement (ICE)
- National Protection & Programs Directorate (NPPD)
  - *Federal Protective Service (FPS)*
  - *Office of Infrastructure Protection (IP)*
- Office of Health Affairs (OHA)
- Office of Intelligence and Analysis (I&A)
- Office of Operations Coordination & Planning (OPS)
- Science and Technology (S&T)
- Transportation Security Administration (TSA)
- US Coast Guard (USCG)
- US Secret Service (USSS)

Department of Housing & Urban Development (HUD)

Department of Interior (DOI)

- US Geological Survey (USGS)

Department of Justice (DOJ)

Director of National Intelligence (DNI)

Department of State (DOS)

- USAID

Department of Transportation (DOT)

Environmental Protection Agency (EPA)

Federal Aviation Administration (FAA)

Office of the Director of National Intelligence (ODNI)

- Program Manager for the Information-Sharing Environment (PM-ISE)

Small Business Administration (SBA)

Veterans Administration (VA)

Collaborating Partners

American Red Cross (ARC)

National Alliance for Public Safety Geospatial Information System (NAPSG)

National States Geographic Information Council (NSGIC)

Open Geospatial Consortium (OGC)

1.0 Geospatial Concept of Operations

This Homeland Security (HLS) Geospatial Concept of Operations (GeoCONOPS) is a strategic roadmap to understand, and improve, the coordination of geospatial activities across the entire spectrum of the Nation: from federal, to state, and local governments, to private sector and community organizations, academia, the research and development industry and citizens in support of Homeland Security and Homeland Defense (HD). The intended audience for this document is the entire geospatial community within the Homeland Security Enterprise that supports the missions of the federal government under The Stafford Act, the National Response Framework (NRF), Presidential Policy Directive-8 (PPD-8) and Presidential Policy Directive-21 (PPD-21). This includes stakeholders and actors representing the Emergency Support Functions (ESFs), the Joint Field Offices (JFO), Federal Operations Centers, the disaster preparedness exercise and evaluation community, and those involved in other NRF missions. Individuals representing these groups and activities have been extensively engaged in providing input for this document.

The GeoCONOPS is updated annually to ensure it meets the requirements of all mission partners. The GeoCONOPS has been incorporated into PPD-8.

1.1 Mission Statement

The Homeland Security GeoCONOPS is intended to identify and align the geospatial resources that are required to support the NRF, ESF, and supporting federal mission partners all in coordination with PPD-8 and PPD-21 direction. Through the development of the document, end users supporting homeland security and emergency management operations will be better served with authoritative and expedited coordination mechanisms that facilitate geospatial information sharing. By defining these mechanisms and authorities, this GeoCONOPS aims to reduce redundancy and confusion while ensuring seamless and timely access to geospatial information for incident management.

1.2 Overview

DHS is relying more often and more broadly on geospatial information technology to collect and analyze key situational awareness data for its emergency response missions. According to the National Strategy for Homeland Security and DHS's mission statement: homeland security covers prevention, protection, mitigation, response, and recovery. Geospatial products and intelligence play a key role in the department's preparation for disasters and its ability to response to them; they are used to help assess damage, aid in Search and Rescue (SAR), remove debris, and support incident management.

The Geospatial Management Office (GMO) serving the DHS Chief Information Office, was established by the Intelligence Reform and Terrorism Prevention Act of 2004 (Title VII, Subtitle B, Section 8201, Homeland Security Geospatial Information). Implemented by the DHS Management Directive 4030, the GMO exercises executive leadership in establishing DHS geospatial information technology programs, directives, and initiatives and provides oversight for the integration of geospatial data and technology. DHS GMO serves as the center of excellence to facilitate all interagency and interagency activities relating to domestic geospatial and remote sensing (RS) data to support the needs of homeland security-related intelligence, law enforcement, environmental, scientific, and emergency response requirements.

The GMO develops requirements and processes for access to common operating data used by components and provide guidance to other federal departments and agencies that are supporting and executing homeland security and emergency management operations

Geospatial information, technology, and tradecraft play a significant role in effective incident management. Its uses today include disaster early warning and mitigation, border monitoring, criminal investigations, public health protection, and Critical Infrastructure (CI) oversight. In recent years, federal mission partners have been operating with minimal formal guidance or direction on how to conduct geospatial support to the emergency response and homeland security operating regimes, relying instead on ad hoc coordination.

As a result, geospatial efforts in support of incident management have frequently been slow to start or have been completely unavailable immediately following a disaster, leaving the "full power" and benefits of geospatial information, technology, and tradecraft unrealized. The development of the HLS GeoCONOPS for homeland security and emergency management operations ensures that timely and accurate geospatial data, models, and simulation analysis are shared across the entire geospatial community, resulting in better informed decision making across all phases of an incident. ***(Figure 1-1 on page 8)***.

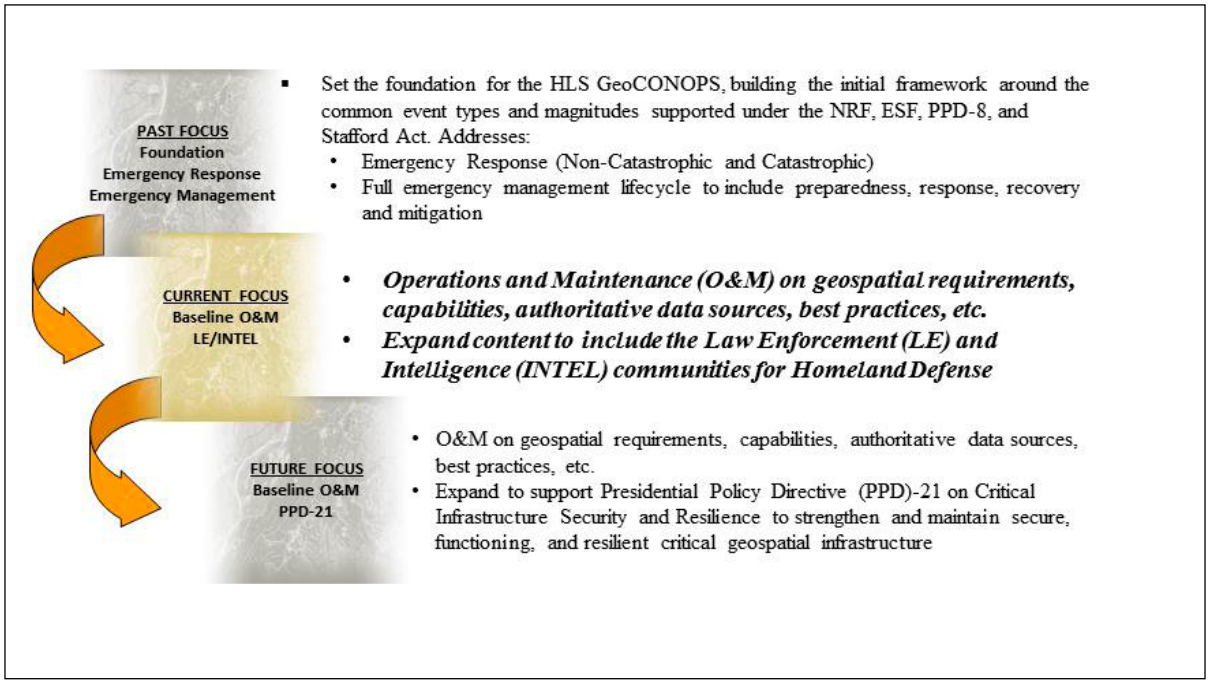

Figure 1-1: GeoCONOPS Development Phases

1.3 GeoCONOPS Community

The community analysis characterizes how the geospatial community within the GeoCONOPS operates and supports the overall DHS mission. The intent of community analysis is to describe and characterize the various actors and stakeholders and their relationships that compose the current geospatial, modeling, and simulation support to emergency operations at the national, regional, and field levels. The purpose of a Community Model (CM) is to provide an overall enterprise view that captures stakeholder interactions related to disaster operations and the mission areas of damage assessment, lifesaving, and recovery operations. The CM allows stakeholders to see how they fit into the overall geospatial community. The GeoCONOPS CM, shown in ***Figure 1-2 on page 10***, provides a graphical representation of the operational framework that:

- Identifies actors and stakeholders that support the GeoCONOPS community mission
- Identifies the information environment, actor responsibilities, and transactional information exchanges
- Illustrates high-level processes across the geospatial mission operations and the correlating relationships of these processes with stakeholders.

The GeoCONOPS CM graphically represents the geospatial community in relation to non-catastrophic events. The model comprises four segments representing the following functional groups: Information Support Services, Infrastructure, People, and Civil Support. The actors participating in the interview process for the GeoCONOPS were broken into these groupings to facilitate consistent topical areas of information collection and analysis. Each group is described in more detail below.

At the center, PPD-8 five mission areas serve as an aid in organizing our national preparedness activities; *Prevention, Protection, Mitigation, Response,* and *Recovery* provide the centerpiece of the model. There are several core capabilities for each of these mission areas, but three core capabilities span across all five mission areas. These are depicted in the three rings; *Operational Coordination, Planning,* and *Public Information and Warning* serve to unify all the mission areas and are necessary for the success of the remaining core capabilities. Guidance is provided by the NIMS, which form the core of the model and dictate the governing stakeholders, processes, and policies. As event information is collected at the federal, state, and local level, additional information is compiled and produced by the geospatial community and assimilated by the Operations/ Coordination group. This information, including geospatial products and reports, is provided back to the functional groups as well as state and local authorities to assist in event management.

Geospatial CONOPS Community Model

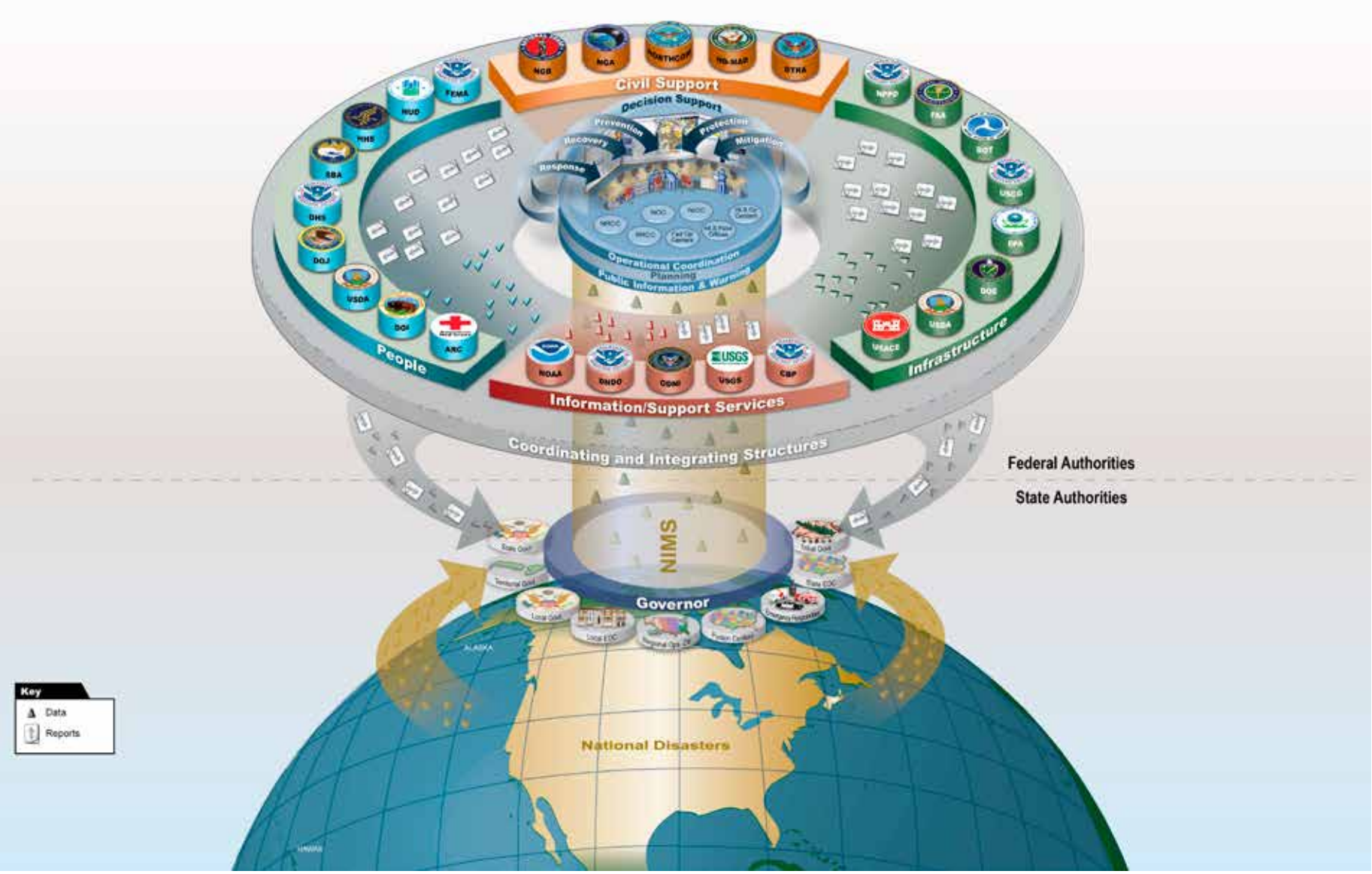

Figure 1-2: Geospatial CONOPS Community Model

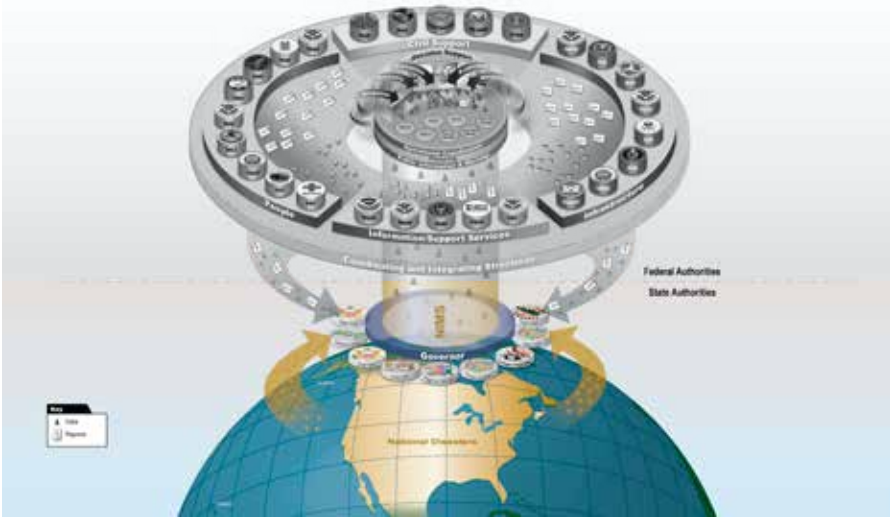

Figure 1-3: State Authorities

1.3.1 State Authorities

As disasters occur, state, local, territorial, and tribal governments and Emergency Operations Centers (EOC) provide coordination and support based on governing authorities. The highlighted elements illustrate the nonfederal government organizations responsible for providing information and immediate response regarding the disaster. A state Governor can provide this information directly to federal Operations/Coordination actors based on the NRF and the NIMS guidelines for requesting assistance.

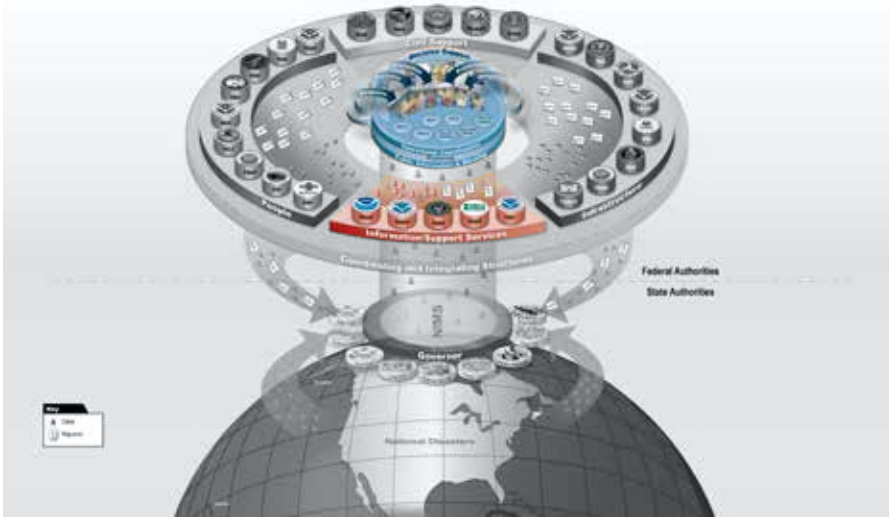

Figure 1-4: Information Support Services

1.3.2 Information Support Services

The Information Support Services segment provides the PPD-8 Mission Areas and Core capabilities segment with modeling, weather, border, and geological related information in response to a disaster incident. The key stakeholders include National Oceanic and Atmospheric Administration (NOAA), Customs and Border Protection (CBP), Office of the Director of national Intelligence (ODNI), DHS Domestic Nuclear Detection Office (DNDO), and the US Geological Survey (USGS).

Figure 1-5: Infrastructure

1.3.3 Infrastructure

The Infrastructure segment provides the PPD-8 Mission Areas and Core capabilities segment with assessment information regarding buildings, schools, dams, levees, and other man-made structures as well as the impact to the local community and environment. The key stakeholders responsible for this information are the Army Corps of Engineers (USACE), US Forest Service, (USDA/FS) Department of Energy (DOE), Environmental Protection Agency (EPA), US Coast Guard (USCG), Department of Transportation (DOT), Federal Aviation Administration (FAA), and the DHS National Protection & Programs Directorate (NPPD).

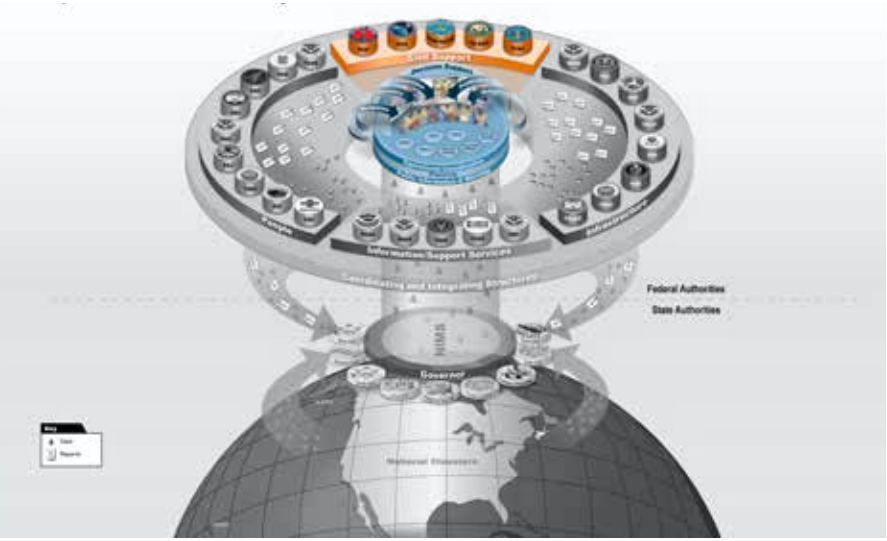

Figure 1-6: Civil Support

1.3.4 Civil Support

The Civil Support segment provides the PPD-8 Mission Areas and Core capabilities segment with geospatial information in support of homeland security-related disaster incidents. The key stakeholders responsible for this information are the National Guard Bureau (NGB), National Geospatial-Intelligence Agency (NGA), US Northern Command (USNORTHCOM) Mission Assurance Division (MAD), and the Defense Threat Reduction Agency (DTRA).

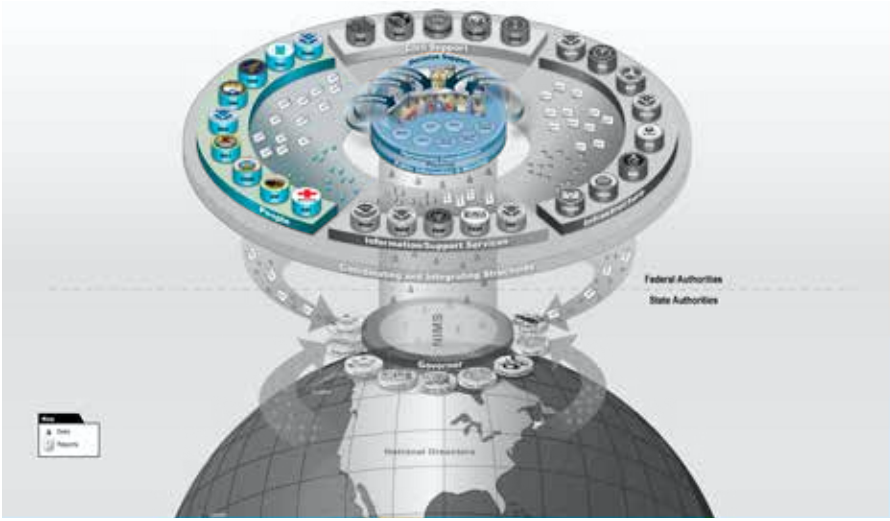

Figure 1-7: People

1.3.5 People

The People segment provides the PPD-8 Mission Areas and Core capabilities segment with information regarding services provided to survivors of disaster incidents including lifesaving, employment, sheltering, legal, and health-related information. The key stakeholders include the Federal Emergency Management Agency (FEMA), the Department of Housing & Urban Development (HUD), the Department of Health & Human Services (HHS), Small Business Administration (SBA), Department of Homeland Security (DHS), Department of Justice (DOJ), US Department of Agriculture (USDA), Department of the Interior (DOI), and the American Red Cross (ARC).

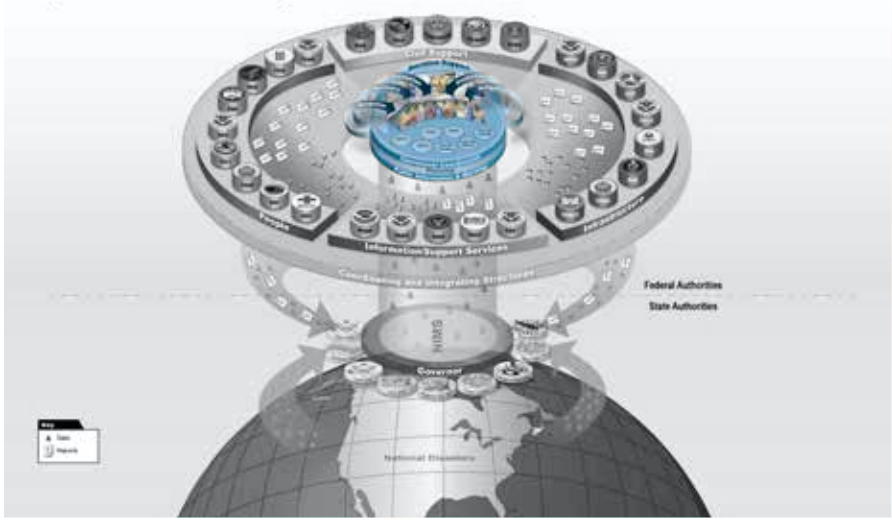

Figure 1-8: Operations/Coordination

1.3.6 Operations/Coordination

The PPD-8 Mission Areas and Core capabilities segment is the central access point for the Request For Assistance (RFA) as well as information and reports provided to other geospatial community segments and state and local entities. These five mission areas serve as an aid in organizing our national preparedness activities, and do not constrain or limit integration across mission areas and core capabilities. Three core capabilities span all five mission areas: *Planning, Public Information and Warning, and Operational Coordination*, and serve to unify the mission areas and are necessary for the success of the remaining core capabilities. The key stakeholders responsible for gathering, compiling, and distributing this information are the DHS National Operations Center (NOC), National Infrastructure Coordinating Center (NICC), National Response Coordination Center (NRCC), FEMA, JFOs, FEMA Regional Response Coordination Center (RRCC), Federal Operations Centers, and the HLS Operations Center.

1.4 Audience and Intended Use

The intended audience for this document is the entire geospatial community supporting the missions of the federal government under The Stafford Act, the National Response Framework (NRF) and Presidential Policy Directive 8 (PPD-8), and Presidential Policy Directive 21 (PPD-21). This includes stakeholders and actors representing the Emergency Support Functions (ESFs), the Joint Field Offices (JFO), Federal Operations Centers, the disaster preparedness exercise and evaluation community, and those involved in other NRF missions. Individuals representing these groups and activities have been extensively engaged in providing input for this document.

This GeoCONOPS provides a strategic roadmap and knowledge base to understand, and improve, coordinating geospatial activities across the entire spectrum of the Nation: from federal, to state, and local governments, to private sector and community organizations, academia, the research and development industry and citizens in support of Homeland Security and Homeland Defense (HD).

1.5 Alignment with NIMS and NRF

The NRF establishes a comprehensive, national, all-hazards approach to domestic incident response and defines the key principles, roles, and structures that organize the way we respond as a nation. It describes how communities, tribes, states, the federal government, private sector, and nongovernmental organizations (NGO) partners apply these principles for a coordinated, effective national response. In addition, the NRF enables first responders, decision makers, and supporting entities to provide a unified national response.

The GeoCONOPS is aligned to the NRF mission partners, PPD-8 Mission Areas, the ESFs, and other support elements through the depiction of geospatial information required to provide key mission support (damage assessment, lifesaving, and recovery). Within the event-specific sections of the GeoCONOPS, ESF-specific mission activities, including geospatial production efforts, are identified.

PPD-8 describes the Nation's approach to preparing for the threats and hazards that pose the greatest risk to the security of the United States. National preparedness is the shared responsibility of our Whole Community[1]. Every member contributes, including individuals, communities, the private and nonprofit sectors, faith-based organizations, and federal, state, and local governments. The GeoCONOPS is aligned with the PPD-8 core capabilities which are essential for the execution of each of the five mission areas:

- Prevention
- Protection
- Mitigation
- Response
- Recovery

The NIMS provides a systematic, proactive approach to guide departments and agencies at all levels of government, NGOs, and the private sector to work seamlessly to reduce the loss of life and property and harm to the environment. These efforts aim to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity. NIMS provides the template for the management of incidents, while the NRF provides the structure and mechanisms for national-level policy for incident management.

2 *The Whole Community includes individuals, families, communities, the private and nonprofit sectors, faith-based organizations, and Federal, state, local, tribal, and territorial governments.*

Component II, Section C, of NIMS (draft 2008) has a section dedicated to the critical importance of geospatial information to communication and information management during an incident.

The alignment of the GeoCONOPS to NIMS can be used to support information and communication management as well as to support the other components of NIMS:

- **Preparedness, Pre-event Planning and Coordination.** The GeoCONOPS supports pre-event planning and coordination through the documentation of the "as-is" environment of the geospatial community supporting emergency management activities. This information provides the basis for continued coordination efforts and the development of updated standard operating procedure (SOP)-type documents.
- **Resource Management.** The GeoCONOPS supports credentialing of staff and resource requirements, as discussed in Section 2.
- **Coordination and Management.** The GeoCONOPS will assist in reducing duplication of efforts in geospatial data collection and production by identifying authoritative sources for information.
- **Management and Maintenance/Standards and Technology.** The GeoCONOPS provides a venue for the sharing of information related to planning, training, and development of best practices and SOPs.

Within the NRF, the ESFs provide the structure to group capabilities and functional expertise of departments and agencies for coordinating interagency support and response to an incident. The NIMS provides the flexibility to assign the ESFs in support of event operations at the JFO, RRCCs or the NRCC in order to respond to incidents in a more collaborative manner. Each ESF assigns responsibilities to a primary agency and support

agencies. The Roles and Responsibilities of the 15 ESFs are defined below:

ESF #1 – Transportation

- Aviation/airspace management and control
- Transportation safety
- Restoration/recovery of transportation infrastructure
- Movement restrictions
- Damage and impact assessment

ESF #2 – Communications

- Coordination with telecommunications and information technology industries
- Restoration and repair of telecommunications infrastructure
- Protection, restoration, and sustainment of national cyber and information technology resources
- Oversight of communications within the federal incident management and response structures

ESF #3 – Public Works and Engineering

- Infrastructure protection and emergency repair
- Infrastructure restoration
- Engineering services and construction management
- Emergency contracting support for lifesaving and life-sustaining services

ESF #4 – Firefighting

- Coordination of federal firefighting activities
- Support to wildland, rural, and urban firefighting operations

ESF #5 – Information and Planning

- Coordination of incident management and response efforts
- Issuance of mission assignments
- Resource and human capital
- Incident action planning
- Financial management

ESF #6 – Mass Care, Emergency Assistance, Housing, and Human Services

- Mass care
- Emergency assistance
- Disaster housing
- Human services
- Sheltering

ESF #7 – Logistics

- Manages complex logistics supply chain that provides equipment, supplies, and services for incidents requiring an integrated whole community response capability
- Integration of whole community logistics partners through deliberate and crisis collaboration in the planning, sourcing, acquisition, utilization, and disposition of resources
- Facilitating communication and collaboration among all supply chain support elements in order to minimize recovery efforts in the impacted area and reestablish local and state self-sufficiency as rapidly as possible

ESF #8 – Public Health and Medical Services

- Public health
- Medical
- Mental health services
- Mass fatality management

ESF #9 – Search and Rescue (SAR)

- Lifesaving assistance
- Search and rescue operations

ESF #10 – Oil and Hazardous Materials Response

- Oil and hazardous materials (chemical, biological, radiological, etc.) response
- Environmental short- and long-term cleanup

ESF #11 – Agriculture and Natural Resources

- Nutrition assistance
- Animal and plant disease and pest response
- Food safety and security
- Natural and cultural resources and historic properties protection and restoration
- Safety and well-being of household pets

ESF #12 – Energy

- Energy infrastructure assessment, repair, and restoration
- Energy industry utilities coordination
- Energy forecast

ESF #13 – Public Safety and Security

- Facility and resource security
- Security planning and technical resource assistance
- Public safety and security support
- Support to access, traffic, and crowd control

ESF #14 – Long-Term Community Recovery

- Social and economic community impact assessment
- Long-term community recovery assistance to states, local governments, and the private sector
- Analysis and review of mitigation program implementation

ESF #15 – External Affairs

- Emergency public information and protective action guidance
- Media and community relations
- Congressional and international affairs
- Tribal and insular affairs

Federal departments and agencies routinely manage the response to incidents under their statutory or executive authorities. When a federal entity with primary responsibility and authority for handling an incident requires federal assistance above and beyond its interagency mechanisms (e.g., Executive orders, memorandums of understanding [MOU], memorandums of agreement [MOA]), that department or agency can request additional federal assistance through DHS. When this happens, this support is:

- Coordinated by DHS using the multiagency coordination structures established in the NRF and in accordance with the NIMS
- Generally funded by the federal entity with primary responsibility and statutory authority for the incident in accordance with provisions of the Economy Act, unless other statutory authorities exist
- Facilitated by the interagency MOU for Mutual Aid, and executed at the time of the incident through interagency agreements (see the Financial Management Support Annex for more information).

Figure 1-9 illustrates the actions federal departments and agencies take to assist state and local governments under Stafford Act.

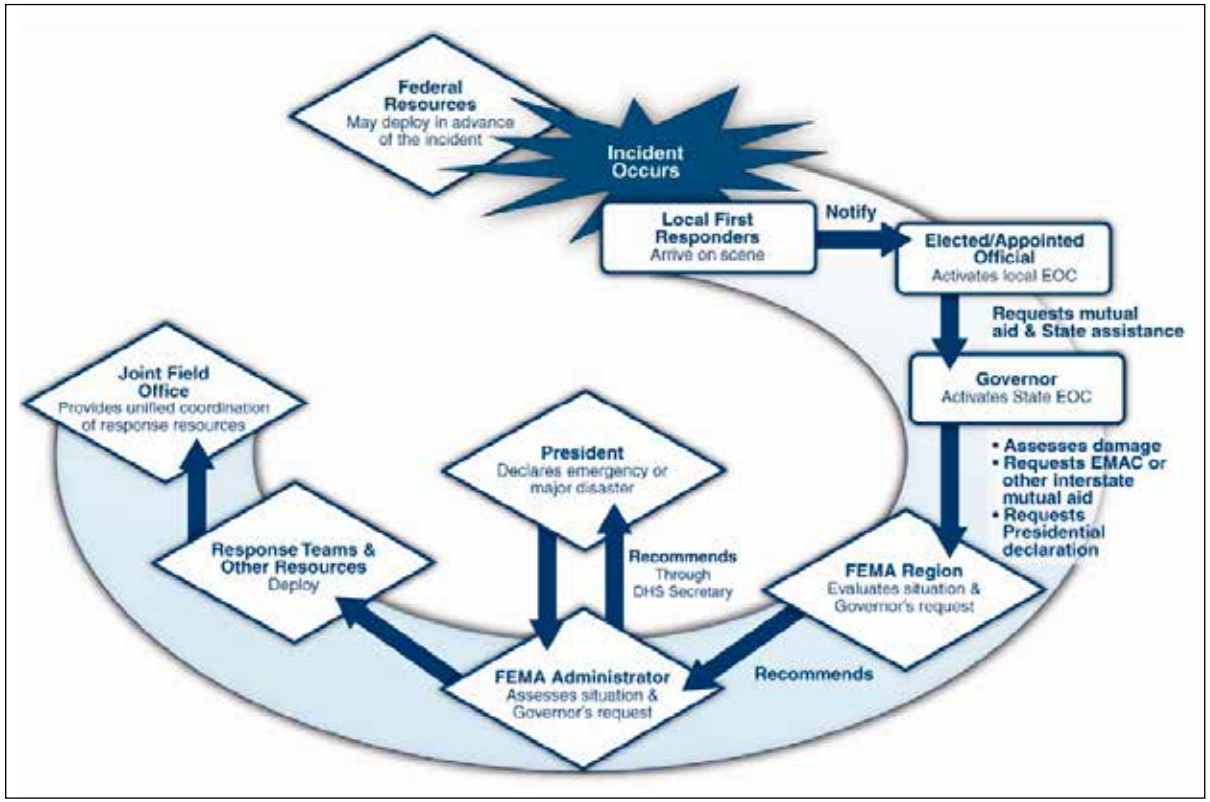

Figure 1-9: Federal Response - Stafford Act Support to States

1.6 Determination of Authorities

The GeoCONOPS is based on appropriate roles, responsibilities and authorities and is consistent with all appropriate United States laws, policies, and other related requirements.

Specific authorities include, but are not limited to:

- **The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act)**, as amended (42 United States Code [U.S.C.] § 5121 et seq.) describes the programs and processes by which the Federal Government provides disaster and emergency assistance to state and local governments, tribal nations, eligible private nonprofit organizations, and individuals affected by a declared major disaster or emergency. The Stafford Act covers all-hazards, including natural disasters and terrorist events.
- **National Response Framework (NRF)**, May 2013, is a guide to how the Nation responds to all types of disasters and emergencies. It is built on scalable, flexible, and adaptable concepts identified in the National Incident Management System (NIMS) to align key roles and responsibilities across the Nation. The NRF describes specific authorities and best practices for managing incidents that range from the serious but purely local to large-scale terrorist attacks or catastrophic natural disasters.
- **National Incident Management System (NIMS),** December 2008, provides a systematic, proactive approach to guide departments and agencies at all levels of government, nongovernmental organizations, and the private sector to work seamlessly to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment. NIMS works hand in hand with the

National Response Framework (NRF). NIMS provides the template for the management of incidents, while the NRF provides the structure and mechanisms for national - level policy for incident management.

- **Homeland Security Act of 2002** (P.L. 107-296, 116 Stat. 2135 (2002) (codified predominantly at 6 U.S.C. § 101-557), as amended, with respect to the organization and mission of FEMA in the DHS Appropriations Act of 2007, P.L. 109-295, 120 Stat. 1355 (2006), established DHS as an executive department of the United States. The Homeland Security Act consolidated component agencies, including FEMA, into DHS.
- **Post-Katrina Emergency Management Reform Act (PKEMRA)** of 2006 (P.L. 109-295) clarified and modified the Homeland Security Act with respect to the organizational structure, authorities, and responsibilities of FEMA and the FEMA Administrator.
- **Homeland Security Presidential Directive-5 (HSPD-5), Management of Domestic Incidents**, , February 28, 2003, establishes a single, comprehensive national incident management system. It also designates the Secretary of Homeland Security as the principal federal official for domestic incident management and recognizes the statutory authorities of the Attorney General, Secretary of Defense, and Secretary of State. It directs the heads of all federal departments and agencies to provide their full and prompt cooperation, resources, and support, as appropriate and consistent with their own responsibilities for protecting national security, to the Secretary of Homeland Security, Attorney General, Secretary of Defense, and Secretary of State in the exercise of leadership responsibilities and missions assigned.
- **PPD-8, National Preparedness**, March 30, 2011, strengthens the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the Nation, including acts of terrorism, cyber-attacks, pandemics, and catastrophic natural disasters. National preparedness is the shared responsibility of all levels of government, the private and nonprofit sectors, and individual citizens. Everyone can contribute to safeguarding the Nation from harm. As such, while this directive is intended to galvanize action by the Federal Government, it is also aimed at facilitating an integrated, all-of-Nation, capabilities-based approach to preparedness.
- **PPD-21, Critical Infrastructure Security and Resilience, February 12, 1013**, advances a national unity of effort to strengthen and maintain secure, functioning, and resilient critical infrastructure. The Nation's critical infrastructure is diverse and complex. It includes distributed networks, varied organizational structures and operating models (including multinational ownership), interdependent functions and systems in both the physical space and cyberspace, and governance constructs that involve multi-level authorities, responsibilities, and regulations. Critical infrastructure owners and operators are uniquely positioned to manage risks to their individual operations and assets, and to determine effective strategies to make them more secure and resilient. This directive includes the requirement to coordinate with and utilize the expertise of Sector-Specific Agencies (SSAs) and other appropriate Federal departments and agencies to map geospatially, image, analyze, and sort critical infrastructure by employing commercial satellite and airborne systems, as well as existing capabilities within other departments and agencies.

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2.0 Geospatial Requirements and Capabilities

Geospatial technology provides solutions for big-picture visibility through the ground-level efforts of direct operational support through the collection, analysis, and sharing of geospatial information and products. To effectively accomplish these goals, the resources and technology assets must be available to fill the information and production requirement of an event. This section assists in identifying the general requirements and capabilities of a geospatial support entity. The details of the specific mission areas as well as the operational environments are further addressed in Sections 3 and 4 of the GeoCONOPS.

2.1 Geospatial Mission Support

Geospatial technology is used throughout the operations supporting response, recovery, mitigation, preparedness, and prevention efforts. The missions reflected in these efforts include the saving of lives and property, the provision of food and shelter, financial assistance, damage assessments, and recovery. With coordination and a strategy for resource use, geospatial technology can be more effective in meeting the requirements of any incident.

2.1.1 Coordination Requirements

The focus of the geospatial leadership is to provide a coordinated level of support to their customers. In the context of this GeoCONOPS, the term "geospatial leadership" refers to an operational paradigm that suggests ownership at multiple levels of a community or organization, which allows for geospatial activities to operate efficiently in support of incident response. This operational paradigm will assist in minimizing the duplication of efforts and expedite the availability of critical information. Efforts to maintain connections with other entities involved with disaster operations will assist in the pursuit of mutually supportive projects at the strategic, operational, and tactical levels.

Geospatial efforts require full integration with the leadership and mission areas supporting an incident. The geospatial managers must work to build relationships with the onsite leadership team, attending key meetings and ensuring that geospatial technology is available to support the event in its entirety. Having full situational awareness, the geospatial leads will effectively build staffing and resource plans for the provision of support.

Table 2–1: Geospatial Roles and Responsibilities

Position Title	Responsibilities
Team Leader	• Responsible for the coordination of geospatial information system (GIS) production, RS, and geospatial database efforts. • Define staffing, meeting, and rotation schedules. • Conducts briefings, attends meetings, and directs overall geospatial support operations. • Interfaces with federal, state, and local authorities establishing MOUs, partnerships, and data sharing agreements. • Proactively seeks opportunities to integrate geospatial products into executive decision making.
Deputy Team Leader	• Reports to the Geospatial Team Leader. • Responsible for maintaining the coordinated efforts of the geospatial team. • During times of absence of the Team Leader, becomes the representative of the Team.
Administrative Assistant	• Reports to the Team Leader. • Provides administrative support to the Team Leader and the Team in general. • Manages reception area. • Greets customers and assists them in filling out request forms.
Geospatial Production Manager	• Reports to the Team Leader. • Coordinates GIS requirements and supervises assigned Geospatial Analysts. • Prioritizes GIS production and activities. • Works with product requesters to properly define requirements and ensures the timely preparation and delivery of recurring and ad hoc GIS products.
Geospatial Analyst	• Reports to the Geospatial Production Manager. • Prepares recurring and ad hoc GIS products. • Compiles various types of geospatial information into map and data products. • Analyzes geospatial data from various sources to answer diverse questions and populate geospatial products.
Geospatial Imagery Manager	• Reports to the Team Leader. • Responsible for the coordination of RS requirements, resources, and requests for the team. • Operates as task originator & collection manager for assets related to the operation. • Works with Geospatial Production Manager to ensure imagery- derived products are delivered in a timely manner. • Supervises Imagery Analysts.
Imagery Analyst	• Reports to the Geospatial Imagery Manager. • Processes and interprets acquired imagery. • Processes imagery in native and/or other formats. • Prepares image data files for use by the Geospatial Analyst Staff. • Creates imagery-derived data sets and products.

Table 2-1: Geospatial Roles and Responsibilities (continued)

Position Title	Responsibilities
Geospatial Database Manager	• Reports to Team Leader. • Responsible for creating and managing the file-based data storage system, updating and distributing associated documentation, answering all queries for use, and briefing teams on use of data. • Initiates data sharing agreements or purchases for data as required. • Arranges for data updates as necessary.
Geospatial Database Administrator	• Reports to the Geospatial Database Manager. • Develops, maintains, and coordinates the geospatial data used. • Sets database access rights and privileges. • Responsible for data backups as required.
Geospatial Data Analyst	• Reports to the Geospatial Database Manager. • Designs and builds custom database queries as requested by task force members. • Performs quality control and corrects anomalies in the data. • Loads data sets under direction of Database Manager.

2.1.2 Staffing Requirements

To ensure access to critical geospatial information and products, personnel must be readily available to support the many entities engaged in incident operations. This level of specific operational support provides situational awareness and geospatial tools to the managers of Multiagency Coordination Centers (MACC) and field facilities.

Staffing requirements can be met with proper planning. While smaller events may be adequately supported with existing in-house staff, larger events will require additional staffing resources. After determining an estimated level of effort required for an operation, staff should be ordered/requested in a phased sequence to ensure that the team grows with the progress of the operation. Staff planning should look 30+ days into the future and accommodate rotation and duration requirements of the respective parent organizations. Surge staff can be accessed within the operational organization, other federal entities, contract staff, local hires, and/or volunteer organizations.

An effective operational response will rely heavily on establishing and following a regular operational tempo in concert with interagency partners, and other stakeholders. Interagency Agreements, Mission Assignments (MA), Pre-Scripted Mission Assignments (PSMA), MOUs, and MOAs will be leveraged during all phases to support surge requirements, in coordination with state, local, and tribal authorities.

Staffing procedures must be in accordance with existing department and agency plans, MACCs (e.g., NRCC, RRCC, JFO) SOPs, policies, and procedures relating to statutory requirements as well as in support of explicit roles, responsibilities, and assignments specified under:

- NRF ESF, Support and Incident Annexes

Best Practices - NSGIC Emergency Contacts

The National States Geographic Information Council (NSGIC), through the auspices of the Department of Homeland Security Geospatial Management Office, has developed a list of emergency GIS contacts across the nation. The list contains key contacts for all fifty States plus the District of Columbia, Puerto Rico and the US Virgin Islands as well as several Federal Agencies.

This document is provided to each State GIS Coordinator for distribution to all appropriate individuals and organizations at the local, State, and Federal government levels in his or her state. Copies are also distributed to the Geospatial Management Office of DHS, FEMA, the USGS, and other Federal Government Agencies that have contributed to its development as well as the DHS Geospatial Working Group and placed on the Homeland Security Information Network.

The document is contained in an Excel workbook. The first few tabs at the bottom of the workbook provide contact information for geospatial professionals in State and Federal government agencies who are involved in planning, mitigation, response and recovery efforts related to natural and manmade emergencies. Additional pages cover: access to daily FEMA GIS briefings, information on the Emergency Management Assistance Compact, sources for imagery and other data, an overview of HSIP Data content as well as a guide of how to access it, and an introduction to the Lawrence Livermore National Labs' Homeland Defense Operational Planning System (HOPS).

To request a copy, contact NSGIC through their website (www.NSGIC.org) or contact your respective NSGIC state POC (http://www.nsgic.org/state-representatives).

Table 2–2: Federal Geospatial Teams

Team	Type	Location
FEMA Mapping and Analysis Center (MAC)	Fixed	Located at FEMA HQ supporting NRCC, RRCC and JFO operations
FEMA Geospatial Intelligence Unit (GIU)	Field	Operational within each FEMA JFO
DHS Geospatial Management Office (GMO)	Fixed	Support for all DHS-related geospatial activities
DHS Interagency Modeling and Atmospheric Assessment Center (IMAAC)	Fixed	Authoritative modeling source for air-borne hazards
DHS Infrastructure Information Collection Division (IICD)	Fixed	Support for Critical Infrastructure
DHS National Infrastructure Coordinating Center (NICC) Geospatial Information System (GIS) Desk	Fixed	Internal support to NICC
DHS National Operations Center (NOC) GIS Desk	Fixed	Internal support to NOC
NGA Mobile Integrated Geospatial-Intelligence System (MIGS)	Field	Mobile Geospatial Team supporting FBI, FEMA, and others
NGA PMH (Office of Americas/Homeland Security Division)	Field	Located at NGA Bethesda and St. Louis supporting defense, intelligence, and civil federal agencies with a homeland security/ defense mission.
NGB Civil Support Team (CST)	Field	Support for NGB operations
USACE Planning & Response Team (PRT)	Field	Deployed to JFO and other disaster support facilities

- Existing and ad hoc MAs authorized by FEMA and coordinated through the JFO, RRCC, or NRCC
- State, local, tribal, and regional emergency operations plans and associated procedures
- National Infrastructure Protection Plan (NIPP) Sector Specific Plans
- National Continuity Policy and National Essential Functions (NEFs)

Federal departments and agencies acting under their own jurisdictional authorities and funding mechanisms can deploy prior to or in support of an incident without a request from FEMA.

Geospatial staff and teams typically fall under the Planning Section within NIMS and ICS but may be assigned to Operations or other areas within the NIMS structure. ***Table 2–1*** contains a list of key geospatial position titles and associated responsibilities.

2.1.3 Technology Requirements

The tools required for geospatial support can be acquired in advance or procured immediately following an event. In an effort to minimize delays in service, a basic level of hardware/software should be maintained in preparation for future operations (FEMA JFOs use this type of hardware/software solution with their Deployable Emergency Geospatial Information System [GIS] Suites [DEGS] and NGA with its Mobile Integrated Geospatial Intelligence System [MIGS]). The level of effort required for hardware/software maintenance is high because hardware performance capabilities increase with time and software updates are released regularly. This effort yields large returns when responding to notice and no-notice events with the support and speed associated with current technology and properly trained staff.

2.1.4 Geospatial Capabilities

There are many geospatial-specific organizations and programs in existence across the emergency management and homeland security environments. Although some of these are mission-specific, others are more general and available to support many different operational requirements. A sample listing of common geospatial capabilities, both fixed and field is presented in ***Table 2–2***.

2.1.5 Modeling and Simulation Capabilities

There are many modeling- and simulation-specific organizations and programs in existence across the emergency management and homeland security environments. These include threat and preparedness, response and recovery, as well as exercise and evaluation to name some examples. These capabilities provide predictive, prescriptive, and virtual analysis for emergency management.

2.2 Geospatial Data

Data is required for every geospatial product. The quality of this data dictates the overall value of these products and the level of support available. Without valid authoritative sources and core standards for data management, the investment in hardware, software, and labor can be immediately undermined. This section defines the term “Authoritative” as it relates to geospatial data and provides background on basic data standards for the GeoCONOPS.

2.2.1 Authoritative Data

For the purpose of the GeoCONOPS, authoritative data owned and/or produced by the federal entities supporting the NRF is defined as follows:

- **Rational Authority.** Government agencies are by default the "authoritative" sources for data or services that they produce, or have a statutory responsibility for.
- **Expert Authority.** Scientifically authoritative data is defined in the realm of the various professions under which the standards and methodology for data are created.

These classifications provide clarity beyond the frequent notion that an authoritative data source is simply the entity trusted because of a subjective belief that it is the "best" or "most accurate" source for a specific data theme. The owner or authoritative source of any geospatial data is responsible for defining the business rules for the access and sharing of that information across the stakeholder community. The data provider should identify restrictions that may inhibit the mission at For Official Use Only (FOUO) level, and establish classification at lowest level possible. Data users should abide by the established rules to ensure seamless coordination.

Appendix B of the GeoCONOPS provides a detailed list of Authoritative Data.

2.2.2 Essential Elements of Information

Immediately following an event, priority is given to the collection of key information on the nature and scope of damages. This data is formally defined as Essential Elements of Information (EEI) and typically collected under the guidance of an Information Collection Plan (ICP). The EEIs contribute directly to situational awareness and revolve around a time-based reporting cycle. The overall list of EEIs may vary by a specific event or type, but generally include information such as: disaster boundaries, socio-economic impacts, and status of communications, transportation systems, and CI.

The information collection and analysis process evolves through the life cycle of the event. Initially, predictive modeling may provide estimates for an EEI, prior to field information becoming available. As the event response progresses, the EEI will be populated with data pulled from Situation Reports, and later through ground truth sources. As priorities shift to sustained response and initial recovery, the ICP is adjusted to reflect changing requirements and the EEIs adjust as the key activities determine what information is essential.

2.2.3 Common Operating Data

The Homeland Infrastructure Foundation-Level Data Working Group (HIFLD WG) fosters key HD/HLS partnerships that are focused on facilitating geospatial information sharing.

The Working Group addresses geospatial requirements for HD, HLS, and Emergency Prevention, Protection, Mitigation, Response, and Recovery mission readiness. Leveraging its broad interagency access, the HIFLD Working Group has partnered with a number of key organizations to accomplish its primary goal of developing a common homeland infrastructure data foundation. Additional information on the HIFLD WG can be found in ***Appendix F***.

2.3 Imagery and Derived Products

RS is a general reference to any remotely sensed information, predominately imagery-type products from satellite and aircraft sources.

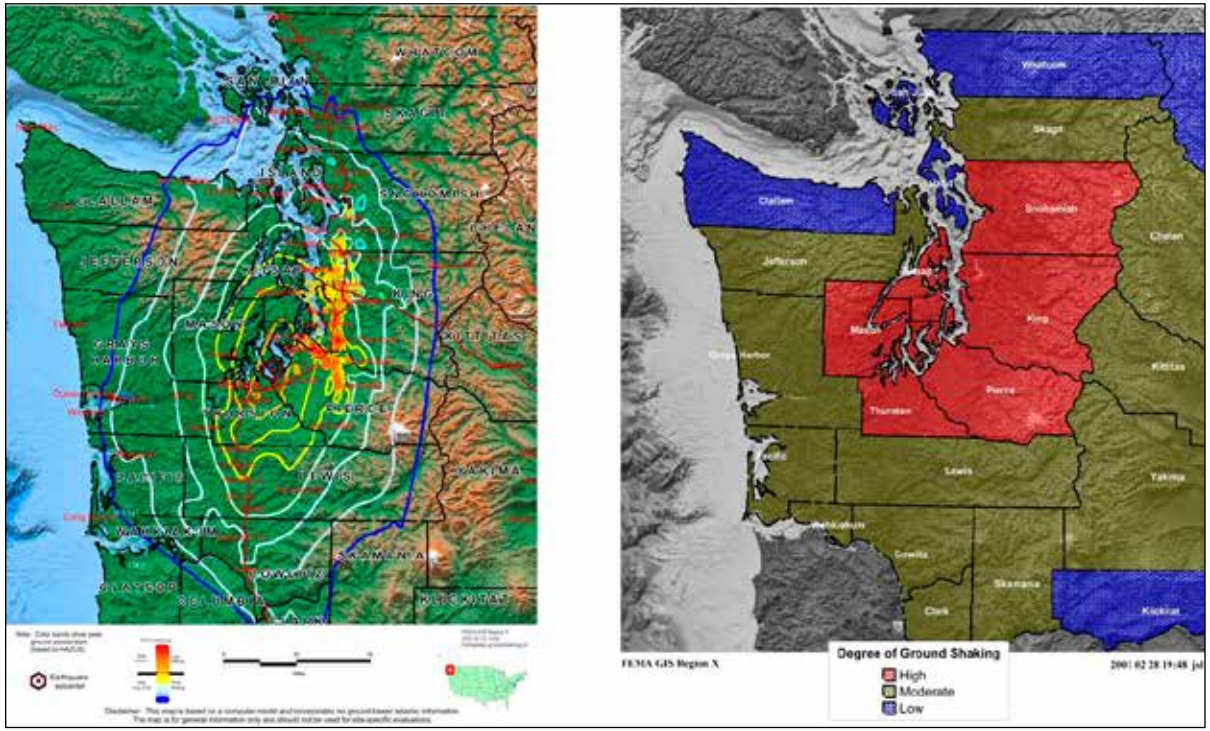


Figure 2-1: Damage Assessment Maps - Nisqually Earthquake

Imagery can be invaluable following an event, providing the ability to view impacts in the disaster area from a remote location over large expanses with minimal effort. To make the most of RS technology, it must be accessed in a timely manner, analyzed by qualified methodologies, and disseminated efficiently. Imagery and the data derived from it can identify damaged areas and specific target locations, or serve as a base-map product for use with other data sets. This section discusses the use of imagery for damage assessments ***(see Figure 2-1)***.

2.3.1 Areas of Expertise

With proper coordination, RS data can be available to any user to assist with mission support requirements. For Stafford Act events, RS efforts are coordinated by FEMA through the JFO, RRCC, and NRCC RS Coordinators. Working with the USGS, NGA, DHS, and other federal departments and agencies, imagery is acquired, analyzed, and disseminated using the Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) Process ***(see Figure 2-2 on page 24)***.

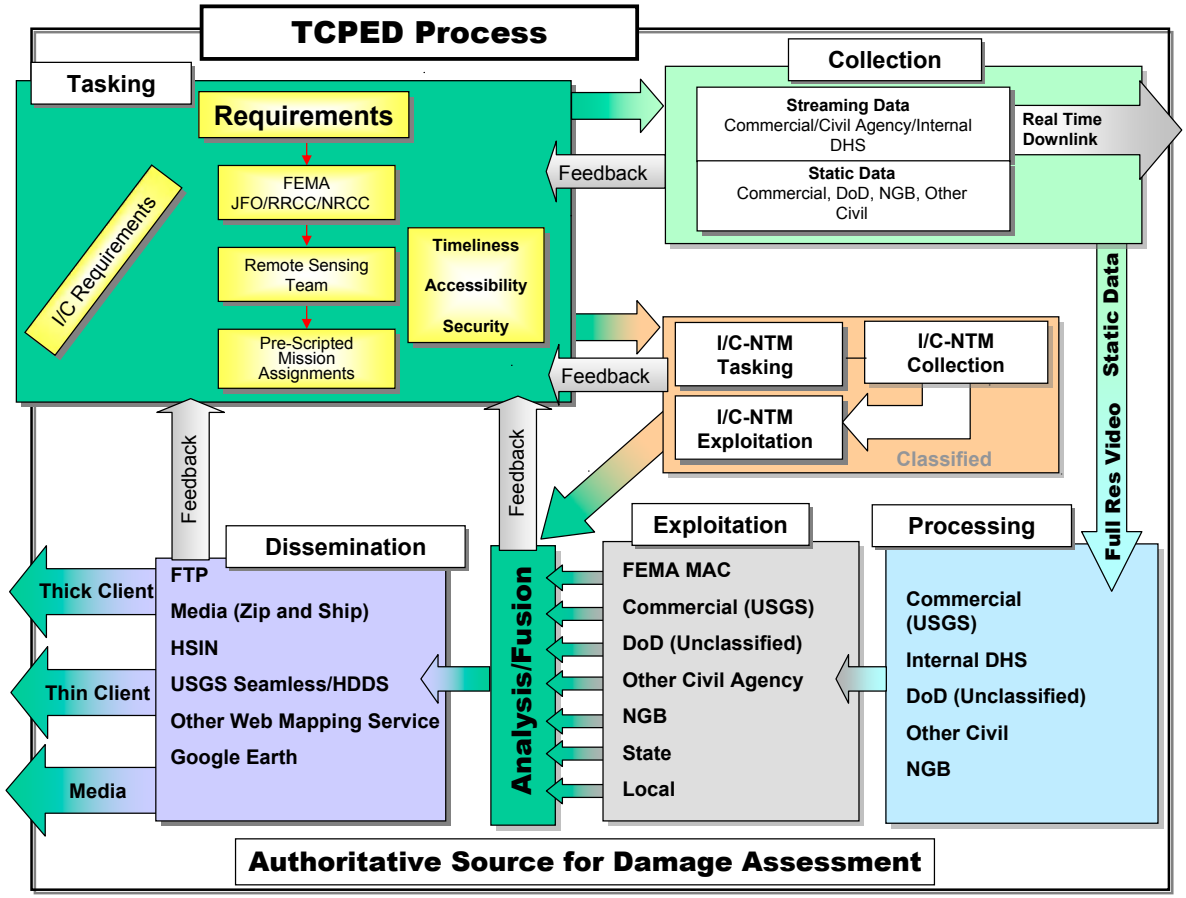


Figure 2-2: TCPED Process

The steps in the TCPED process are as follows:

- **Tasking.** The tasking phase begins with the identification of and prioritization of key target areas. While it is safe to assume that the adjacent areas will be included, requests for imagery should be very specific in coverage area and identify any specific targets.
- **Collection.** Immediately following the tasking phase, the collection phase is focused on the acquisition of "raw" imagery. Because the post-event environment is dynamic, tasking and collection are closely linked. The combined tasks are reliant on continuous feedback. While this phase is often transparent, details such as triaged areas of interest (AOI) and air-space access must be factored into the entire mission.
- **Processing.** During this phase, acquired imagery is processed. The processing requirements can include image registration, rectification, color balancing, and others. Once complete, the imagery is available for exploitation and dissemination.
- **Exploitation.** This phase provides the interpretation required to generate usable end products. Analysis may be automated or interpreted visually by imagery analysts to derive vector data from the imagery source data. This derived data can then be attributed with key pieces of information to add value.
- **Dissemination.** The final phase of the process ensures that the imagery and derived products are effectively delivered and available to the end users and applications. This may be accomplished through a person-to-person exchange of physical media, embedded into a Common Operating Picture (COP)-type viewer, or passed through email or web-based tools.

Table 2–3: Authoritative Data - Damage Assessment Mission - Imagery

Sub Category	Theme	Type	Delay	POC
Emergency Services				
Emergency Management	Image Library Footprints	Polygon	4 day	FEMA
	Imagery Collection Paths (Aircraft)	Polyline	24 hour	NOAA
	Imagery Collection Paths (Aircraft)	Polyline	48 hour	FEMA
	Imagery Collection Paths (Motion Video)	Polyline	24 hour	FEMA
	Imagery Collection Paths (Satellite)	Polyline	24 hour	FEMA
Event Impact				
Event Location	Burn Extents-Imagery Derived	Polygon	24 hour	USGS
	Flood Extents-Imagery Derived	Polygon	48 hour	FEMA
	HMS Thermal Imagery	Raster	24 hour	USGS GeoMAC
	Imagery Derived Products (Targets)	Point	24 hour	FEMA
	Imagery Post-Event (Aircraft)	Raster	3 day	FEMA
	Imagery Post-Event (Motion Video)	Video	24 hour	FEMA
	Imagery Post-Event (Satellite)	Raster	3 day	FEMA
	Residential Damage-Imagery Derived	Polygon	48 hour	FEMA
	Roof Damage - Imagery Derived	Polygon	24 hour	DOD/USACE, FEMA
	Wildfire Perimeters (GeoMAC)	Polygon	24 hour	USGS
Imagery				
High Resolution	EPA ASPECT	Raster	4 day	EPA
	FEMA LIDAR	Raster	7 day	FEMA
	FEMA Radar	Raster	4 day	FEMA
	NOAA Coastal Shoreline Aerial Photography	Raster	4 day	NOAA/NOS
	NOAA Thermal	Raster	3 day	NOAA
	Post-Event Video	Video	24 hour	DHS, NASA, DoD, NGB, DOI
	USACE Blue-Roof Aerial Photography	Raster	3 day	DOD/USACE

2.3.2 Operational Support

Pre- and post-event imagery requests are processed through the RS Coordinator at the FEMA JFO, RRCC, or NRCC. Requests are compiled, validated, and cross-checked against others for mutually supportive requirements and missions.

Vector-derived products are produced in the exploitation phase of the TCPED process. In addition to the FEMA NRCC, RRCC, and JFOs, other groups may develop derived products in support of their specific missions. For example, DHS Directorates, FEMA organizational elements, federal ESF leads, and/or state, local, and tribal entities have derived vector products from federal-funded imagery products. These activities may be performed at on- or off-site facilities and accessed through the requesting source.

2.3.3 Authoritative Data

Imagery provides a static picture of an area and must be updated regularly to support monitoring efforts. When imagery is initially purchased, licensing agreements are made defining use requirements and restrictions, potentially limiting distribution for the response and recovery efforts. Imagery data products are available in many graphic formats enabling them to be used with imagery-specific software and GIS applications.

The data derived from imagery is highly valuable and easy to share. These are typically vector (point, line, or polygon) or grid products that can quickly provide information on specific structures, impacted areas, or flooded regions. In addition, they represent an excellent information source for determining the area of disaster impact ***(see Table 2–3)***.

2.3.4 Specific Products

Because of the large file size of imagery data, the derived products are shared quickly through email and other forms while the source imagery will be delivered at a later date or posted to a web environment.

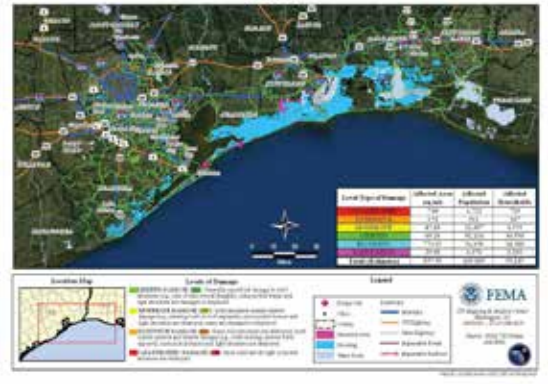
Figure 2-3: Imagery Sample

Best Practices - FEMA Damage Polygons

Imagery derived data products support the immediate information requirements for Response and Recovery operations by allowing fixed facilities to analyze imagery data and quickly share the results with field teams, state/local entities, and the DHS COP with minimal effort. In support of FEMA, NGA provides damage analysis in the form of Imagery Derived Polygons (IDPs) for specific targeted areas. These IDPs provide situational awareness, visualization, and key common operating data for emergency responders and decision makers following hurricane, earthquake, fire, and flood events. The IDPs are identified and annotated based on the Damage Classification System guidelines developed by FEMA and provided to NGA. These guidelines are used by geospatial analysts to determine the magnitude of damage. The NGA analysts delineate the damaged areas according to the FEMA's criteria and provide this information to FEMA in both map and data product formats.

The FEMA NRCC develops analytical products with the IDPs estimating impacted areas, populations, and residential infrastructure. These map and data products are shared with all FEMA operations as well as being distributed to external customers involved in the incident and are posted at www.fema.gov.

The following table represents the classification system and color scheme used to characterize damage in FEMA's Damage Polygons.



FEMA Damage Map

Damage Level		Observed Damages
General Damage Classifications		
LD	Limited Damage	Generally superficial damage to solid structures (e.g., loss of tiles or roof shingles); some mobile homes and light structures are damaged or displaced.
MD	Moderate Damage	Solid structures sustain exterior damage (e.g., missing roofs or roof segments); some mobile homes and light structures are destroyed, many are damaged or displaced.
ED	Extensive Damage	Some solid structures are destroyed; most sustain exterior and interior damage (roofs missing, interior walls exposed); most mobile homes and light structures are destroyed.
CD	Catastrophic Damage	Most solid and all light or mobile home structures destroyed.
Wildfire Damage Classifications		
B	Burned	Areas observed that have already burned.
LD	Limited Damage	Few structures are burned/destroyed.
ED	Extensive Damage	Some structures are completely burned/destroyed and sustained observable exterior damage.
CD	Catastrophic Damage	Most structures are completely burned/destroyed.

FEMA Damage Classification

Note: The above classifications represent generalized expectations only; they do not exclude the possibility of variation within any classified area. Areas that are not observed nor have no discernable damage are left uncolored.

Raster Products

Post-event imagery is used by a multitude of secondary users as it is made available. This data is disseminated through multiple entities including the USGS (on behalf of FEMA), FEMA, NOAA, and others. Following a disaster event, USGS manages daily RS coordination conference calls and an email distribution list. These forums allow the geospatial community to discuss all aspects of RS in support of an incident. Those interested in participating must contact the FEMA RS Coordinator at the FEMA NRCC ***(see Figure 2-3)***.

Vector Products

Imagery-derived data may include various themes such as SAR targets, road damages, and flooded areas. These vector products can be available immediately following the analysis and are sent directly to the requestor and then delivered to the larger stakeholder community as required ***(see Figure 2-4 on page 26)***.

Figure 2-4: Imagery-Derived Data Sample

2.4 Models

Models provide critical predicted information for scenario events prior to an event actually occurring. This information allows for response plans to be developed in preparation for a coming event. This section covers the majority of modeling efforts related to damage assessments.

2.4.1 Areas of Expertise

There are several unique programs and software applications that provide the modeled information that is required to support early exposure, damage, and loss estimates. This section defines several of the significant models and coordinating entities providing modeled information to the disaster response community. Each focuses on a specific area of interest providing authoritative information to assist in federal disaster operations.

Hazards US-MultiHazard (HAZUS). FEMA's HAZUS model provides loss estimates for flood, hurricane (wind), and earthquake events. HAZUS development has been supported by domain experts from academia, nonprofit organizations, and the private sector. The model provides estimates on impact to physical damage to residential and commercial buildings, schools, critical facilities, and infrastructure; economic loss, including business interruption, repair and reconstruction costs; and social impacts, including estimates of shelter requirements, displaced households, and population exposed to scenario floods, earthquakes, and hurricanes.

HURRicane EVACuation (HURREVAC). HURREVAC provides estimates on evacuation decisions using modeled hurricane track information from the National Hurricane Center (NOAA/NWS) and data from the HURREVAC study for the area. In addition, storm surge inundation graphics, where available, are also displayed, using data from the NWS Sea, Lake, and Overland Surges From Hurricanes (SLOSH) model.

Interagency Modeling and Atmospheric Assessment Center (IMAAC). The IMAAC provides interagency coordination to use the most appropriate atmospheric dispersion model for a particular incident and for delivery of a single federal prediction to all responders. The current IMAAC agency federal partners are DHS, Department of Defense (DoD), DOE, EPA, NOAA, Nuclear Regulatory Commission (NRC), and National Aeronautics and Space Administration (NASA).

National Exercise and Simulation Center (NESC). The NESC is a congressionally mandated center within the Federal Emergency Management Agency (FEMA) that provides users with access to preparedness services and tools through a central access point. The mission of the NESC is to enhance preparedness across the Whole Community by providing access to state-of-the-art modeling and simulation and by promoting effective and efficient planning, training, education, exercise, operations, and evaluation services for all mission areas.

Best Practices - Standard Unified Modeling, Mapping & Integration Toolkit

Modeling and Simulation (M&S) can encompass all manner of human and computer based support that is utilized in real world emergency response operations or exercises as decision support tools. A widely recognized example of human-based simulation in emergency management is the Virtual News Network (VNN). Examples of computer-based simulation include wind damage and storm surge forecasting models developed by the NOAA, which enable simulation of the effects a hurricane may have on coastal communities and better forecasting of the needs for assistance that those communities may request from the emergency management community. In order to advance the science of preparedness in emergency management, modeling and simulation capabilities are applied to preparedness, prevention, mitigation, response, and recovery where beneficial over reality. Factors such as cost, time, safety, and uncertainty are considerations that can lead to a more beneficial experience over reality. An example of this was during National Level Exercise 2011 (NLE11), where the Standard Unified Modeling, Mapping & Integration Toolkit (SUMMIT) and the Online Virtual Environment (OLIVE) tools were utilized for virtual meetings as well as "flyovers" of simulated building damage based on the exercise scenario. The cost and safety factors involved with creating a post-earthquake damaged city outweighed the benefit of having them in reality. The virtual world of OLIVE and simulated damage to infrastructure in SUMMIT were utilized by ESF 1, 5, 8 and 12 to exercise response issues such as contraflow of traffic, urban search and rescue (US&R), medical support, and power outages.

Table 2–4: Authoritative Data - Damage Assessment Mission - Modeling

Sub Category	Theme	Type	Delay	POC
Event Impact				
Modeling	CBRN Model Predictions: DOE Temporary Emergency Exposure Limits (TEEL)	Polygon	24 hour	IMAAC
	CBRN Model Predictions: Emergency Response Planning Guidelines (ERPG)	Polygon	24 hour	IMAAC
	CBRN Model Predictions: EPA Protective Action Guidelines (PAG)	Polygon	24 hour	IMAAC
	CBRN Model Predictions: SEPA Acute Emergency Guideline Levels (AEGL)	Polygon	24 hour	IMAAC
	CBRN Model Predictions: Time Integrated Air Concentrations	Polygon	24 hour	IMAAC
	CBRN Model Predictions: USDA/FDA Derived Intervention Levels (DIL)	Polygon	24 hour	IMAAC
	Earthquake Damage-Modeled	Polygon	24 hour	USGS
	Earthquake Impact-Modeled Liquefaction	Polygon	24 hour	USGS
	Model Input - CATS	Text	24 hour	DTRA
	Model Input - HAZUS	Text	24 hour	FEMA
	Model Input - HPAC	Text	24 hour	DTRA
	Model Input - HURREVAC	Text	24 hour	FEMA
	Model Input - IMAAC	Text	24 hour	IMAAC
	Model Input - NISAC	Text	24 hour	DHS
	Modeled Impacts - CATS	Polygon	24 hour	DTRA
	Modeled Impacts - HAZUS	Polygon	24 hour	FEMA
	Modeled Impacts - HPAC	Polygon	24 hour	DTRA
	Modeled Impacts - HURREVAC	Polygon	24 hour	National Hurricane Center
	Modeled Impacts - IMAAC	Polygon	24 hour	IMAAC
	Modeled Impacts - NISAC	Polygon	24 hour	DHS
	Modeled Impacts - SLOSH	Polygon	24 hour	FEMA, USACE, NWS
	Modeled Impacts - Surge (SLOSH)	Polygon	24 hour	FEMA, USACE, NWS
	Modeled Impacts - USACE Debris	Polygon	24 hour	DOD/USACE
	Modeled Losses - CATS	Polygon	24 hour	DHS
	Modeled Losses - HAZUS	Polygon	24 hour	FEMA
	Modeled Losses - NISAC	Polygon	24 hour	DHS
	Plume Analysis	Point	24 hour	IMAAC
	ShakeMap Pager	Point	Immediate	USGS
	Volcano Damage-Modeled	Polygon	24 hour	USGS
	Wildfire Damage-Modeled	Polygon	24 hour	USGS

LandScan USA. Oakridge National Laboratory (ORNL) has developed a population distribution model that produces the finest resolution population distribution data available for the continental United States. LandScan USA includes nighttime (residential) as well as daytime population distributions. LandScan USA is more spatially refined than the resolution of block-level census data and includes demographic attributes such as age, sex, or race. LandScan USA also identifies daytime populations and other socio-economic data including places of work, journey to work, and other mobility factors. In addition, ORNL maintains a global low-resolution product simply titled LandScan.

National Infrastructure Simulation and Analysis Center (NISAC). The NISAC provides advanced modeling and simulation capabilities for the analysis of CIs, their interdependencies, vulnerabilities, and complexities. NISAC is a program under the DHS Preparedness Directorate, building a partnership between Sandia National Laboratories (SNL) and Los Alamos National Laboratory (LANL).

Sea, Land, Overland, Surge from Hurricanes (SLOSH). The SLOSH model estimates storm surge depths resulting from historical, hypothetical, or predicted hurricanes by taking into account a storm's pressure, size, forward speed, forecast track, wind speeds, and topographical data. SLOSH was developed by FEMA, USACE, and the NOAA NWS.

USACE Debris Model. The debris model estimates amounts of debris from hurricanes making landfall along the Gulf and East Coasts of the continental United States. The model has been developed by USACE subject matter experts (SMEs) and is based heavily on experience from Hurricanes Andrew, Fredrick, and Hugo. This work has been further extended for the estimation of debris across the United States.

2.4.2 Operational Support

In most cases, modeling support will be provided by fixed facilities with stable operating environments to support the hardware and software requirements of the computer models. This provides continuity of information released through authoritative sources, versioning of updated results, and effective distribution mechanisms. Within these fixed operations, SMEs have a pre-identified work area to report to and have access to the preconfigured hardware and software required to produce the modeled results.

The authoritative sources of modeled information generally comprise specific SMEs working together with specific software applications to provide the best-available results for any given subject area. These activities may operate with a single model (FEMA HAZUS) or through a federal sponsor to access specific areas of several national labs [DHS IMAAC and DOE Visualization and Modeling Working Group (VMWG)].

It is also possible for individuals to acquire modeling software for use within their professional disciplines. These applications are designed to run on desktop hardware and are in use by thousands of individuals across the country. For federal operations, these sources may not be the authority for the event and must be used with caution because the event input parameters, supporting data, and other factors can yield drastically conflicting results.

2.4.3 Authoritative Data

Modeled output is typically map- or report-based, providing products intended to effectively answer specific scenario-based questions. In addition, the majority of the supporting modeled data can be extracted for other purposes. One example of this is the SLOSH model; the derived data produced by SLOSH is used by HAZUS and HURREVAC to support their modeling efforts. In addition, SLOSH outputs are used by others for map products and analysis relating to an event scenario ***(see Table 2–4 on page 28).***

2.4.4 Specific Products

As identified above, most models produce combinations of map and report products identifying estimates of damage and associated losses for their areas of expertise and authority. These products are made available to the user community through email and other media where they support decision making throughout the event. It is important to keep track of versioned results as the event operations progress. Many of the models will be run frequently to support the evolution of the event, and each run will produce updated versions of the modeled results. Products created by several models include:

HAZUS

- Spatial boundaries of hazard/event
- Damage to essential facilities
- Casualties
- Shelter requirements
- Economic loss

HURREVAC

- Evacuation recommendations
- Estimated wind speeds

IMAAC

- Plume projections
- Lethality/dosage predictions

USACE Debris

- Debris volume estimates
- Debris removal requirements

2.5 Field Data Collection

There are many types of field collection efforts: windshield surveys, preliminary damage assessments (PDA), searches, detailed post-event surveys,

Best Practices - Disaster Clearinghouses

The concept of Disaster Clearinghouses originated with the earthquake community in an effort to coordinate post disaster field data collection and research activities. The Disaster Clearinghouses provide an ideal opportunity to access information on observed damages missed in formal program-based data collection efforts. Clearinghouses were used extensively in the aftermath of the Northridge, California earthquake in 1994, and then more formally developed in response to the Nisqually, Washington earthquake of 2001.

Following Hurricane Katrina in 2005, FEMA and Louisiana State University (LSU) established the LSU GIS Clearinghouse Cooperative (LGCC) to coordinate and centralize the collection and dissemination of geospatial information. The LGCC marked an important transition in the clearinghouse concept from coordination of post- disaster field data collection and research activities to centralizing post-disaster geospatial information and making the information available through innovative technologies. Innovative features of the LGCC include:

- Installing a 20 Terabyte, restricted access data server that provided a common storage area for geospatial data for use by federal, state, local, research, and private sector users
- Allowing users without GIS software to access and view high resolution imagery
- Utilizing readily accessible web-based technology, such as Google Earth, to share field data and other geospatial files, making them accessible to local officials and the disaster response community.

Disaster clearinghouses are scalable, unifying, and transferable, and will continue to serve a valuable role in post-event collection, coordination, and dissemination of geospatial information.

Best Practices - Open Geospatial Consortium

The Open Geospatial Consortium (OGC) consists of over 400 commercial, governmental, nonprofit, and research organizations worldwide, participating to develop publicly available interface standards. OGC supports interoperable solutions that "geo-enable" the Web, wireless, and location-based services. The standards empower technology developers to make spatial information and services accessible. OGC standards are developed in a unique consensus process to enable geoprocessing technologies to interoperate, or "plug and play."

The DHS GII utilizes OGC Web Feature Services (WFS) & Web Map Services (WMS) to make HSIP and other key data available to stakeholders through their HSIN credentials. While the GII provides core support for DHS related geospatial tools, OGC standards provide access to geospatial data across the community. These services allow users to connect to data they would otherwise maintain across their own IT infrastructures or workstations.

The FAA Special Activity Airspace (SAA) Dissemination OGC Pilot demonstrates the feasibility of automating the dissemination and portrayal of SAA information to stakeholders and other external users via OGC WFS and Feature Portrayal Service (FPS). These services are implemented as part of the Aeronautical Information Exchange Model (AIXM) to support filtering, access, and portrayal of SAA information as well as notification to subscribed users of SAA updates.

OGC standards provide for an effective means to share and transport information in a geospatial context and to geo-enable the NIEM. Through the adoption of OGC Standards and NIEM, critical information can be efficiently collected, published, and visualized by the stakeholder community to better inform decision making and operations.

program-specific inspections, etc. These efforts are labor intensive and require individuals to be placed into the damage area to meet the surge staffing requirements. Although these transient staff add to the burden of the impacted communities to provide food and lodging, they also provide additional income to the impacted area, aiding in the economic recovery of the geography.

In many cases, field data collection efforts provide the most detailed information on the impact of an event. While this is a great source for general impact information, it may be limited by the scope of the mission that created it [e.g., the FEMA Individual Assistance (IA) program does not look at military or university housing]. In addition, field data assists in validating modeled information, identifies affected areas missed by other information collection means, and provides a ground presence, validating the event while supporting community relations by being in the field. The information collected ensures that the necessary services and commodities are provided to affected citizens as quickly as possible.

2.5.1 Areas of Expertise

Each field data collection effort is intended to meet the specific missions of the hosting entity. This data also supports seemingly unrelated efforts in the greater emergency response environment by providing field-level information to the broader community. Field information is collected in a spatial context using Global Positioning System (GPS)-based tools by the majority of entities conducting the work. Some data collection efforts are still focused on the collection of data manually out of mission necessity or lack of pre-planning. This information must be compiled and processed to generate a geographic coordinate required for spatial reference.

Below are several field data collection efforts deployed on most federally declared disasters:

- **American Red Cross (ARC).** The ARC Disaster Assessment workers gather, analyze, interpret, and distribute accurate and timely information on the extent of the damage, overall impact, weather conditions, and demographics of a disaster-affected community. ARC teams focus on 15 "high-level" essential elements of information, which represent the broad categories of information to be collected about what has happened (typically excluding damage figures) as a result of any disaster.
- **FEMA PDA Teams.** Immediately following an event, FEMA sends out PDA teams to conduct windshield surveys of the impacted areas to assist in determining the level of assistance required from FEMA by county. The PDA teams are composed of FEMA and state staff representing the IA, Public Assistance (PA), and Mitigation program areas. The information collected supports the state request for federal assistance and assists FEMA in determining the level and extent of federal assistance required.
- **FEMA IA Inspections.** Immediately following a disaster declaration, FEMA IA inspectors are deployed to inspect the households of individuals applying for federal assistance. These inspections are intended to verify levels of damage and focus on the habitability of private properties to ensure that basic levels of living requirements are met.
- **FEMA Mitigation High Water Marks.** For flood-related events, FEMA collects high water marks to determine the overall level of flooding within the inspected area. This information is used to support the NFIP in proper flood zoning and assists in making determinations of level of damage to impacted properties.
- **FEMA Mitigation Assessment Team (MAT).** FEMA's Risk Reduction Branch will deploy a MAT to conduct field inspections and technical evaluations of the performance of buildings subjected to damaging forces generated by

an event. The primary purpose of the MAT's technical evaluations is to identify design practices, construction methods, and building materials that either failed, or were successful in resisting such forces.

- **FEMA PA Inspections.** Once applicants to the FEMA PA program supply information on damage locations, PA inspectors team up with state PA inspectors to create inspection teams. These PA teams visit individual sites to determine eligibility, validate levels of damage, and assist in the approval of inspected PA projects.
- **Small Business Administration (SBA) Inspections.** Similar to the FEMA IA inspections, the SBA conducts inspections of properties seeking assistance under the SBA disaster assistance program. Inspections are conducted to verify level of damages and estimate costs for repairs to private properties.
- **Local Red-Tag/Yellow-Tag Reports.** At the city and county level, inspections are conducted immediately following an event to determine the structural safety of individual properties. This is commonly known as Red/Yellow tagging of structures. This data is frequently collected by local governments as they conduct inspections and share with state and federal entities supporting the response efforts.

2.5.2 Operational Support

Field data collection operations are typically self-sufficient in their information compilation and processing activities. Many feed automatically into larger database environments where they are combined with additional information collected through other means to support a specific program. In more dynamic environments, the information collected may be passed to geospatial staff in fixed or field facilities for additional processing and/or analysis. In the worst-case scenario, hand-written paper reports may require manual entry into computer-based systems to generate useful information for geospatial efforts.

2.5.3 Authoritative Data

Each entity conducting field data collection efforts is by default the authoritative source for the specific information acquired. Each data set is unique to the program it supports and may have use restrictions attached to it. These data sets are key in analysis requiring specific attributes; examples would include structures by type, owner/renter, or water depth at a specific location. As a secondary use, these data sets are used to support the overall damage assessment by providing field-level damage data, which provides additional visibility into the impacted areas ***(see Table 2–5 on page 33).***

2.5.4 Specific Products

The products resulting from the field collection efforts focus on the missions of the specific entities conducting the work. Output products are used in map and text-based reports and are often shared across the event. Field data products include:

- Reported damage comparisons (FEMA IA, FEMA PA, SBA, etc.)
- Actual damage locations
- Distribution of Red/Yellow tagged homes
- High water marks.

2.6 Information Sharing and Data Dissemination

Pre- and post-event information is shared across the geospatial community through multiple tools and systems. The individuals involved are aware of the information requirements of the situation and the data that is available to them. Ideally, our data management systems should be sharing this information in near real-time; however, data sharing frequently occurs at the human-to-human level. As technologies supporting

Best Practices - Homeland Security Information Network

The Homeland Security Information Network (HSIN) is a secure and trusted web-based network for information sharing and collaboration between federal, state, local, tribal, territorial, private sector, and international partners engaged in the homeland security mission. With real-time collaboration tools, including a virtual meeting space, instant messaging, and document sharing, HSIN allows partners to work together instantly, regardless of their location, to communicate, collaborate, and coordinate.

The Geographic Information System (GIS) Community of Interest (COI) serves as the central mechanism for sharing Department of Homeland Security (DHS)-related geospatial information. The COI is a common resource for HSIN users to find information about GIS Products, Situational Awareness, Homeland Security Information Protection HSIP Freedom, and the Homeland Security Geospatial Concept of Operations (GeoCONOPS) as well as links other federal geospatial programs. Users can also access the DHS Geospatial Infrastructure (GII), as well as all the enterprise applications, tools, and information, directly from the COI.

Best Practices - Geospatial Platform

In the President's FY11 budget, federal data managers were directed to move to a portfolio management approach, creating a Geospatial Platform (GeoPlatform). The Geospatial Platform provides shared and trusted geospatial data, services, and applications for use by government agencies, their partners, and the public. The content of all datasets and services demarcated with the Data.gov globe have been verified by the agencies to be consistent with federal privacy, national security, and information quality policies. Additionally, the geospatial platform provides access to data from various partners across state, tribal, regional, and local governments as well as non-governmental organizations.

The Geospatial Platform is an internet-based capability intended to assist anyone needing standard geospatial products, which includes federal agencies, state, local, and tribal governments, private sector, academia, non-governmental organizations, and the general public in meeting their mission needs. The overall goal is to reduce duplication of efforts and promote the use of open standards among agencies' geospatial programs.

The move to a standard Geospatial Platform offers many advantages to its users:

- A "one-stop shop" to deliver trusted, nationally consistent geospatial products, with a preference towards interoperable web services.
- Tools for the centralized discovery, access, and use of data and services managed and maintained in multiple agencies.
- Tools that enable cross-government data to be displayed in a visual context.
- Problem-solving applications that are built once and reused many times.
- A shared cloud computing infrastructure.
- Open standards compliant interoperability [OGC Catalog Service for the Web (CSW), WMS, and Keyhole Markup Language (KML)].
- The tools and infrastructure to enable decision makers to quickly and efficiently determine what geospatial data, services, and application assets can be brought to bear to solve problems.
- The opportunity to leverage complementary efforts such as Data.gov and the federal cloud computing initiative.
- The means to operationalize the federal geospatial portfolio management processes described in the 2010 Circular A-16 Supplemental Guidance.

The Geospatial Platform Conceptual Model is illustrated below.

Some of the current features of the Geospatial Platform include the migration of the Geospatial Open Source catalog to geo.data.gov, which includes a search interface and community features. The Map Gallery is now available as a feature of geo.data.gov and Version 1 of www.geoplatform.gov has been released. In addition to catalog search, users will be able to create and share maps and featured cross-government stories are being developed. Agencies are also starting to provide content supporting their business cases.

The Geospatial Platform will significantly expand access to high quality data, enabling users to improve problem solving and streamline mission critical operations. It is expected that the increased sharing and reuse of resources facilitated by the Geospatial Platform will reduce costs, result in savings and wise investments, and improve decision making while stimulating innovation. On balance, the integrated approach of the Geospatial Platform will mean that the federal portfolio of geospatial data will be better managed, service a broader audience, and be easier to use.

Several organizations have already embraced the Geospatial Platform and have created portals for their users. The EPA and NOAA portals utilize the Geospatial Platform to provide their customers, partners, and staff members with a centralized platform for sharing, discovering, and accessing much of their distributed geospatial data, services, and applications.

For more information on the overall Geospatial Platform program, please go to http://www.geoplatform.gov.

Geospatial Platform Conceptual Model

Table 2–5: Authoritative Data - Damage Assessment Mission - Ground Truth

Sub Category	Theme	Type	Delay	POC
Event Impact				
Damage - Infrastructure	Commercial Building Damage	Point	5 day	FEMA (State/Local EOC)
	Government Building Damage	Point	5 day	FEMA (State/Local EOC)
	Residential Building Damage	Point	5 day	FEMA (State/Local EOC)
	Road Damage	Polyline	24 hour	FEMA (State/Local EOC)
Event Location	Damaged Areas (Report Derived)	Polygon	3 day	FEMA, JOC, State
	Earthquake Damage-Field Reported Liquefaction	Polygon	48 hour	USGS
	Earthquake Damage-Field Reports	Polygon	48 hour	USGS
	Earthquake Damage-Reported (Did you feel it)	Polygon	24 hour	USGS
	Earthquake Impact-Measured (MMI)	Polygon	24 hour	USGS
	FEMA IMAT Reports	Polygon	48 hour	FEMA
	High Water Depth	Polygon	4 day	FEMA Mitigation
	Red Cross Inspections	Point	3 day	ARC
	Red/Yellow Tag Reports	Point	3 day	FEMA/State
	SBA Applicants	Point	5 day	SBA
	Volcano Damage-Field Reports	Point	24 hour	USGS
	Wildfire Damage-Field Reports	Polygon	24 hour	USGS
Specialized Response Teams				
DHS	FEMA Damage Assessment Teams	Point	48 hour	FEMA

information sharing and data dissemination evolve, our requirements to share information through email and portable media should continue to diminish.

2.6.1 Information Sharing

Information sharing at the systems level is in the early stages of development. The ability to transport critical data element between the first-responder and front-line sensor and operational systems is beginning to approach reality. Through the implementation of information sharing standards, such as those established by the National Information Exchange Model (NIEM), the Geospatial Platform, and the Open Geospatial Consortium (OGC), geospatial information is becoming more portable and interoperable.

For dynamic data exchanges, DHS supports NIEM, Geospatial Platform, and OGC standards to facilitate data dissemination and information movement. NIEM represents a collaborative partnership of agencies and organizations across all levels of government (federal, state, tribal, and local) and with private industry. The purpose of NIEM is to effectively and efficiently share critical information at key decision points throughout the whole of the justice,

Best Practices - National Information Exchange Model

The National Information Exchange Model (NIEM) is a program supported by DHS and other federal government partners. NIEM connects communities sharing a common need to exchange information to advance their missions and is intended to be the best practice for intergovernmental information exchange. NIEM provides a common vocabulary to ensure consistency and understanding among domains that may not collaborate traditionally. NIEM promulgates location elements using OGC standards.

DHS and the Law Enforcement communities leverage NIEM to enable the exchange of suspicious activity reports. These reports support information sharing between DHS CI owners/operators, the National Infrastructure Coordination Center (NICC) and the National Suspicious Activity Report Initiative (NSI). Suspicious activity reports utilize Logical Entity eXchange Specifications - Publication & Discovery (LEX-PD) to transport reports between disparate systems across the DHS/DOJ mission space.

The Maritime Notice of Arrival (NOA) mission, led by the Department of Defense ensures that vessels bound for US ports meet their 96 hour notification requirement to provide key information concerning vessel, cargo, and crew data. Location information is tracked as position coordinates and geolocatable through visualization tools. Information is collected and disseminated utilizing NIEM-M. The NOA increases situational awareness, enables predictive analytics, and enhances threat evaluation by producing more actionable information.

NIEM is not limited to law enforcement and justice communities. The emergency management domain data elements and attributes were derived from existing messaging standards developed by the EDXL initiative. Using NIEM, practitioners in government and industry can share accurate, complete, timely, and appropriately secured information to enable informed decision making.

Best Practices - Requests for Information

The Request for Information (RFI) process streamlines geospatial product delivery and ensures the requests meet the needs of the requestor. To meet the growing information requirements of its internal and external customers, the DHS Office of Infrastructure Protection (IP) has defined a RFI process for managing requests for infrastructure related information. The enterprise RFI solution is designed to fulfill requests for infrastructure data which are vital for preparing, responding to, or supporting events that require DHS resources. RFIs can include (but are not limited to) data, map products, policy, guidelines, and reports related to infrastructure data.

Incoming RFIs require the collaboration of various divisions within IP to complete the RFI process; because the National Infrastructure Coordinating Center (NICC) manages collaboration between all IP divisions, IP mission partners are able to use a single interface to submit a RFI. The NICC is responsible for capturing and tracking all RFIs submitted to IP. When an event occurs, the Incident Management Cell (IMC) provides surge support to handle the influx of event-related RFIs. The IMC coordinates event-related RFIs with the NICC to ensure that all event-related RFIs are:

- Identified and documented
- Submitted into the RFI system
- Reviewed for sufficient information accuracy
- Routed to the appropriate party for action
- Tracked
- Provided to the requestor upon completion.

public safety, emergency and disaster management, intelligence, and homeland security enterprise. The Geospatial Platform is relatively new, but it provides opportunities for the federal government to share trusted geospatial data, services, and applications with their partners and the public. NIEM is designed to develop, disseminate, and support enterprise-wide information exchange standards and processes that will enable jurisdictions to automate information sharing. The NIEM emergency management domain data elements and attributes were derived from existing messaging standards promulgated by the Emergency Data Exchange Language (EDXL) initiative, including the Common Alert Protocol (CAP v1.1), Distribution Element (DE), and Hospital Availability Exchange (HAVE). EDXL functions as a stand-alone suite of messaging standards.

The mission communities who built the NIEM Framework (law enforcement/public safety, emergency management, infrastructure protection, screening), from the very beginning recognized that location or proximity relationships require “geospatial data” and the exchange of information with “geospatial context” was a fundamental requirement for understanding and informing decisions. This is particularly powerful because geospatial data provides an intuitive mechanism for cross-mission – cross-community – information-sharing and information-understanding and allows us to Prepare Nationally and Respond Locally.

NIEM promulgates OGC standards and location elements in the following manner. NIEM defines simple location concepts (address, city, 2D longitude/latitude, grid coordinates) using NIEMified data constructs. NIEM uses OGC GML for more complex geospatial constructs, such as 3D Point, LineString, CircleByCenterpoint, and Polygon, using OGC GML. NIEM reuses about 10% of the GML constructs in the domain model (15 of ~150 GML data objects).

The OGC is an international industry consortium of government agencies and organizations, universities, and the private sector that develops publicly available interface standards that are geo-enabled and interoperable. OGC develops standards through a consensus process involving commercial, government, and academic partners to address problems relating to the creation, communication, and use of geospatial information. OGC activities are broadly organized around ten domains or communities of interest, including the Emergency Response and Disaster Management domain. OGC standards are built to geo-enable the exchange of information among and between systems used by organizations operating in different jurisdictions, knowledge networks, and domains of activity to reduce the time required to find, analyze, and update critical information.

The net result of information exchange models and open standards is that Homeland Security stakeholders have more information available to them before, during, and after an emergency or disaster occurs. Through the adoption of the NIEM and OGC Standards, critical information can be collected, published, and visualized with minimal effort to the stakeholder community to better inform decision making and operations.

2.6.2 Data Dissemination

Data dissemination is accomplished through many sources as opposed to a single centralized venue. While this is effective in promoting information data sharing and general wide area access, it does not provide a consolidated or managed source for either. Currently the formal location for posting and accessing geospatial data is through the Homeland Security Information Network (HSIN) and DHS Geospatial Information Infrastructure (GII) using capabilities such as the OneView web map viewer or the OGC web services for HSIP data. In addition, the USGS maintains the Hazard Data Distribution System (HDDS). The HDDS (http://hdds.usgs.gov/hdds/) provides storage and dissemination of USGS-hosted imagery and datasets related to emergency response activities. Imagery data hosted in HDDS can be categorized as public or restricted as required.

Best Practices – DHS Geospatial Information Infrastructure

The Geospatial Information Infrastructure (GII) provides a platform for users to access trusted geospatial data, map services, and geospatial applications. Two of the key geospatial applications that are available on the GII are Portal for ArcGIS and OneView.

Portal for ArcGIS allows GIS practitioners of all levels to search and discover geospatial content and use this data to create web maps that can be saved and shared with other users. The search functionality provided through Portal includes a federated search which allows users to search multiple geospatial catalogs, including FEMA's ArcGIS Portal, ESRI's ArcGIS.com, and Data.gov.

DHS OneView is a secure, web-based, geospatial visualization application that allows individual users to view and interact with data and application services within the DHS GII. OneView users have the ability to add external data sources to their view in common web service formats (KML, KMZ, WMS, and GeoRSS). Other capabilities within OneView include basic attribute query, measurement, location (geocoding, reverse geocoding, and gazetteer), and routing tools.

Geospatial information provides a key connection across homeland security-specific missions. OneView delivers the visualization and analytic tools while Portal provides data search capabilities, both of which support the mission stakeholders in their efforts. With the GII, homeland security partners can establish a comprehensive situational and strategic awareness across the nation to better prepare, prevent, respond, and recover from crisis-related events.

Access to OneView and Portal is granted to authorize federal, state, and local emergency responders, emergency managers, homeland security officials and other personnel with official infrastructure protection responsibilities, through HSIN. Both of these applications can be accessed from most web-browser systems, enabling its use from both fixed and mobile environments. For more information on DHS OneView see Appendix E of the DHS GeoCONOPS.

The community continues to utilize file transfer protocol (FTP) and email as fallbacks to meet their basic data sharing requirements. Vector data products are fairly compact in individual file size, facilitating data sharing through web services, email, and web postings. With agile delivery options, emergency managers have access to these data products in a timely manner to assist in their decision making. Larger data files such as imagery or national datasets are more difficult to manage. Frequently these data types are shared through the physical transfer of external hard drives and other portable media.

2.7 Geospatial Production and Delivery

The production and delivery of geospatial products in the disaster environment is a challenge because each event brings unique circumstances and solutions. The information requirements, data availability, and customer base are driven by the event. Pre-planning allows for immediate activation and productivity as the teams adjust as required to ensure products are available when needed. The production of geospatial products can occur at either a fixed or field facility.

- **Fixed facilities** provide internal and external support focused at their areas of responsibility. Often, surge staff and resources are brought in to assist with the large workloads and long hours associated with disaster operations. For typical day-to-day operations, geospatial staffing may be 1–5 individuals. When activated, the staff count might climb to 8–10 individuals to meet the surge requirements of an event. Entities with specific surge plans have the opportunity to pre-train staff to minimize delays in response and recovery efforts. Hardware and software is generally pre-configured and available to the workforce as they arrive.
- **Field facilities** are typically created rapidly to accommodate the requirements of the event. On smaller events, this entity may be fully operational with 1–5 individuals while large events may require a staffing level of 30+ people. As the magnitude of the event and support requirements increase so does the level of complexity of the geospatial entity supporting it.

2.7.1 Production

The initial point at which a geospatial product request is taken is vital to its execution and completion. The Geospatial Request for Information (RFI) must provide enough information to ensure that the product delivered to the requestor is accurate, timely, and effective. With the multitude of RFIs, a system must be defined to triage them against mission requirements and priorities, requestor responsibilities, and geospatial capabilities.

Several geospatial products are developed during every event: maps, analysis, analytical results, reports, and geospatial data. Paper maps are the predominate geospatial product for onsite RFIs. These products are used for low-tech briefings, posting on conference room walls, and literally placing critical information into the hands of key leadership.

Digital graphics provide the medium for basic information sharing, reproduction, and archiving. These products are emailed, embedded into text-based reports, and posted to HSIN and other web-based locations.

Often, RFIs result in large volumes of ad hoc products for specific customers resulting in the mass production of large volumes of unique paper map products. In these scenarios, efforts are immediately streamlined by consolidating multiple similar products into a single product. Process flows of large production efforts must be completely documented to ensure continued success. These operations may require a large amount of printing, packaging, and hardware resources unavailable locally; teams should plan to order them in from outside sources.

2.7.2 Delivery

The delivery of geospatial RFI products is normally a routine activity. For disaster support, additional thought and conversation is needed to determine the proper format for product delivery. Factoring the product destination (fixed location vs. field location), purpose (briefing, embedded report, etc.), timeliness (5 minutes, today, tomorrow, etc.) and audience (public, internal, classified, etc.) will assist in defining the final output type. Prior to releasing products, each should be checked for errors in spelling, grammar, dates, symbology, and general accuracy.

Paper products require the greatest amount of hardware and consumable resources. Teams should ensure that adequate supplies are available to support the estimated printing requirements. For events requiring information management in a secure environment, specific data and products should be stored appropriately. Printed products are immediately out-of-date, which will drive regular revisions to ensure product currency. When defining a geospatial RFI management system, the designer should make certain that it provides closure when a request is completed to ensure that products get to customers.

Digital graphics are essentially electronic prints of the products listed above and therefore must adhere to the same guidance. These files are easily distributed widely and often presented to other stakeholders as needed. Teams should expect to field email and phone questions on products and be prepared to defend the data, analysis, and presentation of these products.

Best Practices - NAPSG Capability and Readiness Assessment Tool

The Capability and Readiness Assessment Tool (CARAT) is a tool created by the National Alliance for Public Safety (NAPSG) Foundation (a 501c3 non-profit) and is intended for public safety practitioners interested in learning about and/or building a GIS to support their agencies' work. It is designed to serve as a roadmap for anyone interested in learning about, doing, or directing a GIS program to support public safety.

How does it work? Simply look through the topics in the four categories; Planning, Preparedness, Response or Recovery. When you see the issue that you are interested in implementing in your department, click on it. A short description of each will help you identify your current capability and describe what is next for you. You may have a basic capability, and just need to understand what to do next. Or you may just be getting started and need to know how to get started. Each section contains a topical example that demonstrates how another entity is implementing this function & level. In addition, there is a dynamic list of resources descriptions identifying current, online examples of the capability.

Additional information can be found at https://napsgfoundation.org/carat/

3.0 PPD-8 Mission Areas

This section details the five mission areas defined in PPD-8: Prevention, Protection, Mitigation, Response, and Recovery. Each mission area sub-section encompasses multiple federal partners to accomplish their goals and discusses the geospatial requirements and specific products supporting each of their roles.

3.1 Prevention Mission

Preparedness implies a state of readiness or the taking of preventative measures to minimize the impacts of a disastrous event on life and property. Preparedness efforts are undertaken in advance of an event and build upon the experiences of past and predictions of future events.

DHS National Planning Scenarios

Overview

The Homeland Security Council (HSC), in partnership with the DHS, federal interagency partners, and state and local homeland security agencies has developed fifteen all-hazards planning scenarios to assist stakeholders with understanding the range of required prevention, protection, response, and recovery resources and requirements. From this, the SWG refined and vetted fifteen all-hazards planning scenarios. The National Planning Scenarios, which depict a diverse set of high-consequence threat scenarios of both potential terrorist attacks and natural disasters. Collectively, the 15 scenarios are designed to focus contingency planning for homeland security preparedness work at all levels of government and with the private sector. The scenarios form the basis for coordinated federal planning, training, exercises, and grant investments needed to prepare for emergencies of all types. Twelve represent terrorist attacks; three represent natural disasters or naturally occurring epidemics. Each of the 15 scenarios follows the same outline to include a detailed scenario description, planning considerations, and implications.

The fifteen all-hazards National Planning Scenarios are an integral component of DHS's capabilities-based approach to implementing HSPD-8. The scenarios serve as the foundation for the development of homeland security tasks, target capabilities, and standards and performance metrics against which capabilities and tasks will ultimately be measured. The scenario-derived capabilities and standards serve as a basis for assessing national preparedness; help guide federal preparedness assistance to state, local, and tribal governments; and assist in development of national exercises and training programs. These scenarios do not represent the full extent of potential scenarios and should be considered in support of capability-based planning

Operational Support

The planning scenario documents provide key information for activities related to similar event scenarios.

Authoritative Data

The scenarios do not generate any specific authoritative data but do provide information relevant to their respective event and scenario location. The details captured are applicable to similar event scenarios likely to impact the US in the future. Reviewing these materials provides the reader with subject matter specific information to support their involvement in activities related to actual events.

Specific Products

Each of the planning scenarios discusses general scenario descriptions, overall planning considerations, geographic considerations, timelines, and key implications. While not geospatial specific, the scenarios incorporate analysis from multiple tools and methodologies.

FEMA Chemical Stockpile Emergency Preparedness Program

Overview

The Chemical Stockpile Emergency Preparedness Program (CSEPP) is a partnership between the Federal Emergency Management Agency and the U.S. Department of the Army, providing emergency preparedness assistance and resources to communities surrounding the Army's chemical warfare agent stockpiles. In accordance with international treaties and national policy, the Army is fulfilling its mission to eliminate aging chemical munitions and warfare materials housed at the stockpile installations. CSEPP will remain in place until the stockpiles are completely destroyed.

The CSEPP efforts are designed to protect the health and safety of the public, work force, and environment from the effects of a chemical accident or incident involving the U.S. Army chemical stockpile. FEMA works closely with the U.S. Army; state, local and tribal emergency management agencies; public health, environmental, fire, rescue, and law enforcement professionals; medical providers; and elected officials to provide emergency preparedness assistance in CSEPP communities. Program components include emergency planning, training, public outreach and education, exercises, medical preparedness and response, public alert and notification, and communications.

Operational Support

In the event of a chemical release, the affected installation will operate as the incident manager for the event. Activities would include guidance on citizen evacuations and sheltering, information on the released chemical(s), and modeled plume information for the event. This information would be released to the impacted cities, counties, and states immediately and updated as the event progresses.

Authoritative Data

(see Table 3–1 on page 39)

Specific Products

The majority of the CSEPP products are not geospatial; however, most relate back to the authoritative data listed above. This program is deeply vested in annual training and exercise activities with products documenting shelter guidance, medical evaluation, and general event response activities.

A recent geospatial-specific tool, the Special Population Planner (SPP) has been developed and is operational with the Alabama Emergency Management Agency and six Alabama counties. The SPP facilitates emergency planning for special-needs populations in effort to empower and prepare the community for related disasters.

FEMA Citizen Corps

Overview

Citizen Corps was created in 2002 to help coordinate volunteer activities that will make our communities safer, stronger, and better prepared to respond to any emergency situation. Citizen Corps is coordinated nationally by FEMA and works closely with other federal entities, state and local governments, first responders and emergency managers, the volunteer community, and the Corporation for National & Community Service.

It provides opportunities for people to participate in a range of measures to make their families, their homes, and their communities safer from the threats of crime, terrorism, and disasters of all kinds.

Through citizen involvement in supporting preparedness, training Citizen Corps builds on the successful efforts that are in place in many communities around the country to prevent crime and respond to emergencies. Programs that started through local innovation are the foundation for Citizen Corps and this national approach to citizen participation in community safety.

The Citizen Corps mission is accomplished through a national network of state, local, and tribal Citizen Corps Councils. These councils build on community strengths to implement the Citizen Corps preparedness programs and carry out a local strategy to involve government, community leaders, and citizens in all-hazards preparedness and resilience. The five Citizen Corps programs are:

- **Community Emergency Response Teams (CERT):** Provides training to prepare citizens to respond to emergency situations in their communities.
- **Fire Corps:** Promotes the use of citizen advocates (volunteers) to support and augment the capacity of resource-constrained fire and emergency service departments at all levels: volunteer, combination, and career.
- **Medical Reserve Corps (MRC):** Coordinates the skills of practicing and retired physicians, nurses, and other health professionals as well as other citizens interested in health issues, who are eager to volunteer to address their community's ongoing public health needs and to help their community during large-scale emergency situations.
- **USAonWatch:** Serves as the face of the National Neighborhood Watch Program with time-tested practices such as "eyes-and-ears" training and target-hardening techniques.
- **Volunteers in Police Service (VIPS):** Provides support and resources for agencies interested in developing or enhancing a volunteer program and for citizens who wish to volunteer their time and skills with a law enforcement agency.

Operational Support

Following a crisis event, Citizen Corps programs will support local emergency responders, disaster relief efforts, and overall community safety. Through these pre-arranged volunteer opportunities, citizens will be vetted, trained, and ready to provide immediate assistance to their communities.

Local CERT members can provide critical support to first responders, immediate assistance to survivors, and organize spontaneous volunteers at a disaster site.

- **Fire Corps** volunteers will work side-by-side with fire and emergency service departments in support of their first-responder duties.
- **MRC** members will assist in the provision of much-needed medical assistance by volunteer citizens, practicing and retired physicians, nurses, and other health professionals.
- **USAonWatch** coordination will support "community-watch activities" at a time when local law enforcement is occupied with specific response and recovery duties.

Table 3–1: Authoritative Data – Prevention Mission – FEMA Chemical Stockpile Emergency Preparedness Program

Sub Category	Theme	Type	POC
Emergency Services			
Shelter Locations	CSEPP Pressurized Shelters	Point	DHS/FEMA
Man-Made Hazards			
Emergency Warning	Protective Action Zones	Polygon	DHS/FEMA
Emergency Warning	Incident Plume Data	Polygon	DHS/FEMA

- **VIPS** volunteers will support the formal activities of state and local law enforcement agencies.

Authoritative Data

(see Table 3–2)

Specific Products

The Citizen Corps programs provide data systems tracking membership, training, and resources. While this information is not widely available outside the program management, there are map products available for the Authoritative data listed above as well as a Program locator application located on their internet site.

FEMA Continuity of Operations Division

Overview

Continuity of Operations (COOP) is an effort within individual executive departments and agencies to ensure that Primary Mission Essential Functions (PMEF) continue to be performed during a wide range of emergencies, including localized acts of nature, accidents, and technological or attack-related emergencies. The ultimate goal of continuity efforts in the executive branch is the continuation of NEFs. In order to achieve that goal, the objective for organizations is to identify their Essential Functions (EF) and ensure that those functions can be continued throughout, or resumed rapidly after, a disruption of normal activities.

An organization's resiliency is directly related to the effectiveness of its continuity capability and ability to perform its essential functions continuously. The continuity program staff within an agency shall coordinate and oversee the development and implementation of continuity plans and supporting procedures. These activities establish consistent performance metrics, compile best practices, develop implementation plans, and facilitate cross-agency continuity evaluations.

A COOP plan shall be developed and documented that, when implemented, will provide for continued performance of essential federal functions under all circumstances. According to Federal Preparedness Circular 65, at a minimum, the plan should:

- Delineate essential functions and activities
- Outline a decision process for determining appropriate actions in implementing COOP plans and procedures
- Establish a roster of fully equipped and trained emergency personnel with the authority to perform essential functions and activities
- Include procedures for employee advisories, alerts, and COOP plan activation, with instructions for relocation to pre-designated facilities, with and without warning, during duty and non-duty hours
- Provide for personnel accountability throughout the duration of the emergency
- Provide for attaining operational capability within 12 hours
- Establish reliable processes and procedures to acquire resources necessary to continue essential functions and sustain operations for up to 30 days.

Operational Support

It is the policy of the United States to have in place a comprehensive and effective program to ensure continuity of essential federal functions under all circumstances. As a baseline of preparedness for the full range of potential emergencies, all federal agencies shall have in place a viable COOP capability, which ensures the performance of their essential functions during any emergency or situation that may disrupt normal operations.

Any event that makes it impossible for employees to work in their regular facility could result in the activation of a continuity plan. In this situation there are typically four phases of COOP Activation:

- Phase I – Readiness and Preparedness
- Phase II – Activation and Relocation: plans, procedures, and schedules to transfer activities, personnel, records, and equipment to alternate facilities are activated

Table 3–2: Authoritative Data – Prevention Mission – FEMA Citizen Corps

Sub Category	Theme	Type	POC
Emergency Services			
Emergency Resources	Citizen Corps Councils Areas	Polygon	DHS/FEMA
Emergency Resources	Community Emergency Response Team/Program Areas	Polygon	DHS/FEMA
Emergency Resources	Community Emergency Response Team Staging Areas	Point	DHS/FEMA
Emergency Resources	Fire Corps Program Locations	Point	DHS/FEMA
Emergency Resources	Medical Reserve Corps Program Locations	Point	DHS/FEMA
Emergency Resources	USAonWatch Program Locations	Point	DHS/FEMA
Emergency Resources	Volunteers in Police Service Program Locations	Point	DHS/FEMA

- Phase III – Continuity Operations: full execution of essential operations at alternate operating facilities is commenced
- Phase IV – Reconstitution: operations at alternate facility are terminated and normal operations resume

During incident response activities any of these phases could be activated with varying impacts on the event operations.

Authoritative Data

(see Table 3–3)

Specific Products

All executive departments of the US Federal Government maintain COOP plans, which include location-specific information.

FEMA Homeland Security Exercise and Evaluation Program

Overview

The Homeland Security Exercise and Evaluation Program (HSEEP) provides common exercise policy and program guidance through a performance-based exercise program. Through exercises, the National Exercise Program (NEP) supports organizations to achieve objective assessments of their capabilities so that strengths and areas for improvement are identified, corrected, and shared as appropriate prior to a real incident. HSEEP provides a standardized methodology and terminology for exercise design, development, conduct, evaluation, and improvement planning regardless of the nature and composition of their sponsoring agency or organization.

HSEEP reflects lessons learned and best practices from existing exercise programs and can be adapted to the full spectrum of hazardous scenarios and incidents (e.g., natural disasters, terrorism, and technological events). The HSEEP documents and reference volumes integrate language and concepts from the National Response Plan (NRP), the NIMS, the National Preparedness Goal, the Universal Task List (UTL), the Target Capabilities List (TCL), existing exercise programs, and prevention and response protocols from all levels of government.

Operational Support

As a significant preparedness effort, HSEEP links the exercise community to geospatial products. Exercise efforts are quickly expanding their use of spatial information for identifying their respective geographic areas and providing mock-situational awareness in a format consistent with tools utilized in Homeland Security missions. Products and data developed for exercise support will have an immediate and relevant place in response to a similar event.

Authoritative Data

While authoritative data is developed and shared through HSEEP activities, it remains unique to the scenario and geography is designed around. Currently, this information is not maintained in a central location and must be requested through the relevant exercise organization.

Specific Products

The HSEEP utilizes scenario-based geospatial products, including HAZUS, in exercise design, development, conduct, and improvement planning.

FEMA Logistics Management Directorate

Overview

The Logistics Management Directorate (LMD) has the mission to effectively plan, manage, and sustain national logistics response and recovery operations, in support of domestic emergencies and special events, acting as the National Logistics Coordinator (NLC) or Single Logistics Integrator for domestic incident support. LMD is organized around the following four core competencies:

- **Logistics Operations** - Manages and executes the national logistics command and coordination, tracking, and reporting for all-hazards operations
- **Logistics Plans and Exercises** - Develops and provides cohesive and synchronized logistics plans and exercises to achieve both short- and long-term readiness requirements
- **Distribution Management** - Manages a comprehensive supply chain, warehouse, and transportation operation
- **Property Management** - Provides management oversight, internal control, and technical reviews in the areas of property accountability, reutilization, and disposal of Disaster Operations equipment.

Operational Support

FEMA relies on the LMD to maintain and deliver lifesaving commodities in support of its all-hazards

Table 3–3: Authoritative Data – Prevention Mission – FEMA Continuity of Operations Division

Sub Category	Theme	Type	POC
Specialized Response Teams			
Other Federal Agency	Continuity Facility Locations	Point	DHS/FEMA
Other Federal Agency	Emergency Employee Locations	Point	DHS/FEMA

mission. Central to this concept are the Initial Response Resources (IRR) that are ready to be deployed to relieve the suffering of disaster survivors. These items consist of six basic items: 1) water, 2) tarps, 3) meals 4) cots, 5) blue roof sheeting, and 6) blankets. These items are intended to sustain lives and prevent further property damage during an emergency or disaster.

During catastrophic events, IRR commodities may be distributed to as many as 60 forward sites for distribution. During complex disaster scenarios these commodities flow through specifically designed National Logistics Support Bases (NLSB) operated by FEMA's Logistics Management Directorate, to State Resourced Staging Areas, also known as Points of Distribution (POD) operated by state and local governments.

Authoritative Data

(see Table 3–4)

Specific Products

The Logistics Supply Chain Management System (LSCMS) (previously Total Asset Visibility) supports FEMA's mission of responding to all-hazards expediently and efficiently by improving the performance and accountability of the nation's end-to-end supply chain management of critical assets and commodities. Through this process LSCMS supports the LMD mission as the National Logistics Coordinator.

FEMA National Exercise Division

Overview

The National Exercise Division (NED) was established within FEMA to develop, coordinate, and manage a national exercise program that would enable federal, tribal, territorial, regional, state, and local stakeholders to exercise and evaluate their preparedness capabilities in a consistent and integrated manner. Under the NED, the Homeland Security Exercise and Evaluation Program (HSEEP) was established as the nation's capabilities-based exercise and evaluation program to develop standardized policy, methodology, and terminology for all aspects of exercise design, development, conduct, evaluation, and improvement planning.

Operational Support

While focused at exercise and opportunities, the NESC provides an EOC-type training environment suitable for supporting the FEMA NRCC with desk space as well as access to the multitude of exercise and simulation tools available to the NED.

Authoritative Data

While authoritative data is developed and shared through NED and NESC activities, it remains unique to the scenario and geography it is designed around. Currently this information is not maintained in a central location for distribution in support of response and recovery activities.

Specific Products

The Standard Unified Modeling Mapping Integration Toolkit (SUMMIT) provides the NESC with the ability to discover and integrate geospatial models, data, and SME expertise applicable to specified hazards, regions, and objectives. SUMMIT supports the generation of simulations that can rapidly ingest collaborative data and deliver an integrated analysis and display of the simulated results.

FEMA Public Affairs

Overview

FEMA's role in providing public information supports the communication of timely, accurate, and accessible information on the incident's cause, size, and current situation to the public, responders, and other stakeholders. Public information is coordinated and integrated across jurisdictions, agencies, and organizations; among federal, state, tribal, and local governments, and with NGOs and the private sector.

Operational Support

Both before and following an incident, FEMA provides key public information on historic and current disasters. As much of the event information is FOUO, the FEMA Public Information staff serves as the public's portal for information and map-based products. In coordination with the FEMA Office of Public Affairs (OPA), the Public information Officer assigned to an event is responsible for gathering, verifying, coordinating, and disseminating this information for both internal and external use. These activities take place at the NRCC, RRCC, JFO, and JIC and relevant information is disseminated across

Table 3–4: Authoritative Data – Prevention Mission – FEMA Logistics Management Directorate

Sub Category	Theme	Type	POC
Field Operation Locations			
DHS/FEMA	IRR Commodity Locations	Polygon	DHS/FEMA
DHS/FEMA	State Resourced Staging Area Locations	Point	DHS/FEMA
Government Facilities			
DHS/FEMA	National Logistics Support Locations	Point	DHS/FEMA

a coordinated series of mechanisms to include email, websites, and social network services.

Authoritative Data

(see Table 3–5)

Specific Products

FEMA provides public access to current and historic information through their website (http://www.fema.gov/hazard/index.shtm). From this location, access is provided to the authoritative data listed above, text reports, and map products for specific events and general interests. Products include; analytical national maps, current map products from major events, historic maps/data, and links to other FEMA programs.

FEMA Radiological Emergency Preparedness Program

Overview

FEMA established the Radiological Emergency Preparedness Program (REPP) Program to ensure the health and safety of citizens living around commercial nuclear power plants would be adequately protected in the event of a nuclear power plant accident and inform and educate the public about radiological emergency preparedness. This is accomplished in coordination with the NRC and the facility owners and operators.

The REP Program has responsibility for activities outside the nuclear power plant boundaries. The program provides emergency planning and preparedness support to the state, tribal and local governments adjacent to the nuclear power plants. All onsite activities fall under the responsibility of the NRC for regulatory compliance, emergency planning, and incident response.

Operational Support

When a radiological emergency occurs, nuclear power plant personnel evaluate plant conditions and make protective action recommendations to the state and local government agencies on how to protect the population. Based on the recommendation and independent assessment of other local factors, the state or local government agencies are responsible for making decisions on the actions necessary to protect the public and for relaying these decisions to the public.

Factors that affect protective action decisions include plant conditions, competing events, weather, evacuation times, shelter factors, how quickly an incident develops, how short-lived a release of radiation may be, and other conditions.

Initial protective actions considered for a radiological emergency include evacuation and sheltering. These recommendations would be expected to include a two-mile radius around the plant along with citizens living and working in the 5 and 10-mile zone directly downwind and slightly too either side of the projected path of the release.

Table 3–5: Authoritative Data – Prevention Mission – FEMA Public Affairs

Sub Category	Theme	Type	POC
Event Damage			
Event Location	FEMA Designated Counties	Polygon	DHS/FEMA
Event Location	FEMA Imagery Derived Damage Areas	Polygon	DHS/FEMA

Authoritative Data

(see Table 3–7 on page 45)

Specific Products

Planning maps are produced for each nuclear facility and should be available through the respective FEMA Region and/or State EOC.

3.2 Protection Mission

The Protection Mission addresses capabilities to safeguard against acts of terrorism and man-made or natural disasters. Through collaboration and cooperation, this mission aims to protect the citizens, residents, visitors, and critical assets, systems, and networks against risks.

Federal Bureau of Investigation (FBI) Joint Terrorism Task Force

Overview

The Joint Terrorism Task Force (JTTF) is an FBI-sponsored multijurisdictional function established specifically to conduct terrorism-related investigations. Analytic and information-sharing efforts carried out by the JTTFs are done solely to support those investigative efforts. They serve as the coordinated "action arm" for federal, state, and local government responses to terrorist threats in specific U.S. geographic regions. The FBI is the lead agency that oversees JTTFs, whose benefits include:

- "One-stop shopping" for law enforcement information or investigation of suspected or real terrorist activities
- Use of a shared intelligence base
- Ability to prosecute cases in the jurisdiction that is most efficient and effective

- Task-force member awareness of investigations within a jurisdiction and ability to assist in investigations in other jurisdictions
- Familiarity among agencies, investigators, and managers before a crisis occurs.

The mission of a JTTF is to leverage the collective resources of the member agencies for the prevention, preemption, deterrence, and investigation of terrorist acts that affect United States interests, to disrupt and prevent terrorist acts, and to apprehend individuals who may commit or plan to commit such acts. To further this mission, a JTTF serves as a means to facilitate information sharing among its members.

- As of January 2011, there are 104 JTTFs based nationwide, including at least one in each of the FBI's 56 field offices.
- More than 600 state and local agencies participate in JTTFs nationwide. Federal representation includes representatives from the U.S. Intelligence Community, the Departments of Homeland Security, Defense, Justice, Treasury, Transportation, Commerce, Energy, State, and Interior, among others.

The National Joint Terrorism Task Force (NJTTF) mission is to enhance communication, coordination, and cooperation between federal, state, and local government agencies representing the intelligence, law enforcement, defense, diplomatic, public safety, transportation, and homeland security communities by providing a point of fusion for terrorism intelligence and by supporting the JTTFs throughout the United States.

- The NJTTF was established in July 2002 to serve as a coordinating mechanism with the FBI's partners.
- Forty-nine agencies are represented in the NJTTF, which has become a focal point for information sharing and the management of large-scale projects that involve multiple partners.

Operational Support

The JTTFs conduct their work in advance of terror-based events. The analysis conducted is intended to discover and prevent acts of terrorism from reaching maturity and execution. During an event the JTTFs would continue to monitor and analyze information looking for follow-on acts and additional information defining the attack. Following an event, efforts would transition to intelligence collection in support of criminal investigations and prosecution.

Authoritative Data

Data products developed by the JTTF would fall into classified and law enforcement sensitive environments. Only filtered information would be shared with the general emergency management community. Through representatives of the JTTF, information sharing would be established with the federal, state, and local communities supporting the aftermath of an event.

Specific Products

Products released from the JTTFs would include reports and filtered data. Anticipated products would be expected to include information on specific event details to include; impact details, immediate environmental safety issues, and any site closure details.

FEMA Integrated Public Alert and Warning System

Overview

Executive Order 13407 established as policy the requirement for the United States to have an effective, reliable, integrated, flexible, and comprehensive system to alert and warn the American people. FEMA is designated within the Department of Homeland Security to implement this policy of the United States for a public alert and warning system as outlined in Executive Order 13407 and has established a program office to implement Integrated Public Alert and Warning System (IPAWS). FEMA and its federal partners, the Federal Communications Commission (FCC), the NOAA NWS, and the DHS Science and Technology Directorate (DHS S&T), are working together to transform the national alert and warning system to enable rapid dissemination of authenticated

Table 3–6: Authoritative Data – Prevention Mission – FEMA Radiological Emergency Preparedness Program

Sub Category	Theme	Type	POC
Event Impact			
Evacuation	REP Nuclear Evacuation Routes	Polyline	DHS/FEMA
Evacuation	REP Relocation Areas	Polygon	DHS/FEMA
Event Location	REP Modeled Plume	Polygon	DHS/FEMA
Man-Made Hazards			
Emergency Warning	REP Emergency Planning Zone (EPZ) – Plume Exposure (10 miles)	Polygon	DHS/FEMA
Emergency Warning	REP Emergency Planning Zone (EPZ) – Ingestion Pathway (50 miles)	Polygon	DHS/FEMA

alert information over as many communications channels as possible.

During an emergency, alert and warning officials need to provide the public with lifesaving information quickly, regardless of what communications technologies they use. IPAWS is a modernization and integration of the nation's alert and warning infrastructure, integrating new and existing public alert and warning systems and technologies from federal, state, territorial, tribal, and local governments. The system is intended to provide a broader range of message options and communications pathways for the delivery of alert and warning information to the American people before, during, and after a disaster.

Operational Support

In support of emergency incidents, IPAWS serves as the federal communication channel for emergency alerts and messaging. This information may originate with federal, state, and/or local government officials, reaching out to the citizens with urgent messages. The system provides coverage to 90% of the American public through broadcast stations [Primary Entry Points (PEP)] located throughout the country with a direct connection to resilient transmission capabilities. These stations provide the initial broadcast of a Presidential Emergency Alert System (EAS) message directly to any mobile device within range of particular cellular communications towers.

With the mission to provide integrated services and capabilities to local, state, and federal authorities that enable them to alert and warn their respective communities via multiple communications methods, the public can expect the expansion of alert notifications technologies through current technologies. This process will disseminate information quickly in an automated manner, allowing critical crisis management resources to focus notification efforts on areas outside the messaging reach.

Authoritative Data

(see Table 3–23)

Specific Products

The Commercial Mobile Alert System (CMAS) is one of the major components of the IPAWS. The CMAS component will provide an interface to participating cellular mobile service providers for delivery of critical alert information to mobile devices in a danger zone. Specifically, the IPAWS CMAS capability will provide federal, state, territorial, tribal and local government officials the ability to send 90 character, geographically targeted text alerts to the public, warning of imminent threats to life and property. The cellular industry, the FCC, and DHS S&T are critical partners with FEMA in developing this new alerting capability. The initial requirements of the system were developed by an advisory committee established by the FCC in accordance with the Warning, Alert and Response Network ("WARN") Act of 2006. The Commercial Mobile Service Alert Advisory Committee (CMSAAC) conducted meetings during 2008 with findings published in three FCC Report and Order documents.

NOAA is developing the Geo-Targeted Alerting System (GTAS) in partnership with IPAWS for plume modeling and collaboration. GTAS will quickly estimate the affected area during a HAZMAT incident using current weather conditions and allow for the rapid creation of a CAP message for public alerting. GTAS also provides collaboration tools for emergency managers to leverage the expertise of their supporting NWS Weather Forecast Office.

Fusion Centers

Overview

The Fusion Center is a dedicated element, run by the applicable state or local jurisdiction, that exchanges information and intelligence, maximizes resources, streamlines operations, and improves the ability to disrupt, prevent, respond to, and recover from all threats by analyzing data from a variety of sources. This center is defined as a "collaborative effort of two or more agencies that provide resources, expertise, and information to the center with the goal of maximizing a center's ability to detect, prevent, investigate, and respond to criminal and terrorist activity." They focus primarily on the intelligence and fusion processes through which information is gathered, integrated, evaluated, analyzed, and disseminated. State and major urban area fusion centers provide analysis and information-sharing capabilities that support the efforts of state and local law enforcement to prevent and investigate crime and terrorism. Fusion centers receive information from a variety of sources, including state and local tips and leads as well as federal information and intelligence. By "fusing" information from a wide variety of disciplines to conduct analysis, fusion centers generate products that are timely and relevant to their customers' needs. This allows state and local

Table 3–7: Authoritative Data – Protection Mission – FEMA Integrated Public Alert and Warning System

Sub Category	Theme	Type	POC
Telecommunications			
Broadcasting	IPAWS Coverage Areas (Messaging Type)	Polygon	DHS/FEMA
Broadcasting	Primary Entry Points (PEP)	Point	DHS/FEMA

law enforcement to address immediate and emerging threat-related circumstances and events. It also supports risk-based, information-driven prevention, response, and consequence management.

- As of January 2011, there are 72 designated fusion centers (50 state and 22 major urban areas).
- Fusion centers are designed to involve every level and discipline of government, private-sector entities, and the public—though the level of involvement of some participants will vary.
- Fusion centers are state and locally owned and operated. The Department of Homeland Security (DHS) has a statutory program to support fusion centers.

Operational Support

The Fusion Centers interact directly with federal, state, and local law enforcement communities. With representation from many different government communities, information is pulled from their entities for collaborative analysis and information is then shared across all mission partners. The majority of their work is preformed prior to any event occurring.

Authoritative Data

The information shared by the fusion centers comes through various reports, predominately internal.

Specific Products

Information provided by the Fusion Centers following an event would be minimal as the majority of Law Enforcement activities would be led by the appropriate authority. Products developed at this level would be distributed directly by the responsible parties.

3.3 Mitigation Mission

Mitigation efforts aim to minimize future hazard impacts following disaster events. Through structural (e.g., earthquake retrofitting and levee construction) or nonstructural efforts (e.g., building codes and land-use planning), future losses to lives and property are reduced and/or avoided for anticipated disaster events.

FEMA Building Science

Overview

The Building Science Branch is a technical services bureau made up of highly skilled SMEs, which develops and produces technical guidance and tools focused on fostering a disaster resilient built environment. Located within the FEMA Federal Insurance and Mitigation Administration's (FIMA's) Risk Reduction Division, the Building Science Branch supports the directorate's mission to reduce risk to life and property by providing state-of-the-art technical hazard mitigation solutions for buildings.

The Building Science branch develops mitigation guidance that focuses on creating disaster-resilient communities. Mitigation efforts provide value to the American people by creating safer communities and reducing loss of life and property. The Building Science activities provide technical support to public and private sector to support the development and adoption of model building codes and standards. An example of a past success has been the provision of state-of-the-art guidance for the construction of community and residential safe rooms to help protect people in their homes, public buildings, and schools in hurricane and tornado-prone areas.

Operational Support

In support of long-term recovery efforts following an event, FEMA's Building Science Branch supports the development of community-based recovery advisories that incorporate the most up-to-date building codes, flood proofing requirements, seismic design standards, and wind-bracing requirements for new construction or repair of existing buildings. The Building Sciences Branch also manages the MATs, which are deployed to disaster sites to assess and document disaster impacts on buildings, lifelines, and essential facilities.

Authoritative Data

Authoritative data is based on the specific mitigation activities that the Building Science Branch is investigating and is directly attached to the individual communities they are supporting.

Specific Products

Building Science Branch data varies depending on the focus of their studies to include information created for the MATs (assess the performance of mitigation activities post event, assess the performance of critical facilities, and evaluate the level of damage for the areas performing building assessment), hazard mitigation plans, and various technical support.

FEMA Community Rating System

Overview

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions related to reduce flood losses, providing accurate insurance ratings, and promoting the awareness of flood insurance.

Operational Support

The CRS community data layer will be used during an event to identify the CRS communities to evaluate how the floodplain mitigation activities performed during the event.

Authoritative Data

(see Table 3–8)

Specific Products

The CRS data layer contains both CRS community polygon boundary and the CRS rating identifications.

FEMA Flood Mitigation Assistance Program

Overview

Under the Flood Mitigation Assistance (FMA) program, FEMA provides grant funding to assist states and local communities in implementing measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the NFIP. Funding includes Planning Grants to prepare Flood Mitigation Plans and Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures.

Operational Support

Following an event, the project/property locations can be utilized for identifying high-risk areas. The FMA program does not have an active post-event role outside of long-term recovery efforts.

Authoritative Data

(see Table 3–9)

Specific Products

FEMA's FMA data is not widely available outside the program management. The program develops map products identifying specific property locations in relationship to the Special Flood Hazard Area. These products are available through special request to FEMA.

Table 3–8: Authoritative Data – Mitigation Mission – FEMA Community Rating System

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Reduction	CRS Communities	Polygon	DHS/FEMA

Table 3–9: Authoritative Data – Mitigation Mission – FEMA Flood Mitigation Assistance Program

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Reduction	FMA Project Locations	Point	DHS/FEMA
Risk Reduction	FMA Property Locations	Point	DHS/FEMA

FEMA Hazard Mitigation Grant Program

Overview

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster.

HMGP funds may be used to fund projects that will reduce or eliminate the losses from future disasters. Projects must provide a long-term solution to a problem, such as elevating a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage.

Operational Support

HMGP funding is only available to applicants that reside within a presidentially declared disaster area. Eligible applicants are state and local governments, Indian tribes or other tribal organizations, and certain non-profit organizations.

Following an event, the state prioritizes and selects project applications developed and submitted by local jurisdictions. The state forwards applications consistent with state mitigation planning objectives to FEMA for eligibility review. Funding for this grant program is limited and states and local communities must make difficult decisions as to the most effective use of grant funds.

Authoritative Data

(see Table 3–10)

Specific Products

The HMGP projects and property locations are often mapped based on mitigation type (acquisition, elevation, etc.). In addition, mitigation plans funded under HMGP grants generate data by specific projects which can include, but are not limited to:

- Acquisition of real property for willing sellers and demolition or relocation of buildings to convert the property to open space use
- Retrofitting structures and facilities to minimize damages from high winds, earthquake, flood, wildfire, or other natural hazards
- Elevation of flood prone structures
- Development and initial implementation of vegetative management programs
- Minor flood control projects that do not duplicate the flood prevention activities of other federal agencies
- Localized flood control projects, such as certain ring levees and floodwall systems that are designed specifically to protect critical facilities
- Post-disaster building code related activities that support building code officials during the reconstruction process.

Best Practices - ENVAS for Environmental Assessments

FEMA Region X serves the states of Alaska, Idaho, Oregon, and Washington. The Environmental Program is an important part of this FEMA regional organization whose mission is to ensure that FEMA's activities (including disaster response, recovery, and hazard mitigation) are carried out in a manner consistent with national environmental policies, i.e. with minimum adverse environmental impacts.

The FEMA Region X Environmental Program is leading the way to expediting and enhancing the environmental review process using geospatial technology. They have designed and implemented the ENVAS (Environmental Assessment) GIS Application project with the following benefits:

- It provides an integrated and comprehensive GIS database and intuitive user interface system that queries data provided by various state and federal agencies all in one application.
- It provides a coordinated overview of potential environmental concerns associated with repair or reconstruction projects.
- It provides automated reports and mapping on common issues including endangered species, wetlands and streams, archaeological and cultural resources, and others. The map can be generated using USGS topographic maps or USGS aerial photography as a base mapping layer.
- It allows FEMA staff to screen disaster funding requests quickly for environmental concerns and develop appropriate responses to aid coordination with federal and state resource agencies, permitting entities, and local jurisdictions.
- It ultimately facilitates a more efficient recovery response and repair of affected infrastructure.

The ENVAS GIS Application has a very simple function—it allows various FEMA users to select or define a potential or real disaster area and produce automated reports with maps listing all the environmentally sensitive resources within a specified buffer around the area. Prior to the implementation of the Environmental Assessment tool (ENVAS), this task would take several hours and sometimes days to compile information from various databases and coordinate with GIS specialists to produce maps. Using the ENVAS GIS application also allows non-technical users to produce useful reports within a few minutes.

ENVAS serves as a good example of how the implementation of relatively inexpensive technology, designed with careful consideration for users and business processes, can go a long way to improving the efficiency and quality of service for an organization and inter-governmental coordination efforts. The application has been used in Region X since 2004 and has been revised through several desktop versions into its current web-based version. Because of their dedication to serving the customer based needs for GIS, Region X has been designated as a center of excellence within FEMA.

Table 3–10: Authoritative Data – Mitigation Mission – FEMA Hazard Mitigation Grant Program

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Reduction	HMGP Project Locations	Point	DHS/FEMA
Risk Reduction	HMGP Property Locations	Point	DHS/FEMA

FEMA HAZUS Program

Overview

HAZUS is a nationally applicable standardized-based model for estimating potential losses from earthquakes, floods, and hurricanes. Developed by FEMA, HAZUS uses GIS technology to estimate physical, economic, and social impacts 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.

Operational Support

For the past decade, 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. HAZUS 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:

- **Earthquake:** 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 ground shaking 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.
- **Hurricane:** 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.
- **Flood:** 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.

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.

Authoritative Data

FEMA is the authoritative source for modeled runs and results following real events. ***(see Table 3–11)***

Specific Products

HAZUS is a hazards model available at no cost to the emergency management community and is delivered on multiple DVDs. 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).

Table 3–11: Authoritative Data – Mitigation Mission – FEMA HAZUS Program

Sub Category	Theme	Type	POC
Risk Analysis	HAZUS Modeled Scenario Results	Point	DHS/FEMA
Risk Analysis	HAZUS Modeled Scenario Results	Polygon	DHS/FEMA

FEMA Map Modernization Program

Overview

The focus of FEMA's Map Modernization Program is Risk MAP, which combines flood hazard mapping, risk assessment tools, and mitigation planning into one program. This program integration 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.

Operational Support

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.

Authoritative Data

(see Table 3–12)

Specific Products

The Map Modernization Program continues to generate products and data across the U.S. These 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).

Table 3–12: Authoritative Data – Mitigation Mission – FEMA Map Modernization Program

Sub Category	Theme	Type	POC
Base Map			
Elevation	High resolution digital elevation	Polygon	DHS/FEMA
Natural Hazards			
Risk Analysis	Q3Flood Hazard Data	Polygon	DHS/FEMA
Risk Analysis	FIRM Flood Hazard Data	Line	DHS/FEMA
Risk Analysis	FIRM Flood Hazard Data	Point	DHS/FEMA
Risk Analysis	FIRM Flood Hazard Data	Polygon	DHS/FEMA
Risk Analysis	Firmettes	Raster	DHS/FEMA
Risk Analysis	National Flood Risk	Raster	DHS/FEMA

Table 3–13: Authoritative Data – Mitigation Mission – FEMA Mitigation Planning

Sub Category	Theme	Type	POC
Risk Analysis	Community Hazard Boundaries	Polygon	DHS/FEMA
Risk Analysis	Types and numbers of existing and future buildings, infrastructure and critical facilities in the hazard areas	Point	DHS/FEMA

FEMA Mitigation Planning

Overview

FEMA's Multi-Hazard Mitigation Planning provides guidance and technical assistance to states and communities in the development of 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.

Operational Support

Data and analysis contained in state and local hazard mitigation plans can be utilized to support Recovery ESFs, including ESF #14 (Long-Term Community).

Authoritative Data

(see Table 3–13 on page 50)

Specific Products

Through the mitigation planning process, state and local mitigation plans are submitted and held by FEMA. These plans include hazards analysis, inventories of community assets (residential and commercial buildings, essential facilities police, fire, medical, schools, EOC) and utilities (power, gas, water), risk assessment studies, demographics analysis, and specialized studies of high potential loss facilities.

Best Practices - Flood Inundation Mapper

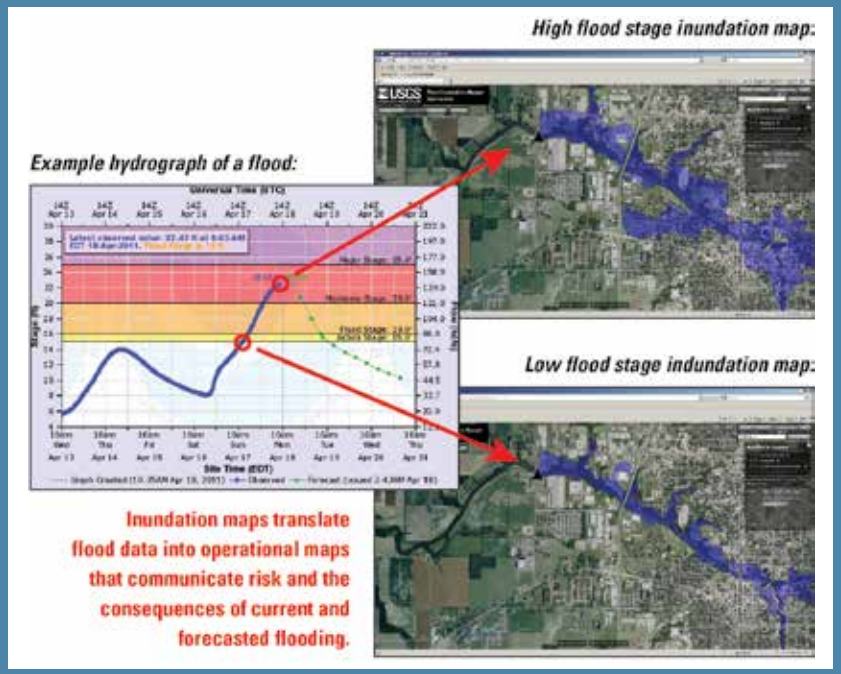
The USGS Flood Inundation Mapper (FIM) combines flood inundation static map libraries with real-time USGS river-level data and NWS flood forecasts into a powerful tool that helps communicate flood risk and when and where it may flood, and allows for better tools to inform local responses that can protect lives and property.

The flood inundation map library contains a series of sequential maps that help communicate where flooding may occur over a range of river levels. The library can be connected to real-time and forecasted river levels to help communities identify immediate risks during a flood. These products provide key information to assist in making quick and informed decisions about when and how to evacuate residents threatened by rising floodwaters. Emergency managers can utilize the interactive tool to better focus flood response and recovery efforts. Additional information about the USGS FIM program can be found here:

http://water.usgs.gov/osw/flood_inundation/

Storm Surge Temporary Monitoring Equipment

In addition to the FIM Mapper program, the USGS has developed and deploys a mobile storm surge monitoring network to provide detailed time-series data for selected hurricane landfalls (URL: http://water.usgs.gov/waterwatch/hsss/) as the timing, magnitude, and duration are critical to accurately measure hurricane storm surge. As part of this program, water level, and barometric pressure sensors are deployed to areas of hurricane landfall to create a concentrated network of as many as 80 temporary storm surge gauges along water channels and throughout nearby overland features such as beaches, barrier islands, wetlands, and constructed environments. When deployed, these sensors typically collect data every 30 seconds for 24–48 hours before hurricane landfall and for as long as two weeks following. The data generated by these temporary monitors can lead to improvements in the design of bridges, dams, levees, and other infrastructure, aid the delineation of flood-plain boundaries and evacuation routes, and serve as the basis for informed land-use planning.



Flood Inundation Mapper Tool

FEMA National Dam Safety Program

Overview

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.

Operational Support

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.

Authoritative Data

(see Table 3–14)

Specific Products

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.

FEMA National Earthquake Hazards Reduction Program

Overview

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.

Operational Support

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

Authoritative Data

(see Table 3–15)

Table 3–14: Authoritative Data – Mitigation Mission – FEMA National Dam Safety Program

Sub Category	Theme	Type	POC
Dams			
Dams	National Dams	Point	DHS/FEMA
Natural Hazards			
Risk Analysis	Levee Accreditation	Polygon	DHS/FEMA
Risk Analysis	Dam Inundation Areas	Polygon	DHS/FEMA

Table 3–15: Authoritative Data – Mitigation Mission – FEMA National Earthquake Hazards Reduction Program

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Reduction	Seismic Impact Assessments of Critical Infrastructure	Point	DHS/FEMA

Specific 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.

FEMA Pre-Disaster Mitigation

Overview

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

Operational Support

The focus of the PDM program is on pre-disaster activities.

Authoritative Data

(see Table 3–16)

Specific Products

PDM data is focused at managing the locations of projects and properties funded by their grants. In addition to the geospatial data, details are maintained by project and available by request.

FEMA Repetitive Flood Claims

Overview

The Repetitive Flood Claims (RFC) grant program provides funding to reduce or eliminate the long-term risk of flood damage to structures insured under the NFIP that have had one or more claim payment(s) for flood damages. The long-term goal of the program is to reduce or eliminate the number reoccurring flood insurance claims, through mitigation activities that are in the best interest of the National Flood Insurance Fund (NFIF).

The RFC program provides property owners who are not eligible for FMA funds with an opportunity to mitigate future losses to their property. All RFC grants are eligible for up to 100 percent federal cost assistance and are awarded to applicants on a nationwide basis without reference to date allocations, quotas, or other formula-based allocations.

Operational Support

Up to $10 million is available annually for FEMA to provide RFC funds to assist states and communities reduce flood damages to insured properties that have had one or more claims to the NFIP. In the recovery phases following a flood-related event, the program provides grant funding to assist property owners in repairing properties in a manner that will reduce future losses to the structures.

Authoritative Data

(see Table 3–17)

Specific Products

RFC stores data related to projects and properties. While this information is not widely available outside the program management, there are map products available for the authoritative data listed above as well as a database that stores the project information.

Table 3–16: Authoritative Data – Mitigation Mission – FEMA Pre-Disaster Mitigation

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Reduction	PDM Project Locations	Point	DHS/FEMA
Risk Reduction	PDM Property Locations	Point	DHS/FEMA

Table 3–17: Authoritative Data – Mitigation Mission – FEMA Repetitive Flood Claims

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Reduction	RFC Project Locations	Point	DHS/FEMA
Risk Reduction	RFC Project Locations	Point	DHS/FEMA

FEMA Risk Insurance Division

Overview

The Risk Insurance Division helps reduce flood losses by providing affordable flood insurance for property owners and by encouraging communities to adopt and enforce floodplain management regulations that mitigate the effects of flooding on new and improved structures. The division manages the NFIP, which works closely with 90 private insurance companies to offer flood insurance to property owners and renters. In order to qualify for flood insurance, a community must join the NFIP and agree to enforce sound floodplain management standards.

The Risk Insurance Division also manages the Coastal Barriers Resource System, which is a database of information related to coastal barriers and is contained on a Flood Insurance Rate Map.

Operational Support

The Risk Insurance Division does not provide operational support to FEMA under the NRF.

Authoritative Data

(see Table 3–18)

Specific Products

A Toolkit has been developed for communities and homeowners to address the identification of flood risk and protective measures. The NFIP Levee Toolkit includes geographically referenced information on levees across the U.S. and steps to take to protect homes and communities from levee failure.

FEMA Severe Repetitive Loss

Overview

The Severe Repetitive Loss (SRL) grant program funds the acquisition of severe repetitive loss properties, as well as non-residential properties that meet the same claims. The overall effort is to reduce or eliminate claims under the NFIP through project activities that will result in the greatest savings to the National Flood Insurance Fund (NFIF). In order for a property to meet the SRL designation, it must be insured under the NFIP and have incurred flood losses that resulted in either:

- Four or more flood insurance claims exceeding $5,000, with at least two of those payments occurring in a 10-year period, and with the total claims paid exceeding $20,000; or
- Two or more flood insurance claims payments that together exceeded the value of the property.

Acquisitions include the demolition or relocation of flood-prone structures and deed restricting the vacant land to open space uses in perpetuity. Awards will be prioritized to those projects that mitigate SRL properties and to those that create the greatest savings to the NFIF based on a benefit-cost analysis.

Operational Support

The SRL program supports long-term recovery activates following a flood-related event with properties meeting the threshold requirements due to the current disaster. SRL provides the most significant property-specific mitigation measures by eliminating future losses for given geographic area.

Authoritative Data

(see Table 3–19)

Specific Products

SRL stores data specific to the properties it has funded. FEMA preforms field data collection to include GPS coordinates and additional sire-specific details for the management of their program.

NIST Disaster Failures and Studies Program

Overview

The NIST Disaster and Failure Studies Program provides national coordination for field data collection and scientific and technical studies. The findings promote the implementation of study

Table 3–18: Authoritative Data – Mitigation Mission – FEMA Risk Insurance Division

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Analysis	NFIP Community Identification Number	Point	DHS/FEMA
Risk Analysis	Coastal Barriers	Polyline	DHS/FEMA

Table 3–19: Authoritative Data – Mitigation Mission – FEMA Severe Repetitive Loss

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Reduction	SRL Property Locations	Point	DHS/FEMA

recommendations both to improve building and fire codes, standards, and practices and to fill gaps in knowledge about buildings and infrastructure performance, emergency response, and human behavior in hazard events.

Typical study objectives include:

- Establishing the likely technical factor or factors responsible for the damage, failure, and/or successful performance of buildings and/or infrastructure in the aftermath of a disaster or failure event
- Evaluating the technical aspects of evacuation and emergency response procedures that contributed to the extent of injuries and fatalities sustained during the event
- Determining the procedures and practices that were used in the design, construction, operation, and maintenance of the buildings and/or infrastructure
- Promoting, enabling, and tracking the adoption of recommendations through improved standards, codes, and practices as well as any research and other appropriate actions based on study findings.

Study objectives aimed to establish likely technical factors responsible for the damage, failure, and/or successful performance of buildings and/or infrastructure in the aftermath of a disaster or failure event. These evaluate the technical aspects of evacuation and emergency response procedures that contributed to the extent of injuries and fatalities sustained during the event. Through the determination of procedures and practices utilized in the design, construction, operation, and maintenance of the buildings and/or infrastructure, improved standards, codes, and practices are promoted.

Operational Support

Following a building failure that has resulted in substantial loss of life, NIST teams are authorized to assess building performance and emergency response and evacuation procedures for the structure(s). In support of disaster operations, NIST may access or develop a database of disaster and failure events, including: performance of the built environment (buildings and infrastructure) during hazard events, associated emergency response and evacuation procedures, and technical, economic, and social factors that affect pre-disaster mitigation activities and post-disaster response efforts.

Authoritative Data

(see Table 3–20)

Specific Products

Post-event reporting may be available during response and recovery operations. These materials may include:

- Data and documents on the evacuation and emergency response procedures during the event
- Sequence of contributing factors and timeline of event outcomes or consequences
- Reports, papers, and other publications that document the findings, conclusions, and recommendations of the technical studies
- Information on changes to standards, codes, and practices based on recommendations.

Table 3–20: Authoritative Data – Mitigation Mission – NIST Disaster Failures and Studies Program

Sub Category	Theme	Type	POC
Natural Hazards			
Risk Analysis	Building performance	Point	NIST
Risk Analysis	Lifeline performance	Polyline	NIST
Risk Analysis	Emergency response and evacuation analysis	Point	NIST

3.4 Recovery Mission

Recovery efforts begin immediately following an event. This section focuses on three urgent recovery activities: debris volume analysis and management (FEMA PA), efforts to expedite the delivery of financial assistance to impacted individuals (FEMA IA), and post-disaster efforts including flood recovery maps and advisory base flood elevations (FEMA Mitigation). These activities provide much-needed assistance to communities affected by disaster events, allowing the citizens to recover as quickly as possible.

FEMA Public Assistance

Overview

FEMA's PA program has many responsibilities, one of which is the clearing and removal of debris. These operations require valid estimates of debris volume and transparent strategies for managing the removal efforts. In addition, debris such as hazardous containers, vehicles, and deceased livestock must be removed quickly to minimize their negative impact on the environment and communities.

Geospatial technologies assist in recovery efforts by providing spatial estimates of debris volumes before an event to support preplanning efforts and again immediately following the event to continue assisting the management of the debris removal efforts. Debris removal can account for 25 to 50 percent of the overall recovery costs and must be effectively managed to keep the expense to a minimum.

Best Practices - USACE Commodities Model

When required, USACE leads missions for providing water and ice to citizens immediately following disaster event. The USACE has developed a Commodities Model to assist in estimating their mission requirements. Model estimates are developed and posted on ENGLink public website (http://www.englink.usace.army.mil). For hurricane events, timing of the release of model results is dependent on critical information provided by the NHC or Central Pacific Hurricane Center (CPHC), depending on storm event.

The model is based on population and an estimated "percent of population" likely to be without power and require commodities. This "percent of population" is based on estimated power outages. The factor changes with forecasted storm intensity. The USACE supports the commodity teams as much as ten days post landfall to provide projections of commodity needs and help them with "burn rates" and commodity ordering.

The model outputs provided include maps depicting amount of commodities required for the event and tables that detail the amount of water and ice needed per day. This information provides emergency managers with an estimate of how many commodities to order and is used to help communities determine the number of POD sites for water and ice as well as their optimal distribution locations.

There are two major areas where geospatial technologies provide immediate support for the debris missions under FEMA's PA program: volume estimation and mission management. While there are additional missions and geospatial activities within PA, this section is focused specifically on the debris mission.

Debris modeling is accomplished through several modeling applications. The use of these models varies with the event, locations, and magnitude of damages. These models are used to predict debris volumes resulting from wind events and factor in variables such as area demographics (housing, population, etc.), estimated storm intensity, and predicted areas of impact. These pre-event debris models provide a basis for planning response and recovery activities but may vary in accuracy when compared to the measured amount of debris actually generated from an event. Efforts to collect debris information in the field provide validation of initial estimations and bring clarity to the debris management requirements as a result of the event. Using field teams and sampling methodologies, improved estimations can be derived to support the continued removal efforts.

The management of the debris mission is driven by geography. Management efforts include tracking the debris locations on streets, recording the measured amounts of debris delivered to staging areas, and reporting the overall status of the debris mission to leadership.

Operational Support

Geospatial support for debris removal efforts is typically performed at the FEMA JFO. Staff deploy from locations around the country to collect field data, perform geospatial analysis, and produce map products as needed. Off-site support can be added as required and may consist of geospatial modeling activities and imagery interpretation.

FEMA supports the geospatial requirements for the debris mission with FEMA staff, Technical Assistance Contractors (TAC), and MA to the USACE. During the debris removal operations, the debris haulers may use geospatial programs to track the progress of debris removal along streets and may have their own programs or private contractors to assist them with this effort.

Authoritative Data

The authoritative data sets generated by the debris mission are focused in scope and quickly outdated. The debris removal mission is constantly evolving as roads are cleared, additional debris is identified, and materials are removed. In addition, specific data is maintained supporting the management and status reporting of the overall operations. ***(see Table 3–21)***

Specific Products

With the mixture of products supporting the debris mission generated by FEMA and USACE as well as products originating from several loss models, there is no single standard for layout or symbology within the debris mission. Below are several examples of the products supporting the PA debris mission:

Loss Modeling

- USACE: debris volume
- HAZUS: debris volume, debris type, impacted population, estimates of FEMA applicants

Table 3–21: Authoritative Data - Recovery Mission - Public Assistance

Sub Category	Theme	Type	Delay	POC
Emergency Services				
Emergency Management	FEMA Debris Removal Metrics	Polygon	10 day	FEMA PA/USACE
	FEMA Debris Volume Estimates	Polygon	4 day	FEMA PA/USACE
	FEMA PA Applicant Locations	Point	6 day	FEMA PA
	FEMA PA Deployed Assets	Point	4 day	FEMA PA
	FEMA PA Project Locations	Point	12 day	FEMA PA

Field Data Collection

- County maps depicting the PDA debris estimates
- Debris site locations visited during field data collection

Management and Removal

- Area maps displaying statistics on debris removal efforts (volume removed vs. estimate). Amounts are either obtained from the debris teams or from the Debris Removal Tracking System (DRTS) located within the Resource Information Management System (RIMS)
- Products tracking debris removal efforts on roads
- Private property debris removal (PPDR) progress
- Tree stump tracking
- Debris tracking in waterways (barges, trees, boats, cars, etc.)

Individual Assistance

Overview

The FEMA IA program provides financial and emergency housing assistance to individuals, families, and businesses that have been impacted by a federally declared disaster. In support of the IA program, geospatial technologies assist in determining the spatial boundaries of damaged areas, assess the nature and scope of damages to housing units and occupants, and estimate the quantities of individuals requiring assistance. Several IA GIS initiatives are underway to integrate and optimize geospatial data and analyses to improve efficiencies and accuracy in estimating IA requirements, particularly for large-scale disasters where reliance on field housing inspections is logistically impractical or costly.

The program uses imagery and modeling in conjunction with other geospatial technologies to assess the nature and scope of residential damage from major disasters. FEMA IA protocols have been established for gathering and analyzing imagery to support IA missions, including post-disaster housing inspections. Damage polygons are derived from aerial photography and used to delineate structures that are destroyed or substantially damaged, based on specified criteria for residential damage states. This process supports a mechanism for processing payments in an expedited manner for applicants in geographic areas that have sustained major or catastrophic damage. A Rapid Damage Assessment (RDA) database of historical awards based on foundations types and High Water Marks is used in conjunction with imagery analysis in the National Emergency Management Information System (NEMIS) GIS processing.

HAZUS modeling is used to delineate the spatial boundaries of floods, hurricanes (wind), and earthquakes (liquefaction, ground shaking, ground deformation), which can be used to identify potential areas of operations, population at risk, characteristics of housing stock within the impacted area, and estimates of residential losses. As a regional loss estimation tool, HAZUS outputs are most reliable at the county or multicounty scale.

In assessing residential damage, Light Detection and Ranging (LIDAR) data is used to establish base elevations (bare earth) of structures. River gauge data (flood stage levels) is then incorporated to estimate flood depth and the extent of potential flooded areas. The derived flood depth grids can then be used by the IA program to assess and delineate residential damages following an event.

Operational Support

The following FEMA entities have a role in the production and application of geospatial data and technologies to support the IA mission:

- FEMA MAC provides geospatial support.
- Disaster Assistance Support Center (DASC) provides policy and program guidance and establishes priorities for data collection and analysis.
- Geospatial Intelligence Unit (GIU) provides geospatial technical support at the JFO, including GIS products and analysis that supports the IA mission.

Virginia National Processing Support Center (VA-NPSC) manages the geospatial processing of IA

Best Practices - FEMA Region VI Field Data Collection Tool

FEMA's process for data collection and reporting associated with debris assessment consisted primarily of handwritten documentation with little standardization of data captured. Historically this has resulted in information processing delays, transcription errors, duplication of collected data records, and, ultimately, the inability to provide accurate and expedited reimbursements to FEMA applicants.

In response to these issues, FEMA Region VI initiated a pilot effort to develop a Field Data Collection Tool to assist in managing the debris mission. The tool consists of GPS-enabled ruggedized tablet computer, the custom application, and a data management system. This facilitates the collection and distribution of information related to disaster response and recovery efforts. The tool is used as a method for capturing disaster specific information in the field in a digital environment. There are several modules within the application, but the primary use is to collect and display debris assessments. Users can automatically add GPS coordinates to features such as a debris pile type and volume, establish GPS-tracked linear debris estimates, and use GPS to monitor the geographic footprint of their activities. Users can roll up totals of debris estimates to various levels of aggregation, such as county or state level. This tool enables accurate data collection, while providing near real-time situational awareness, and "on demand" report generation.

Best Practices - FEMA Post Katrina Damage Assessment for Individual Assistance

In the aftermath of Hurricane Katrina, FEMA faced a significant challenge in identifying and quantifying the nature and scope of damage to residential structures. In response to this issue, FEMA developed a strategy to utilize post-event imagery and other geospatial analysis to assess residential losses.

To assess the feasibility of the strategy, FEMA conducted a study of four Louisiana parishes that used remote sensing, topography (Digital Elevation Model), ZIP Code, and parcel data to perform GIS analysis to estimate numbers of households by ZIP Code area that had experienced severe flooding. The geospatial process for catastrophic damage assessment was extended to coastal counties in Mississippi and Alabama and Florida counties that sustained damage from Hurricane Wilma.

The findings from the study included:

- In large-scale events, geospatial analysis is a cost-effective approach to housing damage assessment.
- Geospatial readiness is a direct function of the availability of data acquisition and analysis contracts, and data "pre-staging," which includes pre-event identification of necessary base and analysis data (ZIP Code areas, LIDAR, tax parcel records, NGA HSIP Gold data).
- Models are valuable in delineating spatial boundaries of damage and housing loss and in establishing priorities for more detailed housing inspections.
- Technical clearinghouses are very useful "integrators" of geospatial technologies and expertise.

Following Katrina, approximately 150,000 homes were analyzed and classified using geospatial tools. Post-Katrina analysis indicated that less than 10 percent of homes surveyed using geospatial technology were incorrectly classified, due largely to issues associated with the use of ZIP Code areas for reporting purposes. The analysis proved to be statistically valid, cost effective, and timely, as compared to physical inspections.

applicants in NEMIS and the Contract Management and Housing Inspection Services (CMHIS). The FEMA NEMIS system stores IA applicant information and determines eligibility for IA payment awards following a declared disaster.

Multiple FEMA contracts have been used to support geospatial analysis of housing damage, response, and recovery. In addition to support for acquisition and analysis of imagery, contract support has been provided through the FEMA Mitigation Directorate for hazard impact analysis and a range of technical studies that contributed to the IA knowledge base of housing vulnerability and the performance of structures in scenario events. Technical support from the Mitigation Directorate is often channeled through technical clearinghouses, which are established following major disasters and provide researchers, contractors, and government agency personnel with a "laboratory" or clearinghouse for event-specific research, including the production and application of geospatial data and technologies.

Authoritative Data

Authoritative data sets for IA efforts to expedite services are illustrated below.
(see Table 3–22 on page 59)

Specific Products

Below are several examples of the products supporting the IA mission:

NRCC

- Demographic profiles
- Population and population density
- Housing units
- Median household income
- Median housing value
- Shelter locations and status

NRCC (MAC and RS Coordinator)

- HAZUS runs that provide estimates of spatial boundaries of hazards (wind, flood, surge)
- Damage area polygons
- Photographic records of dwellings
- ZIP code analysis

JFO GIU Maps and Reports

- Daily updates that display IA data and analysis
- Specialized studies

VA-NPSC

- GIS processed IA applications
- Housing inspection reports

Mitigation Directorate

- Damage functions (flooding, wind, ground shaking, etc.) for residential structures
- High Water Marks and other damage data

Early Mitigation Efforts

Overview

Early recovery efforts provide support to many urgent missions, including mitigation. Although mitigation efforts relate primarily to long-term projects, several activities are pursued as quickly as possible to expedite the recovery of hard-hit communities. These projects incorporate the collection of time-sensitive post-event geospatial data and close interaction with local governments to provide critical guidance for rebuilding. This section focuses on the mitigation efforts for flood-related events.

- **High Water Mark Collection.** Field observers and survey crews are deployed by FEMA to interview residents, find confirmation of high water levels, and capture supporting evidence of high water. These field crews collect detailed information about each High Water Mark, including physical basis of the mark, such as

a mud line inside the building, a mud line on the outside of the building, or debris. Wherever possible, crews also note the coastal flooding characteristics captured by coastal High Water Marks, including storm surge, wave run-up, and wave height. The survey crews use GPS methods to determine an accurate elevation for each high watermark. These locations have been surveyed to within accuracies of 0.25 foot vertically and 10 feet horizontally, with a 95 percent confidence level.

- **Storm Surge Inundation Mapping.** Flood inundation levels are created for the coastal communities by mapping the coastal High Water Mark elevations onto digital, pre-storm, topographic contour data developed from LIDAR surveys. These inundation levels represent an estimate of the inland extent of flooding caused by storm surge. The inundation limit is then refined to remove small-scale, isolated areas of inundated and non-inundated terrain based on knowledge of overland surge propagation and engineering judgment.
- **Advisory Base Flood Elevations (ABFE).** In larger flood events, ABFEs are developed to provide communities with initial recommended building elevations for use in the reconstruction process until more detailed data become available. ABFEs are based on a new flood frequency analysis that takes into account the immediate event as well as additional tide and storm data from other events that have occurred since the existing Flood Insurance Rate Maps (FIRM) were developed.

Operational Support

The FEMA Region and Disaster Support Branch at HQ serve as a central point of contact for coordinating disaster operations, cadre management (including GIS support), regional support, and overall Mitigation program coordination. Geospatial support activities for mitigation include:

- Staffing a Mitigation GIS Coordinator to be the liaison with the FEMA JFO GIU, FEMA HQ, and local operations
- Supporting the acquisition of pre- and post-disaster data collection and coordinating with appropriate mitigation programs.

The Mitigation Directorate's Program Coordination Group brings together representatives of key branches with geospatial expertise that can be applied in the recovery phase, including:

- Building Sciences Coordinator serves as the point of contact for the risk reduction and provides building science tools and guidance to support recovery
- Floodplain Management Coordinator provides geospatial data and relevant analysis to the NRCC Hazard and Mitigation (HM) Branch to support the mission
- Mapping Coordinator represents the Data and Dissemination Branch and Risk Analysis Division and provides geospatial data and analysis to support the mission.

Best Practices - Advisory Base Flood Elevations

Following Hurricanes Katrina and Rita in 2005, FEMA conducted a new flood frequency analysis and determined that current base elevations for many communities impacted by the storms were too low. To help communities reduce their vulnerability to damage from future flooding, FEMA issued ABFEs that incorporated data from Hurricane Katrina, as well as tide and storm data from other events during the preceding 25 years. The ABFEs were significantly higher than Base Flood Elevations (BFEs) shown on pre-Katrina flood maps, and more accurately reflected post-storm conditions.

FEMA issued ABFEs in areas where the effects of the 2005 storms significantly altered the floodplain, or demonstrated that the current BFEs were outdated. Since 2005, ABFEs have become an important tool in early disaster recovery to assess updated community vulnerabilities to flooding. Increasingly, key mitigation programs have tied eligibility for funding to adherence to elevations reflected in ABFEs.

Table 3–22: Authoritative Data - Recovery Mission - Individual Assistance

Sub Category	Theme	Type	Delay	POC
Emergency Services				
Emergency Management	FEMA IA Applicants	Point	48 hour	FEMA IA
	FEMA IA Expedited Assistance Areas	Polygon	3 day	FEMA IA

Table 3–23: Authoritative Data - Recovery Mission - Early Mitigation Efforts

Sub Category	Theme	Type	Delay	POC
Event Impact				
Event Location	High Water Depth	Polygon	4 day	FEMA Mitigation
	High Water Grid	Grid	4 day	FEMA Mitigation
	High Water Marks	Point	4 day	FEMA Mitigation/USGS

Authoritative Data

(see Table 3–23 on page 59)

Specific Products

These high resolution maps are designed to assist property owners in the repair or rebuilding of structures to newly determined advisory coastal flood elevations. Specific mitigation-based products include, but are not limited to:

- Recovery Maps
- High Water Marks
- Inundation levels
- FEMA's ABFEs
- Repetitive loss.

3.5 Response Mission

Lifesaving missions are intended to save lives and reduce casualties and can be initiated before, during, or immediately following an event. The efforts referenced here cover all aspects of lifesaving including SAR, evacuation, feeding, and critical medical support. Many of these activities are high-profile in the eyes of the government officials and emergency managers as well as the media and public.

It is imperative that the geospatial support entities stay agile, dynamic, self-contained, and fully prepared for the unknown. In most cases, there will be requirements for both on- and off-site support. The initial operations may be deployed prior to FEMA standing up a JFO and, therefore, the on-site staff may need to locate a suitable area to begin work.

Search and Rescue

Overview

SAR activities operate under the authority of FEMA and ESF #9 – SAR, in support of state and local authorities. SAR teams are organized within federal, state, and local government entities and spread across the country. The operational management is undertaken by Incident Management teams or similar functional groups and the tactical management is handled within the specific teams.

SAR services include the performance of distress monitoring, communications, location of distressed personnel, coordination, and execution of rescue operations. This includes extrication or evacuation along with the provisioning of medical assistance and civilian services through the use of public and private resources.

SAR rapidly deploys federal SAR resources to provide lifesaving assistance to state, tribal, and local authorities, to include local SAR Coordinators and Mission Coordinators, when there is an actual or anticipated request for federal SAR assistance. Under ESF #9, SAR is broken into three distinct disciplines:

- Structural Collapse (Urban) Search and Rescue (US&R)
- Maritime/Coastal/Waterborne SAR
- Land SAR

SAR services include distress monitoring, incident communications, locating distressed personnel, coordination, and execution of rescue operations including extrication and/or evacuation, along with providing medical assistance and civilian services through the use of public and private resources, to assist persons and property in potential or actual distress.

Structural Collapse (Urban) Search and Rescue (US&R)

Primary Agency: FEMA

US&R includes operations for natural and manmade disasters and catastrophic incidents, as well as other structural collapse operations that primarily require DHS/FEMA US&R task force (TF) operations. The National US&R Response System integrates DHS/FEMA US&R TFs, Incident Support Teams (ISTs), and technical specialists. The federal US&R response integrates DHS/FEMA TFs in support of unified SAR operations conducted following the U.S. National Search and Rescue Plan (NSP).

The National US&R Response System is prepared to deploy and initiate operations immediately in support of ESF #9. The TFs are staffed primarily by emergency services personnel who are trained and experienced in collapsed structure SAR operations and possess specialized expertise and equipment. Upon activation under the NRF, DHS/FEMA US&R TFs are considered federal assets under the Homeland Security Act of 2002, the Robert T. Stafford Disaster Relief and Emergency Assistance Act, and other applicable authorities.

Waterborne Search and Rescue

Primary Agency: DHS/USCG

Maritime/coastal/waterborne SAR includes operations for natural and manmade disasters that primarily require DHS/USCG air, cutter, boat, and response team operations. The federal maritime/coastal/waterborne SAR response integrates DHS/USCG resources in support of unified SAR operations conducted per the NSP.

DHS/USCG personnel are trained and experienced in maritime/coastal/waterborne SAR operations and possess specialized expertise, facilities, and equipment for conducting an effective response to distress situations. DHS/USCG develops, maintains, and operates rescue facilities for SAR in waters subject to U.S. jurisdiction and is designated the primary agency for maritime/coastal/waterborne SAR under ESF #9. In addition, DHS/USCG staffing at Area, District, and local Sector Command Centers promotes interagency coordination with state, tribal, and local emergency managers during incidents requiring a unified SAR response in which maritime/

coastal/waterborne SAR resources allocation are required.

Land Search and Rescue

Primary Agency: Department of the Interior (DOI)/ National Park Service (NPS)/Department of Defense (DoD)

Land SAR includes operations that require aviation and ground forces to meet mission objectives, other than maritime/coastal/waterborne and structural collapse SAR operations as described above. Land SAR primary agencies integrate their efforts to provide an array of diverse capabilities under ESF #9.

DOI/NPS possesses SAR resources that are specially trained to operate in various roles including ground search, small boat operations, swift water rescue, helo-aquatic rescue, and other technical rescue disciplines. DOI/NPS maintains preconfigured teams that include personnel and equipment from DOI/ NPS, U.S. Fish and Wildlife Service, USGS, Bureau of Indian Affairs, and other DOI components in planning for ESF #9.

When requested, DOD, through USNORTHCOM and/or U.S. Pacific Command (USPACOM), coordinates facilities, resources, and special capabilities that conduct and support air, land, and maritime SAR operations according to applicable directives, plans, guidelines, and agreements. Per the NSP, the U.S. Air Force and USPACOM provide resources for the organization and coordination of civil SAR services and operations within their assigned SAR regions and, when requested, to assist federal , state, tribal, and local authorities.

Operational Support

Geospatial support is provided through FEMA and can consist of individuals from FEMA, NGA, USFS, contractors, and others. The overall environment is very dynamic with large quantities of ad hoc requests

Table 3–24: Authoritative Data - Response Mission - SAR

Sub Category	Theme	Type	Delay	POC
Agriculture/Food				
Mobile Food	Mobile Commissary - Mobilized Locations	Point	48 hour	DOI/NIFC
	Mobile Food Unit - Mobilized Locations	Point	24 hour	DOI/NIFC
Emergency Services				
Emergency Management	FEMA SAR Metrics	Polygon	3 day	FEMA
	FEMA SAR Recovery	Point	24 hour	FEMA
	FEMA SAR Rescues	Point	48 hour	FEMA
	FEMA SAR Temporary Landing Zones	Point	48 hour	FEMA
	FEMA Search Grid (2 minute x 2 minute)	Polygon	24 hour	FEMA
	FEMA Search Grid (30 second x 30 second)	Polygon	24 hour	FEMA
	FEMA Search Management Sectors	Polygon	24 hour	FEMA
	FEMA US&R Search Status	Polygon	24 hour	FEMA
	FEMA US&R Search Targets	Point	24 hour	FEMA
	FEMA US&R Unsafe Areas	Polygon	48 hour	FEMA
Emergency Resources	FEMA US&R Equipment Cache Locations	Point	Immediate	FEMA
	Mobile Shower Facilities	Point	24 hour	DOI/NIFC
Field Operating Locations				
FEMA	Area Command/Unified Area Command Post	Point	24 hour	FEMA
	Incident Command Post (ICP)	Point	24 hour	FEMA
Specialized Response Teams				
DHS	Disaster Medical Assistance Team (DMAT) Locations	Point	48 hour	FEMA
	FEMA Incident Management Assistance Team (IMAT)	Point	24 hour	FEMA
	FEMA US&R Canine Teams	Point	3 day	FEMA
	FEMA US&R Incident Support Teams	Point	24 hour	FEMA
	FEMA US&R Teams (Deployed)	Point	24 hour	FEMA
	Incident Management Teams (IMTs) Federal Type 1 and Type 2	Point	48 hour	FEMA
	USCG Strike Teams	Point	24 hour	DHS/USCG
DoD	NGB WMD-Civil Support Team Deployed Locations	Point	48 hour	NGB (JFHQ-STATE)
	USACE Planning & Response Teams (PRTS)	Point	48 hour	DoD/USACE
Other Federal Agency	EPA Environmental Response Team (ERT)	Point	24 hour	EPA
	Mine Rescue Teams	Point	3 day	MSHA/MEO
State/Local	CBRNE Enhanced Response Force Package (CERF-P)	Point	24 hour	NGB
	Hazmat Emergency Response Units - Local	Point	48 hour	FEMA (State/Local)
	Search and Rescue Units - Local	Point	24 hour	FEMA (State/Local)

Best Practices - Search and Rescue Management

By the very nature of the SAR mission, geospatial tools support critical information requirements (CIRs) in the management of their operations. SAR activities are conducted at the ground-level (e.g., street, buildings) and are managed across the extent of the impacted area (e.g., multi-county, multi-state). Information identifying specific locations (points and areas) is tasked, collected, and acted upon with distinct references to the geography of the search area. The geospatial products supporting this mission are critical to the operational and tactical SAR operations. All products must maintain a simplicity allowing them to be replicated in color, black and white, and at worst drawn by hand.

In an effort to accommodate conflicting requirements for coordinate systems in printed map products, FEMA is working to develop a standard for FEMA operational maps using the USNG System (Memo dated May 28, 2009 from William L. Carwile, Assistant Administrator for Disaster Operations). This effort is intended to improve the overall effectiveness within FEMA by standardizing and streamlining operations.

Local Integration

Federal SAR resources are deployed in support of state and local operations. They provide a multitude of specialized plans, tools, techniques, and institutional knowledge adapted from other areas of expertise to assist in the SAR mission. These resources arrive on site, integrate with local emergency operations, and engage in the roles assigned to them. In doing this, event-specific strategies and standards are developed in effort to provide the most effective support to the operation.

Information tracking

The SAR mission is spatially defined and directed. Operational directives task resources to the field-level entities to undertake specific missions in specific areas. Tactical assignments are given in the field, referencing points and/or areas for action. Field-level activities are tasked and completed with their progress tracked and reported with spatial references to areas and locations. Reported information is then compiled into map-based products for presentation to the command staff for planning the next operational period.

Referencing points and areas

There are several predominate systems in place that support interoperability across SAR operations, most notably latitude and longitude and the USNG. SAR support entities are deployed from across the country and come together from many different disciplines. These groups and individuals may favor one system by default over another as their day-to-day non-disaster operations are often using one legacy system for their activities. The basic requirements for SAR related geospatial products are as follows:

- **Point Reference** - Provide options for USNG and latitude and longitude on all map products. This is accomplished through the inclusion of grids for both systems overlaid on all products (can be generated within most software platforms).
- **Area Reference** - Each SAR operation must define a system for managing search areas. This will be used for reporting, general area reference, and the generation of map-books and other geospatial products.

initially followed by frequent updates of event-specific standard products. The staffing positions are highly technical and fast-moving.

SAR activities require on-site geospatial support to meet the aggressive missions they are given. In past events e.g., 9/11 in New York City and Hurricane Katrina), the dedicated staff totaled over 20 individuals. In addition, field support can supplement the operations with appropriate duties. On-site (field) support includes map production, data collection, and mission-specific analysis. Fixed support can include imagery analysis and data processing.

To facilitate the simplified georeferencing across the country, the US National Grid (USNG) is utilized by many SAR resources for the sharing of key geospatial information. The USNG was developed to "create a more interoperable environment for location-based services and products within the United States." Additional information on the USNG can be found in ***Appendix G***.

Authoritative Data

SAR operations produce minimal authoritative data sets. Base data comes primarily from Homeland Security Infrastructure Program (HSIP) Gold and local sources collected on site. ***(see Table 3–14 on page 52)***

Specific Products

There are several standard products used for all SAR operations. In addition, each SAR area may have its own mission-specific products. These standards are always augmented by a multitude of ad hoc products focused at answering specific nonstandard questions. Some are "one-off" products and others evolve into standard products that are unique to the specific event.

SAR products include, but are not limited to:

Operational Management

- Mission Tracking
- Base of Operations
- Area Management
- Safety
- Resource Tracking
- Search Planning
- Flight Planning

Tactical Missions

- Search Tasking
- Search Status

- Transportation Plans

Critical Medical Support

Overview

Emergency Support Function #8 (ESF #8) – Public Health and Medical Services leads efforts to provide critical public health and medical support during disaster response activities. These services must be available immediately after an incident, when permanent resources and facilities are damaged or overwhelmed by the impact of the event. The efforts required cover all aspects of public health and medical needs from childbirth to food and water inspection to disease investigation and mitigation.

Critical medical services must be available to the affected individuals as well as the response workers. Services also cover the public health and medical needs of members of the "at risk" or "special needs" population as defined under the NRF. This section will not address veterinary medicine.

- **Patient Evacuations.** ESF #8 is responsible for transporting seriously ill or injured patients and medical needs populations from casualty collection points in the impacted area to designated reception facilities. ESF #8 may request DoD, VA, and FEMA, via the national ambulance contract, to provide support for evacuating seriously ill or injured patients. Support may include providing transportation assets, operating and staffing National Disaster Medical System (NDMS) Federal Coordination Centers, and processing and tracking patient movements from collection points to their final destination reception facilities.
- **Emergency Equipment/Supplies.** In addition to deploying assets from the SNS, ESF #8 may request DoD or the VA to provide durable medical equipment and supplies. These provisions include medical, diagnostic, and radiation-detecting devices as well as pharmaceuticals and biologic products. This provides support for immediate medical response operations and for restocking health care facilities in the impacted area.
- **Patient Care/Staffing Medical Facilities.** ESF #8 may task Department of Health and Human Services (DHHS) components to engage civil service personnel, the officers from the U.S. Public Health Service Commissioned Corps, the regional offices, and states to engage civilian volunteers and request the VA and DoD to provide available personnel to support pre-hospital triage and treatment, inpatient hospital care, outpatient services, pharmacy services, and dental care to survivors who are seriously ill, injured, or suffer from chronic illnesses who need evacuation assistance, regardless of location.
- **Medical Needs Assessments.** DHHS, in collaboration with DHS, mobilizes and deploys ESF #8 personnel to support national or regional teams to assess public health and medical needs, including the needs of at-risk population groups, such as language assistance services for limited English-proficient individuals and accommodations and services for individuals with disabilities. This function includes the assessment of the health care system/facility infrastructure.
- **Health Monitoring.** DHHS, in coordination with supporting departments and agencies, enhances existing surveillance systems to monitor the health of the general and medical needs population. DHHS carries out field studies and investigations monitoring injury and disease patterns, potential disease outbreaks, blood and blood product biovigilance, and blood supply levels. In addition, they provide technical assistance and consultations on disease and injury prevention and precautions.

Operational Support

The Emergency Management Group (EMG), operating from the DHHS Secretary's Operations Center (SOC), coordinates the overall national ESF #8 response and maintains constant communications with the NOC. All HQ and regional organizations participating in response operations report public health and medical requirements to the appropriate ESF #8 representative operating in the NRCC, RRCC, and JFO, when activated.

Geospatial staff supporting the DHHS SOC and ESF roles with the NRCC, RRCC, and JFO provide products assisting in risk analysis, needs evaluations, and analysis to determine the capability required to meet the mission objective and provide required public health and medical support to state, tribal, and local officials.

Authoritative Data

The Critical Medical Support Mission produces minimal authoritative data during response activities. With efforts focused primarily on analysis and deployment of resources, many of the data compiled are simple resource tracking files consisting of basic point references for various transient field operations. ***(see Table 3–25 on page 64)***

Specific Products

Products supporting the Critical Medical Support Mission include, but are not limited to:

Lifesaving Activities

- Evacuation areas and routes
- Special needs populations
- Urgent transport

Resource Deployments

- Medical team deployments
- Commodity caches

Impact Assessments

- Damaged facilities

- Resource requirements.

Critical Food, Shelter, and Water

Overview

Following an event, many communities are left without the basic needs they require for survival: food, shelter, and water. These critical resources must be available to assist the survivors of an event in a very short timeframe. ESF #6 – Mass Care, Emergency Assistance, Housing, and Human Services is led by DHS/FEMA and coordinates many federal entities in the provision of critical food, shelter, and water. This section focuses on topics within the two primary functions supporting disaster response efforts under ESF #6.

- Feeding Operations. Feeding includes a combination of fixed sites, mobile feeding units, and bulk distribution sites. These operations are often co-located with shelter sites and can be placed in support of other facilities including disaster response entities.
- Sheltering. Emergency sheltering uses pre-designated shelter sites in existing structures within the affected area(s), as well as additional sites designated by local government. In addition, nonconventional sheltering may include hotels, motels, and other single-room facilities. Temporary facilities can include tents, prefabricated modular facilities, trains, and ships.

In addition to supporting the actual shelter facilities, information management systems such as the National Shelter System (NSS) are constantly used and maintained during a crisis. The NSS is a comprehensive web-based database that provides information for shelters during response to disasters and emergencies. Reports from the NSS detail the location and capacities of shelters (evacuation, general, ADA compliant, pet friendly, medical, etc.) open, on stand-by, or closed. The information is submitted by the local, tribal, state, and voluntary agencies (VOLAG) operating these shelters and provides information on survivors to family members and support to evacuations (including registration and tracking of evacuees) and assists in the reunification of families.

Bulk Distribution of Emergency Commodities. Bulk distribution of emergency commodities includes the distribution of emergency relief items to meet urgent needs through sites established within the affected area(s). These sites are used to distribute food, water, or other commodities in coordination with federal, state, local, tribal, and territorial governmental entities as well as VOLAGs and other private sector organizations.

Table 3–25: Authoritative Data - Response Mission - Critical Medical Support

Sub Category	Theme	Type	Delay	POC
Emergency Services				
Rescue and Emergency Medical Services	Armed Forces Reserve Medical Units	Point	3 day	DoD (NGB)
Event Impact				
Damage - Infrastructure	Hospitals/Medical Damage	Point	24 hour	ESF
Evacuation	Evacuation Targets/Status	Point	24 hour	FEMA (State)
	Evacuation Tracking - Special Needs	Point	24 hour	FEMA (State)
	Quarantine Areas	Polygon	48 hour	DHHS
Healthcare and Public Health				
Direct Patient Healthcare	Health Monitoring Results	Polygon	3 day	DHHS
	Medical Requirement Assessments	Polygon	3 day	DHHS
Health Supporting Facilities	Pharmaceutical Storage and Stockpile	Point	immediate	FDA
	Strategic National Stockpile (SNS) Sites	Point	24 hour	DHHS/CDC
Specialized Response Teams				
DHHS	DHHS Incident Response Coordination Team (IRCT)	Point	3 day	DHHS
DHS	Disaster Mortuary Operational Response Team (DMORT) Locations	Point	3 day	FEMA
	Medical Emergency Radiological Response Team (MERRT)	Point	24 hour	FEMA
	National Nurse Response Teams (NNRT)	Point	24 hour	FEMA
	National Pharmacy Response Teams (NPRT)	Point	48 hour	FEMA
	National Veterinary Response Team (NVRT) Locations	Point	3 day	FEMA
Other Federal Agency	DOI Interagency Hotshot Crews	Point	3 day	DOI/NIFC

Table 3–26: Authoritative Data - Response Mission - Critical Food, Shelter, and Water

Sub Category	Theme	Type	Delay	POC
Emergency Services				
American Red Cross	ARC Deployments	Point	24 hour	ARC
Emergency Management	Ice/Water Distribution Metrics	Point	3 day	DOD/USACE
	Ice/Water Model Estimates	Polygon	24 hour	DOD/USACE
	National Shelter System	Point	24 hour	FEMA
Event Impact				
Evacuation	NRC Evacuation Shelters/ Reception Centers	Point	48 hour	NRC
Field Operating Locations				
FEMA	Federal Operational Staging Areas (FOSAS)	Point	24 hour	FEMA
	FEMA Mobilization Centers and Staging Areas	Point	24 hour	FEMA
	Points of Distribution (POD) Sites	Point	3 day	FEMA (USACE, State EOC)
	State Staging Areas	Point	24 hour	FEMA

Operational Support

FEMA, the lead agency for ESF #6, coordinates federal response and recovery operations with state, local, and tribal governments, VOLAGs, and the private sector. ESF #6 assistance is managed and coordinated at the lowest possible organizational level (i.e., JFO and RRCC). Only requests that cannot be filled or issues that cannot be resolved at the RRCC/JFO levels are elevated to the NRCC, ESF #6 Branch for resolution. Initial response activities focus on immediate needs of survivors. Recovery efforts are initiated concurrently with response activities.

While many of the larger initiatives are managed and monitored by HQ-level offices within FEMA and the ARC, the majority of the initial analysis and deployment orders are directed at the RRCC/ JFO level. Geospatial support is typically accessed through the GIU of the Planning Section at the JFO.

Authoritative Data

The authoritative data associated with this mission is sensitive by nature and in many cases will be protected by the Privacy Act. Data will identify the locations of individuals and a mobile CI. ***(see Table 3–26)***

Specific Products

Products developed to support the delivery of Critical Food, Shelter, and Water come from many different sources (federal, state, local, nonprofits, and contractors). Products are developed for specific internal requirements, and many are shared with the greater response community in reports and emails. Examples of products include, but are not limited to:

Shelter

- Locations with sponsor information, populations, etc.
- Population analysis: home location, income, relations to others

Feeding

- Operation locations with capacities
- Commodity storage
- Requirement analysis

Distribution

- Points of distribution (PODs) locations
- Staging areas
- Requirement analysis
- Tracking of commodities distributed
- Delivery locations.

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4.0 Disaster Operations

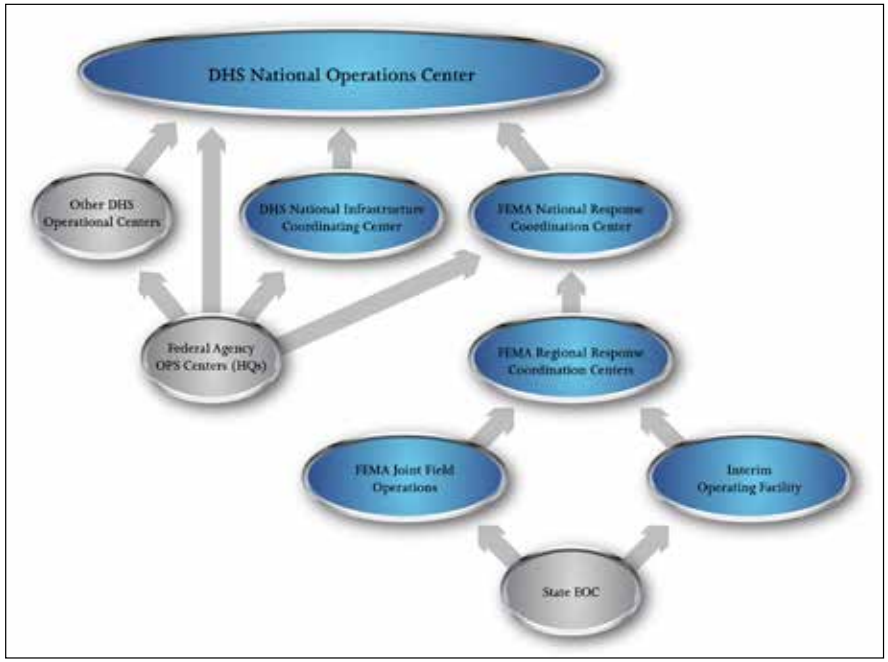


Figure 3-1: Disaster Operations Reporting Structure

This section discusses the primary operation centers supporting DHS-related activities before, during, and after a disaster. These entities provide the oversight, direction, and coordination required at the federal level to support disaster operations. The following graphic identifies the information reporting streams from field operations to the executive-level briefings ***(see Figure 3-1)***.

In addition to formal reports, DHS provides a suite of web-based visualization tools to federal, state, and local partners through HSIN for situational awareness, visualization, and lightweight analytics.

The intent of this section is to discuss the geospatial requirements and specific products supporting the following federal operation centers.

4.1 DHS National Operations Center

Overview

The Office of Operations Coordination and Planning's (OPS) mission is to integrate DHS and interagency planning and operations coordination in order to prevent, protect, respond to, and recover from terrorist threats/attacks and other man-made or natural disasters. Through the NOC, the DHS OPS interacts with DHS Components, state governors, Homeland Security Advisors (HSAs), law enforcement partners, and CI operators in all 50 states and more than 50 major urban areas nationwide.

The NOC, using the DHS COP, provides real-time situational awareness and monitoring of the homeland, coordinates incident response activities, issues advisories and bulletins concerning threats to homeland security, and provides specific protective measures. The NOC operates 24 hours a day, 365 days a year to coordinate information sharing to help deter, detect, and prevent terrorist acts and to manage domestic incidents. Information on domestic incident management is shared with EOCs through HSIN.

Roles and Responsibilities

The NOC is the principal operations center for DHS and provides situational awareness and a COP for the entire federal government, as well as for state, local, and tribal governments as appropriate. The NOC ensures that critical terrorism and disaster-related information reaches government decision makers. In the performance of its mission, the NOC enables the Secretary and other leaders to make informed decisions and identify courses of action during an event or threat.

In addition to NOC staff, more than 30 entities from the federal, state and local level have a presence within the NOC. These agencies work in tandem with the NOC to collect, fuse, and share information. RFIs are coordinated by the NOC's on-duty Senior Watch Officer (SWO) with the Desk Officers representing specific DHS components, other federal agencies, state, and local law enforcement agencies, as well as non-governmental organizations. The NOC establishes information sharing partnerships with specific customer groups through COIs within HSIN. Additional methods for information sharing include phone calls, emails, and reports from and to specific agencies.

Specific geospatial roles and responsibilities include:

- **Spatial Tagging.** In support of creating National Situation Summaries, the NOC Knowledge Management Officer (KMO) establishes an area of interest and creates a summary product for the incident. This geospatial picture is viewable from the HSIN COP COI within a stored map view in Integrated Common Analytical Viewer (iCAV). In addition, the KMOs use DHS Earth for situational awareness. When immediate products are required, NGA supports the NOC leadership for enhanced decision making and executive presentations. These products are often made available to KMOs for distribution to the greater HSIN community.
- **GIS Support.** Within the NOC, the GIS Watch Desk provides geospatial production and geospatial data visualization support to the NOC SWOs and the NOC Director as its primary mission. The NOC GIS Watch Desk Officer, or Geospatial Analyst (GA), also provides GIS subject matter expertise, imagery and data requirements support, and production capabilities to DHS component operations centers, as well as the DHS Office of Intelligence & Analysis (I&A). The NOC GIS Watch Desk also serves as a liaison and coordination point with the NGA Support Team (NST).
- **Remote Sensing (RS).** The NOC relies primarily upon the Interagency Remote Sensing Coordination Cell (IRSCC) during incidents to ensure that federal airborne assets and sensors are tasked efficiently. Additionally, the NOC relies upon the NST to assist with tasking for Commercial RS, as well as classified national imagery. The NOC also coordinates with the US CBP via the Air and Marine Operations Center to task CBP unmanned aerial vehicles to fly particular missions. Real-time video feeds from these tactical resources are streamed to the NOC for SWO Situational Awareness.
- **Modeling.** Chemical Biological, Radiological, Nuclear (CBRN) releases, explosions, fires, and other events can create smoke, gas, or particulate plumes. During planning for special events, response to real world incidents, or in line with training and exercises, the SWO will often want to have situational awareness of downwind consequences (real or simulated) of such plumes. The NOC GIS Watch Desk coordinates that awareness as a spatial requirement, for which Lawrence Livermore National Lab (LLNL) provides modeling expertise. The IMAAC serves as the single point of coordination for modeling, production, and dissemination of federal government dispersion modeling and predictive products. The SWO is the Authorized IMAAC Requestor (AIR) within the NOC. The SWO relies upon the GIS Desk Officer's subject matter expertise to assist with coordination and integration with NOC operations. The NESC serves as the single point of contact to enhance preparedness across the Whole Community by providing access to state-of-the-art modeling and simulation and by promoting effective and efficient planning, training, education, exercise, operations, and evaluation services for all mission areas. NESC capabilities can be accessed through the NRCC during times of response and directly at FEMA-NESC@fema.dhs.gov or 202-212-4800.

Operational Support

Among its various duties, the NOC is responsible for tracking and reporting the National Situation Summaries, the International Situation Summary (ISS) as well as RFIs from the executive branch, DHS components, DoD, and ESFs. Operational support provided by the NOC is primarily centered on gathering event data, coordinating the enhancement of this data with other homeland security partners, and disseminating this information to customers to provide situational awareness. The role of the NOC is to provide information to DHS executive stakeholders for reporting, decision making, and response coordination.

Production Methods

The NOC GA is responsible for managing the NOC's Geospatial Production Request (GPR) process, in coordination with the SWO. The GA produces products both for the SWO, other NOC desk officers, OPS leadership, and other DHS customers. These products can be requested on both a normal priority for day-to-day planning and support operations to a high priority for incident management situational awareness and assessment. The type of product created will always depend on the time allotted by the requestor, as well as the level of effort deemed necessary by the SWO.

The GPR process begins when a requestor submits an RFI to the NOC GIS Watch Desk. The on-shift GA ensures that a NOC number is assigned to the project by notifying the SWO on-duty, as well as the Tracker, who assigns the number in their Tracker Database.

The GA then begins project planning in close coordination with the requestor, searching foundation-level data sets, official data sources, as well as historic products. If additional data is needed, the GA has three avenues to satisfy data needs: (1) Open source collection; (2) Geospatial data fusion and conversion (of textual reporting); or (3) the NOC RFI process. For the NOC RFI process, the GA works with the SWO and Tracker to task other DHS component desks or interagency operations centers to provide data within a specific timeframe.

As the product is created, and analysis conducted, the GA works iteratively with the requestor to ensure that the product continues to meet the requirements. Upon completion, the SWO has final approval over all product dissemination. Methods for dissemination include a variety of tools, to include: HSIN COIs (FedOps, COP, Law Enforcement [LE], Emergency Management [EM], GIS, etc.), GEOINT Online, Intelink, as well as direct dissemination via email to the requestor.

Best Practices - DHS Common Operating Picture

The DHS Common Operational Picture (COP) is the core DHS strategic situational awareness (SA) capability for the DHS. As one of the preeminent points of information collection and dissemination, the DHS COP enables effective decision making and appropriate mission execution. It is an integrated SA application that supports the DHS mission of responding to threats and hazards to the nation by collecting, sharing, and displaying multi-dimensional information that facilitates collaborative planning, and responses to these events. The DHS COP architecture coupled with data from Homeland Security partners provides actionable information, enhanced contextual understanding, and geospatial awareness. The DHS COP provides users a broad set of capabilities based on best-in-class technologies that deliver a rich, end user experience through a web-accessible interface. These core capabilities include role-based access, merging and displaying incident-specific information in multiple formats, data ingest and triage, alerts and notifications, and map visualization.

The DHS COP utilizes a services-oriented architecture allowing it to leverage existing Homeland Security investments and enterprise-class capabilities. Geospatially, these include the HSIN and the DHS GII, which incorporates common geospatial data and services along with DHS OneView for visualization.

This DHS COP enables government and private sector leaders to make timely and informed decisions and to identify courses of action during an event or threat situation. This capability supports the White House, DHS Secretary and Deputy Secretary, NOC, DHS operations leadership, federal , state, tribal, local decision makers and stakeholders by providing consistent, timely, and accurate reporting of critical information for events of national and international significance.

Authoritative Data

The NOC uses authoritative data as provided by each of its component and mission partner Watch Desk Officers. The NOC RFI system, as managed by the Tracker Watch Desk, pushes RFIs from the SWO, Crisis Action Team (CAT) Director or other DHS leadership personnel to the appropriate data providers.

The NOC GIS Watch Desk also uses a NIEM-compliant suite of data standards. These standards help to structure and facilitate the sharing of data sets within the NOC's Geodata Catalog. These data sets are identified as authoritative within the

Best Practices - DHS OneView

DHS OneView is a secure, web-based, geospatial visualization application that allows individual users to view and interact with data and application services within the DHS GII. OneView users have the ability to add external data sources to their view in common web service formats (KML, KMZ, WMS, and GeoRSS). Other capabilities within OneView include basic attribute query, measurement, location (geocoding, reverse geocoding, and gazetteer), and routing tools.

Geospatial information provides a key connection across homeland security-specific missions. OneView delivers the visualization and analytic tools to support the mission stakeholders in their efforts. With OneView, homeland security partners can establish a comprehensive situational and strategic awareness across the nation to better prepare, prevent, respond, and recover from crisis-related events.

Access to OneView is granted to authorized federal, state, and local emergency responders, emergency managers, homeland security officials and other personnel with official infrastructure protection responsibilities, through HSIN. OneView can be accessed from most web-browser systems, enabling its use from both fixed and mobile environments. For more information on DHS OneView see ***Appendix E*** of the DHS GeoCONOPS.

Table 4–1: Authoritative Data - Disaster Operations - NOC

Sub Category	Theme	Type	Delay	POC
Emergency Services				
Emergency Management	Blue Force Tracking	Point	12 hour	DHS/NOC
Emergency Management	NOC Message Alert Location	Point	24 hour	DHS/NOC
Event Impact				
Damage - Infrastructure	NOC Sweat Model	Polygon	24 hour	DHS/NOC

national framework of the Federal Geographic Data Committee (FGDC) and by their respective data stewards ***(see Table 4–1)***.

Product Specifications

The NOC collects, fuses, produces, and disseminates volumes of geospatial and spatially referenced data each day. These include both "official" reporting, web-based geospatial data visualization, as well as finished geospatial products.

Official NOC reporting products include, but are not limited to:

- **NOC Message Alerts.** Disseminated as required via email to a set distribution list. Message alerts typically contain a level of awareness, a location of the alert event, and a description of the issue.
- **NOC COP.** Updated as significant situations develop and available via HSIN. The components of the NOC COP include National Situation Summaries, ISS, RFI Tracking Management, Situation and Spot Report Tracking Management, NOC Event Chronology, Blue Force Tracking, CI Monitor, GIS, and Media Analysis.
- **Spot Reports.** Spot Reports provide warning reports for incidents meriting immediate notification to the NOC. They are submitted to inform selected individuals or entities of critical information as it becomes available.
- **Security, Water, Electricity, Accessibility, Telecom Charts.** These charts provide a county by county view color coded (red: 0%–39%, yellow: 40%–79%, green: 80%–100%) as to the percent of availability of these elements.

4.2 DHS National Infrastructure Coordinating Center

Overview

The DHS Office of Infrastructure Protection (IP) within the National Protection and Programs Directorate (NPPD) leads the coordinated national program to reduce risks to the nation's CI and to strengthen national preparedness, timely response, and rapid recovery in the event of an attack, natural disaster, or other emergency. The Contingency Planning and Incident Management Division (CPIMD) of IP coordinates and implements preparedness activities such as exercises, contingency planning, and incident management in events that impact the nation's CI. CPIMD operates the NICC. The NICC is part of the NOC and is the 24 x 7 coordination and watch center that serves as the primary focal point for CI-related situational awareness.

The NICC is divided into two elements: the NICC Watch and the IMC. The primary role of the

NICC Watch is to operate as a watch center that continuously assesses the operational status of the nation's CI and provides situational awareness to DHS leadership. The NICC serves as a two-way conduit for information sharing between the federal government and the private sector partners on the status of CI during and after a natural or manmade event.

The IMC serves as IP's central mechanism for coordinating IP incident management activities and provides incident-specific situational awareness through the integration of information regarding CI, risk, response, and recovery operations. The IMC is staffed by all divisions within IP; however, CPIMD and the NICC are the lead IP Division responsible for RFI receipt, tasking, tracking, and fulfillment. These RFIs consist of requests for geospatial products, post-event imagery, CI status, and management-level situation reports.

Roles and Responsibilities

The NICC provides the Assistant Secretary for IP, the NOC, and senior DHS/IP decision makers with a central location for CI-related event situational awareness and response coordination. In addition, the NICC provides a centralized hub through which CI public and private sector owners and operators are able to request status information, analysis, geospatial products, and imagery of their facilities, pre-event, during, and after impact of the event. The NICC collects these RFIs and tasks/tracks their fulfillment via its internal RFI management tool. RFIs for analysis, geospatial products, and event imagery are then tasked out to NICC support elements, most notably the NISAC, IMAAC, NRCC, and the Infrastructure Information Collection Division (IICD) for fulfillment.

Specific geospatial roles and responsibilities include:

- **GIS Support.** IICD provides geospatial production and geospatial data visualization support to the NICC and IP IMC. They maintain a minimum of three GAs on site at the NICC and IMC during normal daily operations and surge capacity during an event. The NICC uses iCAV and DHS Earth for visualization of events impacting CI in the area of interest to maintain situational awareness on the NICC watch floor and within the IMC.
- **RS.** The IICD also provides post-event imagery collection coordination with the NRCC on behalf of the NICC and the IMC. Post-event imagery collection is typically focused on IOC within the impacted area. Requests for post-event imagery originate from a combination of customers including private sector partners, federal partners, and DHS management. The imagery is made available to the customer via a variety of mechanisms including the KML file format used to display geographic data, soft copy presentations uploaded to the HSIN GIS COI, or email. Release of the imagery may be limited to federal and specific customers only depending on the sensitivity of the product or the request of the customer.
- **Modeling.** The NISAC uses a number of tools to perform event-driven, rapid analysis. From a geospatial perspective, one of the primary tools used is FASTMap. FASTMap is a suite of mapping and analysis tools custom built for rapid infrastructure analysis. Results from FASTMap are disseminated in a number of different formats including KML and ESRI shapefile, and in hardcopy as well as softcopy geospatial products. The IICD collects FASTMap outputs to provide enhanced situational awareness both on the NICC watch floor and within the IMC.

Operational Support

The IMC is the central information collection, triage, and processing element for all IP incident management activities and private sector partner suspicious activity reporting. When an incident occurs, the IMC, in coordination with the NICC watch, becomes the primary node for CI incident-specific RFIs. Within the IMC, the Incident Manager is responsible for prioritizing all incoming RFIs. When a request is received, the RFI is verified and accepted by the IMC's Information Fusion Cell.

Specific GIS capabilities delivered on behalf of the NICC include:

- **Daily Support.** Geospatial product development is executed at the request of the customer. An example of these types of requests would be maps showing the location of specific dams in a certain region. Daily support maps typically contain base map imagery and infrastructure point data. The geospatial production support is typically provided on the NICC watch floor, with additional resources available as required.
- **National Security Specific Events (NSSE) Support.** Prior to an NSSE, map books are created depicting various areas of interest and sector-specific infrastructure data. Examples of NSSE geospatial products include a map book for the Super Bowl or the recent Presidential Inauguration.
- **Incident/Event State Support.** Examples of event state geospatial products include post-hurricane landfall imagery of chemical facilities in the impacted area. Incident/event state support is provided by contractor support as well as the IMC.

The **Quick Look** product provides the NICC partners with a brief, visual depiction of any CI in a given geographical area. The development is initiated in response to an incident or for an upcoming event and is not intended to be an in-depth analysis of area infrastructure. This product is delivered as a PowerPoint presentation.

Spot Reports are unclassified – FOUO documents used to notify the NOC, sector specialists, and IP

leadership of emerging incidents/events impacting the nation's CI. A Spot Report provides as much information as the watch stander can gather on the incident in a short period of time. Depending on the amount of information available, a geospatial product may be requested to insert into the report to provide location information.

Current Situation Reports provide a more in-depth analysis of an incident impacting CI. Situation Reports are initiated as follow-on reporting to an initial Spot Report or to inform of a slowly developing situation that has risen to a level where reporting would be prudent. The watch stander may request a map product to insert into the report displaying the location and any CI affected in the area.

Production Methods

RFIs from customers to the NICC are requested via phone and email. NICC watch standers track official RFIs within the Master Watch Control Log (MWCL). Open RFI items are closed out after distribution to NICC customers. Primary customers of the NICC include the Protective Security Advisors (PSA) deployed in the field, sector-specific agencies, DHS NOC, the IP IMC, and Infrastructure Liaison Officer, when a JFO is created in response to an incident/event. The NICC leverages its relationship with IICD for support with requests for more complex geospatial product development when necessary. The RFI requests that generate geospatial products from the IICD team are initially entered in a spreadsheet and then tasked to the Geospatial Production Team (GPT).

The tools used to create and disseminate these products consist primarily of web-based geospatial data viewers; thick client analytic tools; data storage, manipulation, and management capabilities; and data/product dissemination mechanisms.

Products requested may range from simple geospatial map products showing the IOC in a given area to more complex geospatial products depicting event locations (e.g., hurricane path, fire perimeter, radiation plume) in relation to CI. In addition, the RS Team receives requests for post-event imagery and works through the IRSCC to fulfill these requests.

Authoritative Data

The NICC uses data provided by DHS IP, identifying nationally significant, high-consequence assets and systems to prioritize the nation's CI. High-level criteria for inclusion on this list include assets that if destroyed or disrupted could cause some combination of significant casualties, major economic losses, or widespread and long-term disruptions to national well-being and governance capability. Identification of these nationally significant assets is conducted annually and relies on the combined insights of Infrastructure Analysis and Strategy Division (IASD), the NISAC, the state/ territorial HSAs, and the federal sector-specific agencies. The resulting list provides DHS and its security partners with the ability to efficiently and effectively implement protection programs and initiatives such as grant programs, buffer zone protection efforts, facility assessments training, and related activities.

The Tier 1 and Tier 2 data set is classified when provided in its entirety for a given state or within one of the 18 sectors. To provide customers with an unclassified version of these critical assets, geospatial products are created that narrow the AOI around an event to a level where the data presented does not conflict with the classification guidelines. The resulting unclassified data set is then referenced as IOC. Additional IP/NICC authoritative data sets consist of the following ***(see Table 4–2)***:

Table 4–2: Authoritative Data - Disaster Operations - NICC

Sub Category	Theme	Type	Delay	POC
Emergency Services				
Emergency Management	Infrastructure Quicklook IAL	Point	3 hour	DHS/NICC
	Infrastructure of Concern (IOC)	Point	3 hour	DHS/NICC
	Patriot Report Area of Concern	Polygon	24 hour	DHS/NICC
	Quick Look Area of Concern	Polygon	24 hour	DHS/NICC
Event Impact				
Damage - Infrastructure	Communications Damage	Point	24 hour	ESF
	Power Supply Damage	Point	24 hour	ESF

Product Specifications

Geospatial data is maintained in shapefile and Relational Database Management System formats and is shared as a KML file. Within the IMC, geospatial products generated on behalf of the NICC by the IICD are typically 11"x 17" in size and wall size maps are 30" x 60" and displayed prominently within the IMC.

Symbology used by the IICD typically consists of the FGDC-compliant symbology available within the HSIP data set. The IICD provides map and post-event imagery products in paper, pdf, jpg, and KML formats. Each product adheres to a consistent and standardized format as determined by the IMC. Once completed, and if appropriate, each product is given a standard naming convention (yyyy/mm/dd/RFI/size)

and uploaded to the HSIN GIS COI for customer retrieval.

4.3 FEMA National Response Coordination Center

Overview

FEMA's Disaster Operations Directorate coordinates and provides the core federal disaster response capability needed to save lives, reduce suffering, and protect property in communities throughout the nation that have been overwhelmed by the impact of a major disaster or emergency, regardless of cause. The Disaster Operations Directorate must ensure that federal emergency response systems and capabilities are properly poised to support states and communities overwhelmed by disasters and emergencies.

The FEMA NRCC is a multiagency entity operating from FEMA HQ that functions as the operational component of the DHS NOC. The NRCC coordinates personnel and resource deployments to support disaster operations and prioritizes interagency allocation of resources. It maintains situational awareness linkages with regional, state, and local partners and 24 x 7 watch team. The NRCC is staffed to support daily monitoring activities with the ability to surge in support of catastrophic events.

Roles and Responsibilities

The NRCC integrates the nation's emergency response teams, systems, and capabilities into a comprehensive, coordinated operational capability to provide an effective and efficient response to major disasters or emergencies. The NRCC coordinates all federal emergency management disaster operational planning and programs to ensure the delivery of immediate emergency assistance to support individuals and communities.

FEMA, through the NRCC, provides coordination and support for geospatial activities responding to federally declared disaster response and recovery activities. This support reaches to the 15 ESF desks, FEMA mission areas, and the DHS NOC and NICC. In addition to federal HQ operations, the NRCC provides geospatial services to the FEMA regional offices and field operations.

Specific geospatial roles and responsibilities include:

- **GIS Support (FEMA MAC).** The MAC supports the NRCC through the GIS Coordinator desk. The MAC is fully staffed and able to provide surge capabilities for disaster production. Standard MAC products include visualization of flooded areas, modeled hurricane impacts, HAZUS outputs, disaster declaration areas, damage locations, and FEMA applicant locations. In addition to these products, the MAC accepts ad hoc requests for all types of information products related to an event. Products requiring specific field information may be forwarded to individuals supporting field activities.
- **RS.** RS requirements are coordinated by FEMA's RS coordinator, also located in the NRCC. Imagery collection and processing is tasked through existing relationships with NGA, USGS, and other federal and commercial sources. The RS Coordinator works closely with customers in the NRCC, FEMA HQ, DHS, FEMA regions, and FEMA/state field offices to ensure that all requirements are met and duplication of efforts is prevented. Once acquired and processed, imagery is made available to all entities supporting the event through various media sources. In some situations, licensing restrictions may limit use to federal or other users.
- **Modeling.** In support of the NRCC, the MAC is the designated entity for producing HAZUS runs of record for FEMA. The MAC produces standardized Level 1 HAZUS analyses using the hurricane, flood, and earthquake models and has developed a dissemination method and protocol for sharing the standardized products. The model developers provide technical support to the MAC.

Operational Support

The NRCC provides support to all presidentially declared disasters, special security events, and other significant events as required. The MAC is the primary geospatial production entity for all federal operations and is augmented by NGA, USGS, USACE, and other federal geospatial offices.

Production Methods

GIS requests are taken by the NRCC GIS Coordinator, who validates requirements and forwards them to the MAC lead. Requests are then triaged and assigned to individuals. The analyst staff work with the customer to deconflict any concerns and the product is generated and delivered to the customer. In situations where data must be collected or created, the analyst works to acquire the best available data and validates with the customer as needed.

RS requests are given to the NRCC RS Coordinator for execution. Requests include details of the area to be acquired, level of detail necessary, and any time constraints. Acquisitions are combined with others when possible and are discussed in a conference call forum when possible to ensure that others are aware of activities and able to assist or be included. Once complete, imagery and derived products are made available to all responding entities as allowed by licensing and other restrictions.

The MAC uses the ESRI Suite of software for data collection/creation, data maintenance, analysis, and map production. Additional software tools include Oracle, geocoder, Adobe Acrobat, Adobe Connect, and others. Geospatial products developed for formal delivery follow basic standards for layout and content

Best Practices - HAZUS Concept of Operations

Prior to 2008, FEMA did not have a standardized process for using HAZUS for disaster response or a system to disseminate the output products for recovery operations. Recognizing the need to have an authoritative source for HAZUS modeling in support of the NRCC, GIS Solutions Branch (GSB), under the Office of Chief Information Officer (OCIO), developed the HAZUS Concept of Operations (CONOPS). This CONOPS is intended to define the official HAZUS run of record for FEMA, minimizing opportunities for conflicting HAZUS model from entering the disaster response community.

With the development of the HAZUS CONOPS, FEMA has taken an important step in the integration of the HAZUS model into the suite of geospatial tools that are used by the NRCC to assess disaster impacts. While HAZUS has been used by FEMA for a decade or more to estimate losses from earthquakes, floods, and hurricanes, the CONOPS provides clear, official guidance on the use of HAZUS by the GSB to support the NRCC in gaining situational awareness.

The HAZUS CONOPS outlines procedures for producing standardized Level 1 HAZUS runs of record for FEMA and the emergency management community. The CONOPS identifies the GSB Mapping Analysis Center (MAC) as the designated geospatial entity for producing HAZUS runs of record for FEMA. The HAZUS CONOPS defines operational deliverables, workflow, tools, and data sources for providing standardized Level 1 HAZUS hurricane, earthquake, and flooding products. The standardized products are intended to be disseminated through internal FEMA networks as well as HSIN.

The HAZUS CONOPS is an important contribution in the application of modeling to support disaster impact assessments. It is important that the SMEs running HAZUS are experienced in its use for disaster operations (rather than for planning purposes) and prepared to quickly and effectively interpret and share the modeled results. The HAZUS CONOPS fuses procedures required to guide the use of HAZUS together into a single authoritative document to support situational awareness and disaster operations.

Table 4–3: Authoritative Data - Disaster Operations - NRCC

Sub Category	Theme	Type	Delay	POC
Emergency Services				
Emergency Management	FEMA IA Applicants	Point	48 hour	FEMA IA
	FEMA NFIP Claims	Polygon	5 day	FEMA Mitigation
	FEMA PA Applicant Locations	Point	6 day	FEMA PA
	FEMA PA Project Locations	Point	12 day	FEMA PA
	Presidential Disaster Declaration Areas	Polygon	immediate	FEMA
	Presidential Emergency Declaration Areas	Polygon	24 hour	FEMA
Event Impact				
Event Location	Imagery Derived Products (Targets)	Point	24 hour	FEMA
	Imagery Post-Event (Aircraft)	Raster	3 day	FEMA
	Imagery Post-Event (Motion Video)	Video	24 hour	FEMA
	Imagery Post-Event (Satellite)	Raster	3 day	FEMA
Modeling	Radiological Hazard Warning (RHW)	Point	24 hour	NRC (FCC)
Field Operating Locations				
DoD	JTF Joint Operations Center	Point	24 hour	NORTHCOM/PACOM
Specialized Response Teams				
DHS	FEMA Incident Management Assistance Team (IMAT)	Point	24 hour	FEMA
	FEMA MERS/MATTS Locations (Deployed)	Point	24 hour	FEMA
	Scientific and Technical Advisory and Response Teams (STARTS)	Point	48 hour	FEMA

and are reviewed for content accuracy and spelling prior to delivery.

Authoritative Data

The NRCC maintains a minimal amount of unique data. Base data is provided by HSIP Gold and other government and commercial sources. The NRCC is a major data user and produces many products designed to answer specific questions. Products and data are provided through HSIN, email, and other means to the NOC, NICC, and FEMA regional offices on an as-needed or as-available basis ***(see Table 4–3)***.

Product Specifications

Geospatial data is maintained in ESRI Oracle/SDE format for internal use and output into geodatabase, shapefiles, and xml formats, depending on customer requirements. Data collected for input can be accessed from almost any source type and may be labor/time intensive. Collections of event data are specific to the FEMA entity directly supporting the

response and recovery efforts and are generally not accessible across the network and must be requested at the point of origin.

The MAC uses a standard symbology based on ICS and FGDC Homeland Security formats with additions for FEMA- specific data and products. The NRCC provides map products in pdf, jpg, and other formats. Using standardized layouts, the MAC produces products with a consistent feel and makes the template available to all FEMA facilities. In addition to internal production, several standard products are made available on FEMA's public Internet site. These include map graphics, specific authoritative data themes, and xml exports.

4.4 FEMA Regional Response Coordination Centers

Overview

FEMA's RRCCs operate within each of the 10 FEMA regional offices around the nation. These facilities provide support to each of the states within the regional boundaries as well as support disaster operations within other regions during major multistate events.

The FEMA RRCC is a multiagency entity operating from FEMA regional offices in two capacities: watch mode (operating during normal business hours) and activation mode (when supporting relevant events). The RRCC is staffed to support daily monitoring activities with the ability to surge in support of catastrophic events.

The RRCC functions as the regional interface between the states and the FEMA NRCC, maintaining situational awareness with all partners until a JFO opens. The RRCC coordinates personnel and resource deployments to support disaster operations and prioritizes interagency allocation of resources.

Roles and Responsibilities

The RRCC integrates the regional and national emergency response teams, systems, and capabilities into a comprehensive, coordinated operational capability to provide an effective and efficient response to major disasters or emergencies. The RRCC coordinates all federal emergency management disaster operational planning and programs to ensure the delivery of immediate emergency assistance to support individuals and communities.

FEMA, through the RRCC, provides key coordination and support for geospatial activities responding to federally declared disaster response and recovery activities. This support reaches the regional and national response teams, the 15 ESF desks, FEMA mission areas, and the NRCC. In addition to regional operations, the RRCC provides the initial geospatial support required to provide situational awareness to regional field operations.

Specific geospatial roles and responsibilities include:

- **GIS Support.** The GIU, under the Planning Section, provides all regional GIS and RS support in response to an event. FEMA is responsible for the management and coordination of all geospatial activities and provides services ranging from basic map production to field data collection to overhead coordination with other federal entities.
- **Remote Sensing.** RS requirements and requests are coordinated by the RS Coordinator within the GIU.
- **Modeling.** In some situations, FEMA HQ will provide the RRCC with HAZUS expertise. Through technical support from the Risk Analysis Branch, the RRCC has been able to identify and prioritize HAZUS outputs for use in disaster operations, based on the reliability of the analysis and value to the emergency management community.

Operational Support

The RRCC provides support to all events of regional interest; this includes local events with the potential to expand, significant civil and weather events, NSSE, declared disasters, and other events as required. The GIU is the primary geospatial production entity for RRCC operations and is augmented by NGA, USGS, USACE, and other federal geospatial offices.

Production Methods

GIS requests are taken by the RRCC GIU where they are validated against mission requirements and acted upon. Requests are triaged and assigned to individuals. The analyst staff work with the customer to deconflict any concerns. The product is then generated and delivered to the customer. In situations where data must be collected or created, the analyst works to acquire the best available data and validates with the customer as needed.

RS requests are given to the RRCC GIU lead and passed to the RS Coordinator for execution. Requests include details of the area to be acquired, level of detail necessary, and any time constraints. Acquisitions are combined with others when possible and are discussed in a conference call forum when possible to ensure that others are aware of activities and able to assist or be included. Once complete, imagery and derived products are made available to all responding entities as allowed by licensing and other restrictions.

Geospatial products developed for formal delivery follow basic standards for layout and content and are reviewed for content accuracy and spelling prior to delivery.

Authoritative Data

The RRCC maintains data unique to the federal government. Some of this critical information is collected from state and local governments to support FEMA's operations. Although FEMA is not the originating entity of this information, it is compiled from multiple entities and consolidated into theme-specific federated data sets. This information is then available as common operating data in support of various regional missions.

Base data is provided by HSIP Gold and other government and commercial sources. The RRCC is a major data user and produces many products designed to answer specific questions. Products and data are provided through HSIN, email, and other means to the state/local EOCs, the FEMA NRCC, and other entities on an as-needed or as-available basis ***(see Table 4–4)***.

Product Specifications

Geospatial data is maintained in ESRI shapefile and ESRI Oracle/SDE formats for internal use and output into geodatabase, shapefiles, and xml formats, depending on customer requirements. Data collected for input can be accessed from almost any source type and may be labor/time intensive. Collections of event data are specific to the FEMA entity directly supporting the response and recovery efforts and are generally not accessible across the network and must be requested at the point of origin.

RRCC symbology varies by regional office and is often based on ICS and FGDC Homeland Security formats with additions for FEMA specific data and products.

The RRCC provides map products in pdf, jpg, and other formats. Product layouts adhere to common basic standards but do vary by facility maintaining a common local feel.

Table 4–4: Authoritative Data - Disaster Operations - RRCC *1 of 2*

Sub Category	Theme	Type	Delay	POC
Event Impact				
Damage - Infrastructure	Road Damage	Polyline	24 hour	FEMA (State/Local EOC)
Evacuation	Evacuee Reception	Point	24 hour	FEMA
	Federal Medical Shelters	Point	24 hour	VA
	Hurricane Evacuation Routes	Polyline	24 hour	FEMA
	Mandatory Evacuation - State/Local	Polygon	24 hour	FEMA (State/Local EOC)
	Patient Reception	Point	24 hour	VA
	Veteran Locations	Point	48 hour	VA
	Veteran Patient Tracking	Point	48 hour	VA
Event Location	Tornado Touchdown - Current	Point	24 hour	NOAA
Field Operating Locations				
FEMA	Incident Command Post (ICP)	Point	24 hour	FEMA
	Joint Field Office (JFO)	Point	24 hour	FEMA
Man-Made Hazards				
Emergency Warning	Civil Danger Warning (CDW)	Point	24 hour	FCC (State/Local)
	Civil Emergency Message (CEM)	Polygon	24 hour	DHS (FCC)
	Evacuation Immediate (EVI)	Polygon	24 hour	FCC (State/Local)
	Hazardous Materials Warning (HMW)	Polygon	24 hour	FCC (State/Local)
	Law Enforcement Warning (LEW)	Polygon	24 hour	FCC (State/Local)
	Local Area Emergency (LAE)	Point	24 hour	FCC (State/Local)
	Nuclear Power Plant Warning (NUW)	Point	24 hour	NRC (FCC)
Natural Hazards				
Emergency Warning	Avalanche Warning (AVW)	Polygon	24 hour	USGS (State/Local)
	Avalanche Watch (AVA)	Point	24 hour	USGS (State/Local)
	Blizzard Warning (BZW) Area	Polygon	24 hour	NOAA/NWS
	Coastal Flood Warning (CFW) Area	Polygon	24 hour	NOAA/NWS
	Coastal Flood Watch (CFA) Area	Polygon	24 hour	NOAA/NWS
	Dust Storm Warning (DSW) Area	Polygon	24 hour	NOAA/NWS
	Earthquake Warning (EQW)	Polygon	24 hour	USGS (FCC)
	Fire Warning (FRW)	Polygon	24 hour	FCC (State/Local)
	Flash Flood Warning (FFW) Area	Polygon	24 hour	NOAA/NWS

Table 4–4: Authoritative Data - Disaster Operations - RRCC (continued) *2 of 2*

Sub Category	Theme	Type	Delay	POC
Emergency Warning	Flash Flood Watch (FFA) Area	Polygon	24 hour	NOAA/NWS
	Flood Warning (FLW)	Polygon	24 hour	NOAA/NWS
	Flood Watch (FLA) Area	Polygon	24 hour	NOAA/NWS
	High Wind Warning (HWW) Area	Polygon	24 hour	NOAA/NWS
	High Wind Watch (HWA) Area	Polygon	24 hour	NOAA/NWS
	Hurricane Warning (HUW) Area	Polygon	24 hour	NOAA/NWS
	Hurricane Watch (HUA) Area	Polygon	24 hour	NOAA/NWS
	Severe Thunderstorm Warning (SVR) Area	Polygon	24 hour	NOAA/NWS
	Severe Thunderstorm Watch (SVA) Area	Polygon	24 hour	NOAA/NWS
	Special Marine Warning (SMW) Area	Polygon	24 hour	NOAA/NWS
	Tornado Warning (TOR) Area	Polygon	24 hour	NOAA/NWS
	Tornado Watch (TOA) Area	Polygon	24 hour	NOAA/NWS
	Tropical Storm Warning (TRW) Area	Polygon	24 hour	NOAA/NWS
	Tropical Storm Watch (TRA) Area	Polygon	24 hour	NOAA/NWS
	Tsunami Warning (TSW) Area	Polygon	24 hour	NOAA/NWS
	Tsunami Watch (TSA) Area	Polygon	24 hour	NOAA/NWS
	Volcano Warning (VOW) Area	Polygon	24 hour	USGS (FCC)
	Winter Storm Warning (WSW) Area	Polygon	24 hour	NOAA/NWS
	Winter Storm Watch (WSA) Area	Polygon	24 hour	NOAA/NWS
Specialized Response Teams				
DHS	FEMA Damage Assessment Teams	Point	48 hour	FEMA
	FEMA Emergency Response Team-Regional (ERT-A)	Point	24 hour	FEMA

4.5 FEMA Joint Field Operations

Overview

A FEMA JFO is established within an affected state following the presidential declaration of a disaster. The JFO is a temporary federal/state MACC (as defined by the NIMS) established locally to facilitate field-level domestic incident management activities related to prevention, preparedness, response, and recovery. The JFO provides a central location for coordination of federal, state, local, tribal, nongovernmental, and private sector organizations. The JFO works to establish joint priorities and allocate resources, resolve agency policy issues, and provide strategic guidance to support federal incident management activities. The exact composition of the JFO is dependent on the nature and magnitude of the incident.

The JFO uses the scalable, modular organizational structure of the NIMS in the context of both pre-incident and post-incident management activities ***(Table 4–2 on page 72)***. The JFO may begin as a small staff supporting the Principal Federal Official (PFO) or Federal Coordination Officer (FCO) upon arrival in the affected jurisdiction and will expand or move as required to accommodate additional JFO subcomponents. While every JFO will generally consist of a Coordination Group/Staff, and JFO Sections (Operations, Planning, Logistics, and Finance/Administration), the size and number of units within each section will vary according to the nature of the situation. The JFO structure should be seen as a scalable "menu" from which applicable component elements can be added as the incident requires.

The JFO may include a limited number of principal state [represented by an appropriate state official or State Coordinating Officer (SCO)], local, and tribal officials, as well as NGO and private sector representatives. The JFO staff focus on providing support to on-scene efforts and incident management and/or disaster response and recovery program implementation and coordinating broader support operations that may extend beyond the immediate incident site. The JFO does not manage on-scene operations.

Roles and Responsibilities

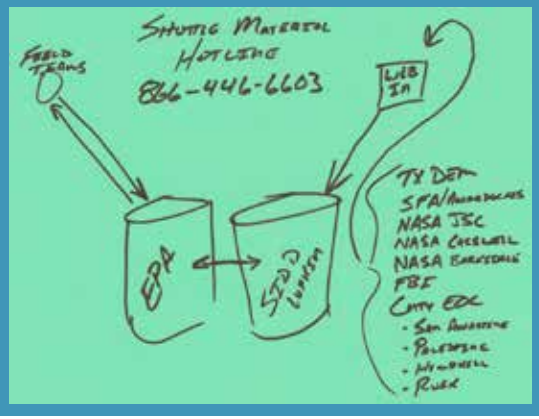
Geospatial activities at the JFO reside predominately within the GIU under the Planning Section. The GIU operates as the coordination lead for GIS, RS, and modeling activities for the JFO. In support of the Planning Section, the GIU is involved with overall situational awareness and reporting activities for the event. The JFO GIU maintains contact with the RRCC and NRCC as required for mutual support.

Best Practices - Disaster Data and Production

On February 1st 2003, the Space Shuttle Columbia broke apart during re-entry into the earth's atmosphere killing the crew and spreading debris over 300 miles across East Texas and into Louisiana. As the lead agency for the immediate recovery efforts, FEMA established a GIS team at the JFO and began to assist the efforts with products and data management for the field operations.

The need for a centralized debris database was identified almost immediately and hasty plans were made to design and develop it. The Shuttle Interagency Debris Database (SIDD) was constructed and the entire event revolved around it. As the event progressed, the SIDD housed records of all debris collected, supported daily mission taskings, and collected citizen reports of debris found as well as the action taken by the field teams. This single data set was incorporated into the majority of map products produced for the event and provided the key piece of Common Operating Data (COD) for everyone involved.

The production requirements for the 90-day search and recovery effort exceeded that of any other event from a single field operation. To maximize effectiveness, the primary production focused on three products: search management, air search, and ground search. To support this, a second key component of the database was developed—the Shuttle Search Grid. This simple data set was utilized to manage the areas searched, create map products, collect post-search field reports, and manage the product requests and tasking.



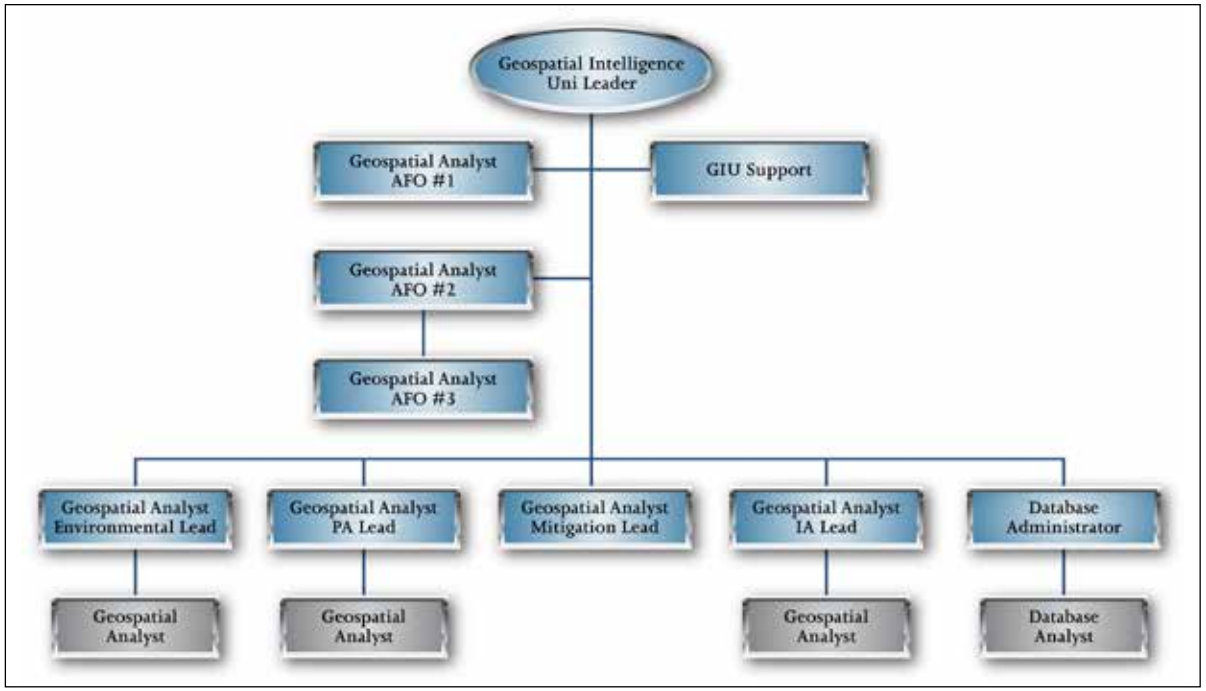


Figure 4-1: Example JFO/GIU Organizational Chart

While there are many "standard" products available across an event, there are a multitude of ad hoc requests for products and services unique to the specific event. The GIU assists in the coordination and implementation of geospatial activities outside the JFO. These efforts include internal field-data collection, imagery collaboration, field team support [Area Field Offices (AFO)], and state, local, and other external customers.

In addition to the GIU, geospatial entities may be operating under the authorities of PA, operations, mitigation, DHS, USACE, EPA, and other federal agencies in support of their specific missions. These entities must coordinate with the JFO GIU to ensure operational awareness and minimize duplication of effort.

Specific geospatial roles and responsibilities include:

- **GIS Support.** The GIU, under the Planning Section, is the federal coordinator of all geospatial activities supporting the event and provides support to all federal and state entities in response to an event. FEMA is responsible for the management and coordination of all geospatial activities and provides services ranging from basic map production to field data collection to overhead coordination with other federal entities. The GIU continues to provide large quantities of printed products and augments these with various digital tools to meet their requirements.
- **RS.** RS requirements and requests are coordinated by the RS Coordinator within the GIU. The JFO RS Coordinator in turn works with colleagues at

the RRCC and/or NRCC to provide customers with the products they require.

- **Modeling.** At the JFO, technical support from the Risk Analysis Branch can be leveraged to assist in the running of the HAZUS model and the prioritization of modeled outputs for use in disaster operations. In addition, derived data is accessed to produce nonstandard products for the JFO customers.

Operational Support

The JFO provides geospatial support to all entities involved in the response and recovery efforts related to the event supported. Geospatial requests at the JFO are submitted through the JFO GIU where they are triaged and acted upon. Each event drives the creation of several standard products that are updated and improved regularly to meet customer demands. In addition, ad hoc requests may consume well over half of the GIU resources.

The GIU can fluctuate in size from 1 to 50 members to accommodate the event requirements. As the primary geospatial production entity for JFO operations, the GIU and its staff must remain agile. FEMA has the ability to pull federal staff from across the government in support of disaster operations. Typically federal staff will be requested from NGA, USGS, USACE, and USFS to support the operations at the JFO.

RS activities are assigned to on-site and off-site entities as appropriate. The GIU RS Coordinator works closely with state/federal partners and the NRCC RS Coordinator to provide the required levels of support. Often, coordination efforts allow missions to be combined across multiple requests and/or fill requests with data products already acquired by other entities.

Table 4–5: Authoritative Data - Disaster Operations - JFO *1 of 2*

Sub Category	Theme	Type	Delay	POC
Emergency Services				
American Red Cross	ARC Deployments	Point	24 hour	ARC
Emergency Management	FEMA IA Applicants	Point	48 hour	FEMA IA
	FEMA PA Applicant Locations	Point	6 day	FEMA PA
	FEMA PA Project Locations	Point	12 day	FEMA PA
	State Guard Joint Receiving Points	Point	48 hour	NGB/State Guard
	State Guard Logistic Supply Points	Point	48 hour	NGB/State Guard
	State Guard Staging Areas	Point	48 hour	NGB/State Guard
	State Guard Unit Locations	Point	48 hour	NGB/State Guard
Emergency Resources	Generator Placement	Point	48 hour	DOD/USACE, FEMA
Event Impact				
Damage - Infrastructure	Bridge/Tunnel Damage	Point	48 hour	ESF
	Commercial Building Damage	Polyline	5 day	FEMA (State/Local EOC)
	Gas Distribution Damage	Point	24 hour	ESF
	Government Building Damage	Polyline	5 day	FEMA (State/Local EOC)
	Residential Building Damage	Polyline	5 day	FEMA (State/Local EOC)
Event Location	Burned Areas	Polygon	48 hour	USGS
	Coastal Flooding	Polygon	48 hour	USGS
	Debris Flows	Polygon	48 hour	USGS
	Debris Locations	Polygon	3 day	USGS
	Disease Impacts	Polygon	48 hour	CDC
	Flood-Fight Measures	Polygon	24 hour	FEMA
	Marine Hazards	Polygon	48 hour	NOAA
	Oil Spill Locations	Polygon	48 hour	NOAA
	Storm Tracks	Polygon	24 hour	NOAA/NWS
	Tsunami Damage	Polygon	24 hour	NOAA
	Wildfire Induced Hazards	Polygon	48 hour	USGS

Table 4–5: Authoritative Data - Disaster Operations - JFO (continued) *2 of 2*

Sub Category	Theme	Type	Delay	POC
Field Operating Locations				
DoD	JTF Joint Operations Center (State)	Point	24 hour	NGB
FEMA	Disaster Recovery Center (DRC)	Point	24 hour	FEMA
	Satellite JFO Facilities	Point	48 hour	FEMA
	State Staging Areas	Point	24 hour	FEMA
Government Facilities				
DHS	FEMA Logistics Centers	Point	immediate	FEMA
Man-Made Hazards				
Emergency Warning	Shelter in Place Warning (SPW)	Polygon	24 hour	FCC (State/Local)
Specialized Response Teams				
DHS	Incident Management Teams (IMTs) Federal Type 1 and Type 2	Point	48 hour	FEMA
Other Federal Agency	Infrastructure Assessment Response Team	Point	48 hour	DOD/USACE
	Navigation Response Team	Point	48 hour	NOAA
	NOAA Incident Meteorologists (IMET)	Point	48 hour	NOAA
	Oil Spill/HAZMAT Response Team	Point	48 hour	NOAA
	Vaccination Teams	Point	48 hour	VA

Production Methods

GIS requests are taken by the JFO GIU where they are validated against mission requirements and acted upon. Requests are triaged and assigned to individual analysts. The analyst staff work with the customer to deconflict any concerns, and the product is generated and delivered to the customer. In situations where data must be collected or created, the analyst works to acquire the best available data and validates with the customer as needed.

RS requests are given to the JFO GIU lead and passed to the RS Coordinator for execution. Requests include details of the area to be acquired, level of detail necessary, and any time constraints. Acquisitions are combined with others when possible and are discussed in a conference call forum when possible to ensure that others are aware of activities and able to assist or be included. Once complete, imagery and derived products are made available to all responding entities as allowed by licensing and other restrictions.

Geospatial products developed for formal delivery follow basic standards for layout and content and are reviewed for content accuracy and spelling prior to delivery.

Authoritative Data

The JFO maintains data unique to the federal government but is a significant user of data acquired from other entities. Some of this critical information is collected from state and local governments to support FEMA's operations. Although FEMA is not the originating entity of this information, it is compiled from multiple entities and consolidated into theme-specific federated data sets. This information is then available as common operating data in support of various regional missions.

The JFO GIU invests a considerable amount of labor to locate, collect, and process data required by its customers. While many federal-level data sets provide the thematic overages required, the detail and currency of local data make on-site data acquisition a major requirement. This data, collected early in the event operations, provides critical support to response, recovery, and mitigation efforts across the lifespan of the recovery efforts. When the JFO closes, this data is archived at the appropriate FEMA regional office for continued and future use.

Base data is provided by HSIP Gold and other government and commercial sources. The JFO is a major data user and produces many products designed to answer specific questions. Products and data are provided through HSIN, email, and other means to the state/local EOCs, the FEMA RRCCs, FEMA NRCC, and other entities on an as-needed or as-available basis ***(see Table 4–5)***.

Product Specifications

Geospatial data is maintained in many formats for internal use and output into geodatabase, shapefiles, and xml formats, depending on customer requirements. Data collected for input can be accessed from almost any source type and may be labor/time intensive. Collections of event data are specific to the FEMA entity directly supporting the response and recovery efforts and are generally not

accessible across the network and must be requested at the point of origin.

JFO symbology varies by facility and is typically based on ICS and FGDC Homeland Security formats with additions for FEMA-specific data and products. Because of the dynamic nature of disaster response and the wide array of JFO customers, symbol standards are often created or modified to meet the unique situations of the event-driven environment.

The JFO provides map products in paper, pdf, jpg, and other formats. Product layouts adhere to common standards but do vary by facility to create a common local feel. Paper is the predominate medium for field-level map products and the GIU must be postured to meet these requirements.

Digital products do, however, provide the predominate means for sharing geospatial information with off-site entities. Geospatial data is shared actively between FEMA and other facilities in several formats. Geospatial products are produced in various graphic formats and posted to operation center sites, attached as emails, and included with digital-versions of JFO reports.

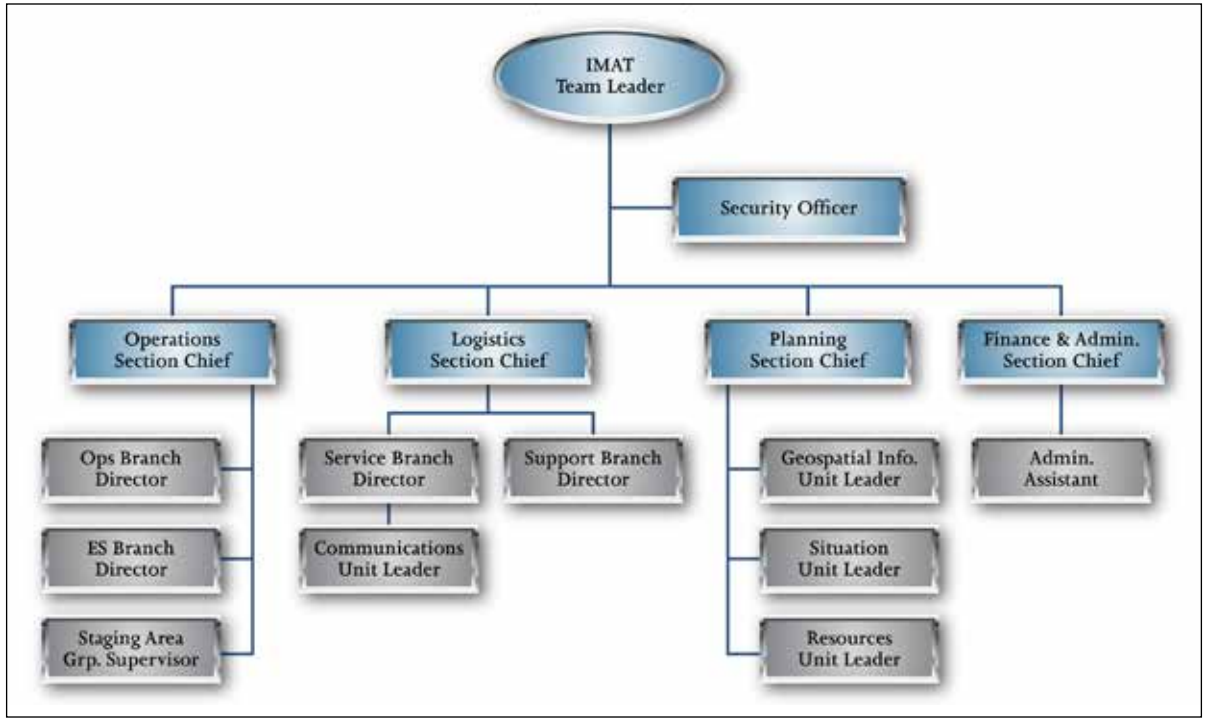


Figure 4-2: Example IMAT Organizational Chart

4.6 FEMA Interim Operating Facility

Overview

In support of catastrophic, no-notice, and other events, FEMA may initiate their efforts with the opening of an Interim Operating Facility (IOF). The IOF is intended to operate as a light-weight version of a JFO with core staffing and the ability to quickly setup operations with minimal dedicated infrastructure. The IOF provides the initial location for federal coordination efforts in support of state-guided local missions. Much like a JFO, the IOF is a flexible entity and varies greatly depending on its specific mission and the evolution of the event it supports. The IOF is staffed by a regional or national Incident Management Assistance Team (IMAT) and tailored specifically to the federal requirements for the expected operations. ***Figure 4-2*** shows the organization of the national IMAT teams.

In disaster response, the IOF serves as the immediate and potentially pre-event federal presence for field-level federal operations. The IOF may be co-located with the state EOC, or operate from a convention center or other suitable facility proximal to the state offices of an impacted community. The IOF is expected to transition support over to a JFO as it comes on-line, typically several days to two weeks. Staff deployed to the IOF will move to the JFO and continue their support roles for the event.

In support of NSSE, federal resources are deployed to maintain a level of security for the specific event. When directed, FEMA can setup an IOF to house their staff deployed as a preparedness measure. In this setting, the IOF may occupy space on a military base, hotel, state offices, or other facilities. NSSE deployments are planned in advance and have a defined staffing plan to support the anticipated operations for the event.

Roles and Responsibilities

The IOF is rostered for a single geospatial lead within the IMAT. This individual provides federal coordination for the event supported. Additional geospatial staff can be deployed to support the IOF; however, the primary geospatial activities at the IOF

are focused at the coordination for data and products as opposed to map production. The IMAT GIU lead will rely on reach-back opportunities to the NRCC and RRCC for most external product requests.

Operational Support

In supporting a disaster event, the JFO will assume responsibility for all geospatial activities. The GIU lead at the IOF may become the JFO GIU lead or transition over as support staff to the JFO. A significant benefit of the IOF interactions revolves heavily around coordination efforts at the federal, state, and local levels. The relationships developed at the IOF allow the JFO to immediately begin operations with significant connections to key data and map products. This relationship continues as remote sensing requests are submitted and geospatial activities escalate with the expansion of disaster response and recovery operations.

Production Methods

GIS and remote sensing requests are taken by the IOF GIU Lead from internal and external customers. Internal requests can be filled by the IMAT GIU lead in support of team operations. External requests are forwarded to the RRCC, NRCC, or JFO (if available) for completion.

Authoritative Data

The IOF produces minimal datasets for their operations. Much of the data utilized by the IMAT GIU lead is provided by federal sources or state/local partners. Core base data comes from HSIP Gold and the FEMA MAC. Any data created at the IOF will be transferred directly to the JFO for continued efforts.

Product Specifications

The IOF maintains data in many formats and often performs the database processing efforts at the JFO due to staffing and mission efforts. Data collected locally will continue to be of value as the event operations progress. Geospatial products are developed according to general FEMA standards to include layout style, symbology, and output formats. Products are shared through HSIN and direct upload to the FEMA network.

5.0 Catastrophic Disasters

Catastrophic events result in an immediate surge of requirements exceeding available resources. The majority of guidance documents related to disaster operations are focused on frequently occurring events and provide a core framework that supports all levels of federal, state, and local response and recovery operations. This section of the GeoCONOPS provides detailed guidance on the provision of geospatial support activities for catastrophic natural and man-made events.

5.1 Event Types

Within the GeoCONOPS, events are broken into two basic categories: natural and man-made events. This provides for a simplified discussion area and provides clear separation between events.

5.1.1 Natural Events

Natural events are inherently dynamic. While they are predictable to a point, events initially believed to be minor threats can quickly become catastrophic. Natural events with catastrophic potential range from hurricanes (with counts and severity predicted yearly) to earthquakes (predicted by magnitude and large reoccurrence intervals). Natural disaster threats are variable with both predicted (notice) and surprise (no-notice) events happing regularly across the country.

Notice Events

Weather-based events generally provide opportunities to observe their formation and development, greatly aiding predictions related to magnitude and impact potentials. The science behind these prediction efforts continues to improve as do the response plans that build from the detail they provide. Natural notice events include: hurricanes, wildfire, riverine flooding, and wind storms.

This advanced notice allows commodities and other resources to be pre-deployed in preparation for the predicted impacts. The response activities with these events benefit greatly from the pre-event attention they are provided. In some situations, Federal Emergency Declarations are granted to provide immediate funding for pre-event activities.

No-Notice Events

No-notice events, including earthquakes, tornadoes, and volcanoes, initially create a multitude of unknown effects. The impacted areas, level of damages, and immediate threats must be defined to support initial impact assessments and planning for disaster response. Depending on the situation, this and other information may be delayed or otherwise unavailable. Estimates from modeling and other geospatial tools may serve as the basis for the immediate response activities.

In addition to local knowledge and assumptions, computer-based models are utilized to assist in defining potential impacts immediately following an event. These tools may be designed specifically for response efforts while others are adapted from their role in planning and preparedness estimations.

5.1.2 Man-Made Events

Man-made events address all human-induced scenarios, whether intentional or unintentional. Fixed facilities such as nuclear, chemical, and biological operations are required to maintain planning and exercise efforts. If an event is generated at these locations, site managers and the local communities are prepared to respond effectively. Terror-based events in contrast can be planned for and exercised; however, the dynamics of location and community variables will always impact the response efforts.

Terror-based events are typically surprise events at any locale chosen by the terrorists. These events generally have plans compiled for them. The dynamics of the venue and occupancy will vary widely and create a multitude of uncertainties.

Notice Events

Man-made notice events would include failing nuclear facilities and pre-identified terrorism targets. With these events, pre-event activities would be initiated to include: threat monitoring, assessments of impact potential, evacuations ordered, and protective measures enacted. While many of these events have been planned for, each event will create unique impacts and require an aggressive and dynamic response by the Whole Community.

No-Notice Events

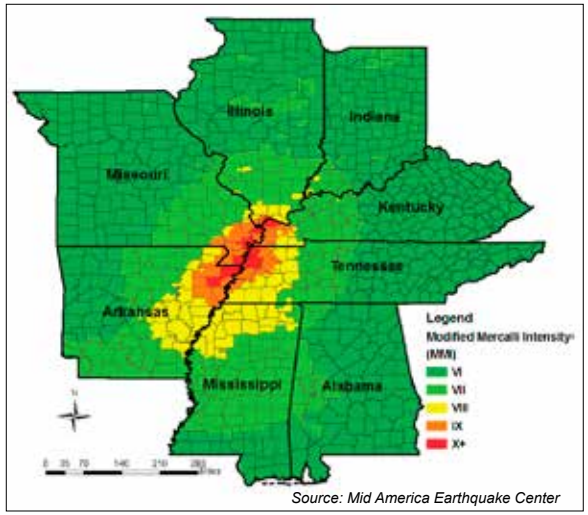
A terrorism scenario would most likely fall into the no-notice category as they are typically intended to surprise and inflict terror. Since the 9/11 attacks, efforts in prepared and protection against terror-based events have expanded significantly. While the related activities have increased our nation's overall preparedness, much of the response effort will be uniquely defined by the mechanism of the attack and the location it is undertaken.

In addition to intentional actions, man-made events can be caused by natural events such as earthquakes and hurricanes. In these instances, the man-made event will impact an already difficult situation. In all situations, modeling tools, specialized team reports, and first-hand information will be imperative in supporting situational awareness and overall decision making.

5.2 The New Madrid Earthquake Scenario

This section of the GeoCONOPS explores the details of applying geospatial technologies in support of efforts following a catastrophic natural event. The New Madrid Seismic Zone (NMSZ) earthquake scenario has been selected as a discussion focus for the preceding text. The NMSZ has a 10 percent probability of a catastrophic NMSZ earthquake in the next fifty years.

The GeoCONOPS uses a detailed scenario to outline the expected geospatial activities that will occur as a result of a catastrophic NMSZ earthquake. Documenting the timing for application of geospatial tools as a result of a NMSZ scenario provides an understanding of activities resulting from an earthquake no-notice event. The geospatial activities



Source: Mid America Earthquake Center

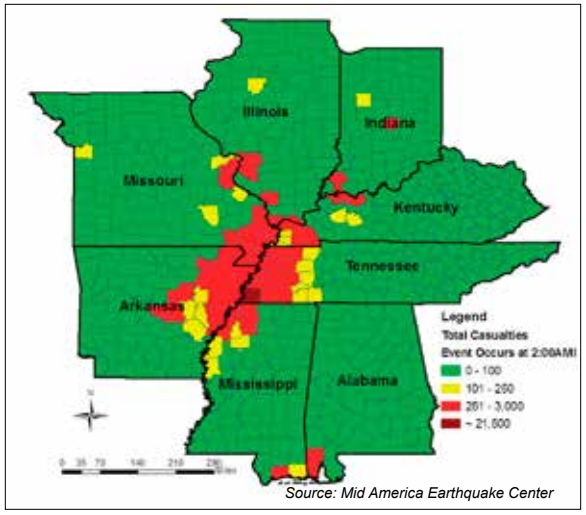
Figure 5-1: Regional Ground Shaking Intensity from NMSZ Earthquake Scenario

can be applied to response efforts of an actual catastrophic event or support disaster exercises.

The NMSZ earthquake scenario was developed by FEMA and the Mid America Earthquake (MAE) Center for contingency planning efforts to assist in defining the federal government's response to an earthquake in the NMSZ. The NMSZ earthquake scenario is a magnitude 7.7 (Richter scale) earthquake caused by a simultaneous rupture over the entire length of three separate segments in the NMSZ impacting an eight-state region.

HAZUS was used to estimate losses in the eight impacted states, in support of the multi-year New Madrid Catastrophic Planning Initiative. The earthquake model estimates the impacts of scenario earthquakes on buildings, transportation and utility lifelines, and the population at risk. Model outputs include maps and tables of estimated losses.

Figure 5-1 shows the ground shaking intensity from the scenario event. As a result of this intensity, high-level impacts include:



Source: Mid America Earthquake Center

Figure 5-2: Total Casualties from Scenario Earthquake

- Severe ground shaking occurs in western Kentucky, Tennessee, southeast Missouri, and northeast Arkansas.
- An estimated 141 counties are impacted in the eight state region.
- By day three, approximately three million people will seek shelter.
- There are approximately 82,000 injuries and 3,500 deaths.
- Approximately 715,000 buildings will be damaged, with 230,000 damaged beyond repair.
- Aftershocks of magnitude six are likely to occur in the days and weeks following the initial event.

5.2.1 Modeled Earthquake Impacts

The following section highlights the nature and scope of damage in the NMSZ of a magnitude 7.7 earthquake, including social impacts (casualties, shelter requirements, displaced households, etc.), damage to buildings and essential facilities, and damage and loss of functionality to transportation and utility lifelines.

Casualties

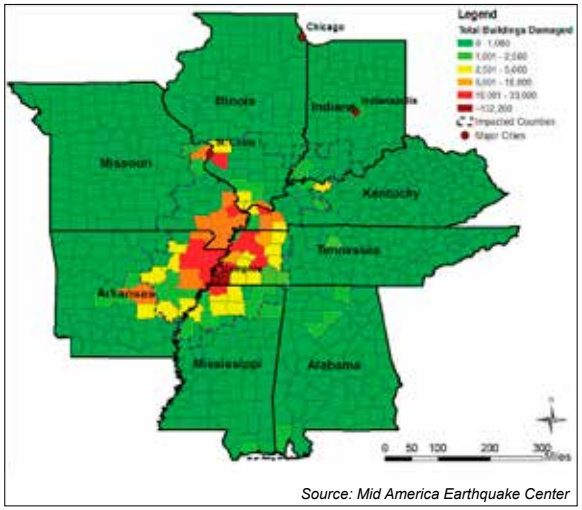
The Central U.S. has high concentrations of unreinforced masonry structures and other buildings that are vulnerable to even moderate levels of ground shaking from earthquakes. Damage to vulnerable structures contributes to the estimated 85,000 casualties that occur in the scenario earthquake, including an estimated 3,500 fatalities.

The largest number of total casualties occurs in Western Tennessee, with 25% of all casualties occurring in the Memphis area. Northeast Arkansas and southeast Missouri also incur substantial casualties, as shown in ***Figure 5-2***.

Displaced Population and Shelter Requirements

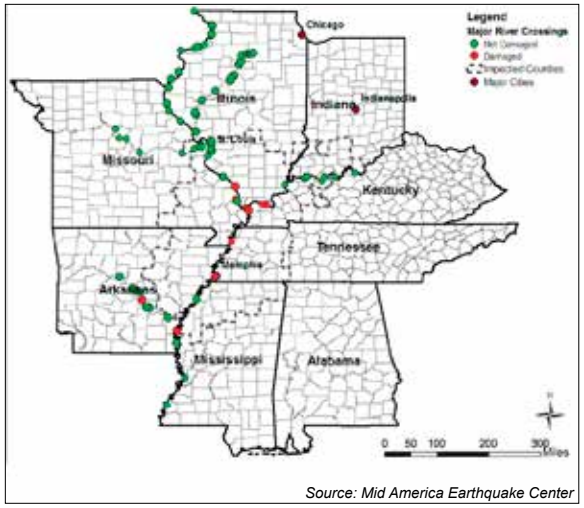
A magnitude 7.7 earthquake will cause a massive displacement of households in the NMSZ. The HAZUS methodology calculates displaced and shelter-seeking populations based on damage to residential structures, and severe and long-term damage to lifeline systems, including water and power. This "At Risk" population is shown in ***(see Table 5–1 on page 86)***. At Risk on Day 1 includes estimates of displaced people. At Risk on Day 3 includes displaced plus those without power or water for at least 72 hours.

Estimates for the number of people seeking shelter are calculated as a percentage of the displaced population, taking into consideration demographic composition factors including ethnicity, age, and income level. These demographic factors influence the number of families seeking shelter in a region. For example, those families with limited financial means are more likely to seek public shelter and require short-term housing.



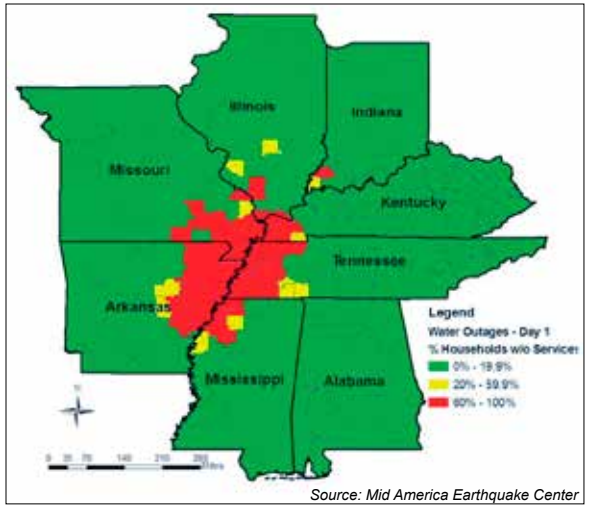
Source: Mid America Earthquake Center

Figure 5-3: Estimated Damage to General Building Stock



Source: Mid America Earthquake Center

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



Source: Mid America Earthquake Center

Figure 5-5: Distribution of Water Outages on Day 1 in NMSZ

A preliminary analysis of shelter availability and the shelter requirements defined in ***Table 5–1***, conducted as part of the NMSZ catastrophic planning initiative, reveals significant shelter gaps in the NMSZ, with the exception of northern parts of Illinois and Indiana.

Structure Damage

Overall, there are more than 700,000 buildings moderately or severely damaged in the eight states that are in the NMSZ.

As reflected in ***Figure 5-3***, Arkansas and Tennessee experience the most significant building damage. The scenario earthquake would cause at least moderate or severe damage to over 265,000 buildings in Tennessee alone, including nearly 50,000 unreinforced masonry structures.

Table 5–1: Estimate of "At Risk" and Shelter Seeking Populations: NMSZ Scenario Earthquake

State & FEMA Region Total	Total Population	At Risk(Day 1)	Seeking Shelter (Day 1)	At Risk (Day 3)	Seeking Shelter (Day 3)
Alabama	4,447,100	9,645	3,081	601,561	173,412
Kentucky	4,041,769	53,860	14,952	850,615	233,909
Mississippi	2,844,658	61,997	18,345	705,032	205,507
Tennessee	5,689,283	316,681	91.103	2,072,942	562,468
Illinois	12,419,293	50,285	15,588	650,247	185,139
Indiana	6,080,485	9,932	2,701	579,627	153,570
Arkansas	2,673,400	124,730	38,827	937,518	285,865
Missouri	5,595,211	103,655	30,074	842,002	237,991
Total	43,791,199	730,795	214,671	7,239,544	2,037,861

Source: Mid America Earthquake Center

Essential Facilities

In the aftermath of this event, there will be limited medical, firefighting, and law enforcement services in the most impacted states in the NMSZ. ***Table 5–2*** shows the total number of essential facilities in the seven states most at risk from a catastrophic earthquake in the NMSZ, estimates of "at least moderate damage" and estimates of "complete damage."

Data Analysis:

- Approximately 80 percent of essential facilities that sustain complete damage are located in the three regions: western Tennessee, southeast Missouri, and eastern Arkansas.

- Many schools in the study area are unreinforced masonry structures, which account for a high percentage of moderately damaged and completely damaged school buildings.
- Over 40 EOCs will be completely damaged, which will significantly impact the ability of local emergency response to respond to needs.

Transportation System Damage

The scenario earthquake damages over 3,500 highway bridges in the 140 counties in the NMSZ. Approximately 1,255 highway bridges will sustain complete damage. Many of these bridges cross the Illinois, Mississippi, Missouri, Ohio, and Arkansas Rivers, which carry high volumes of traffic as well as major pipelines and communications lines. ***Figure 5-4 on page 86*** shows major damaged bridges that cross these rivers, which will impede emergency response and evacuation operations.

Water and Power Outages

Over a million households will be without water following a magnitude 7.7 earthquake in the NMSZ, with over 500,000 in Tennessee alone. Similarly, power outages are widespread, occurring in over 100 counties, and affecting approximately 2.5 million households ***(Figure 5-5 on page 86)***.

Table 5–2: Estimated Damage to Essential Facilities in the NMSZ

Essential Facility	Total Facilities	At Least Moderate Damage	Complete Damage
Schools	44,288	1,322	277
Fire Stations	8,958	729	177
Police Stations	3,984	379	136
Hospitals	2,615	129	32
Emergency Operations Centers (EOC)	869	116	44

Source: Mid America Earthquake Center

The severity of utility damage and duration of disruption has a major impact on the number of households that will seek shelter following the scenario earthquake. In addition, water outages in population centers impede fire suppression.

Scenario Summary

The comprehensive earthquake impact assessment that was undertaken by the MAE Center in support of the New Madrid catastrophic planning initiative utilizes HAZUS and other advanced models to quantify economic loss, building and infrastructure damage, and social impacts. The results of the analysis characterize the catastrophic nature of a magnitude 7.7 earthquake in the NMSZ, and implications for response and recovery.

- Economic losses approach $300 billion.
- There is substantial damage to utility infrastructure, particularly in the impacted counties, leaving 2.6 million households without electricity and 1.1 million households without water after the event.
- Major transportation corridors are interrupted by damage to key infrastructure. Extensive bridge and road damage limits the viable routes for transporting commodities and aiding evacuation efforts.
- Damage to essential facilities will limit the response capabilities of fire, medical, law enforcement, and emergency management in the 140 counties that are most impacted.
- Direct damage to over 700,000 buildings will generate significant US&R team requirements.
- Inland road, rail, air and river travel in the Central U.S. will be severely impacted in the aftermath of the scenario event.
- Over two million people will require temporary shelters after the event due to extended lack of utility services.
- Waterways may become blocked with debris, reducing the viability of major shipping channels in the U.S., namely along the Mississippi, Ohio, Missouri, and Arkansas Rivers.

The results of the loss estimation studies provide FEMA and the states at risk with information that can be used to identify resource gaps and both strategic and tactical challenges to response and recovery from a catastrophic earthquake in the NMSZ.

5.2.2 PPD-8 Mission Area Support

The New Madrid Geospatial Timeline ***(Figure 5-6 on page 88*** and ***Figure 5-7 on page 89)*** identifies high-level federal activities designed to support response and recovery to a catastrophic earthquake in the NMSZ. The geospatial activities ***(Figure 5-6 on page 88)*** are organized into three categories (Operations, Models, RS), and further grouped into the three overlapping key activities (Lifesaving, Damage Assessment, Recovery), described in Section 3. The graphics included in this section ***(Figure 5-7 on page 89)*** provide an overview of activities based on the following assumptions.

- Each push pin represents a key support activity (coded 1-40) with an approximate beginning and end time.
- Each Mission Area is represented by a horizontal platter extending to the right as defined by its operational duration.
- Activities support multiple Mission Areas and are connected by a dashed line dropping to the next platter.
- A significant number of federal activities are initiated concurrently within the first hours of the No-Notice event.

As-is Federal Activities

Operations	Code	Start	End	Key Activity
NOC Spot Reporting & HSIN/COP	1	1hr	90	LS, DA, Rec
Sheltering	2	6hr	90	LS, DA, Rec
State/Local Situation Reports	3	6hr	90	LS, DA, Rec
RNA Teams	4	1	15	LS, DA
FEMA IMAT	5	1	30	LS, DA
Fire Fighting	6	1	30	LS
FEMA US&R Teams	7	1	30	LS
Transportation Inspections (Airport, Rail, & Bridge)	8	1	60	LS, DA, Rec
FEMA IA Inspections (Housing)	9	1	75	DA,Rec
Commodity Distribution	10	1	90	LS, DA, Rec
National Guard Security Teams	11	1	90	LS, Rec
Disaster Medical Assistance Teams	12	3	25	LS, Rec
Veterinary Medical Assistance Teams	13	3	60	LS
FEMA JFO/GIU	14	3	90	LS, DA, Rec
FEMA DRCs	15	3	90	Rec
ARC Damage Assessment Teams	16	4	10	DA, Rec
FEMA PDA Teams	17	4	15	DA, Rec
SBA Inspection Teams	18	4	75	Rec
FEMA PA Inspectors (Infrastructure)	19	5	90	DA, Rec
Debris Removal	20	5	90	Rec
Temporary Hospitals	21	6	90	LS, Rec
Environmental Assessments	22	6	90	Rec
Temporary Housing	23	6	60	Rec
USCG Riverine Task Force	24	8	90	LS, DA, Rec
FEMA Mitigation Assessment Teams	25	15	30	DA, Rec
Models				
USGS Earthquake Notification Service	26	1hr	2	LS, DA, Rec
USGS ShakeMap/PAGER	27	1hr	15	LS, DA, Rec
NOAA/National Weather Service	28	1hr	90	LS
HAZUS-MH	29	4hr	15	LS, DA, Rec
HAZMAT	30	1	8	LS, DA, Rec
USACE Commodities	31	1	45	LS
NISAC (Infrastructure)	32	2	10	DA, Rec
USACE Post-Earthquake Flood	33	2	15	LS, DA, Rec
DHS IMAAC	34	2	15	LS, DA
Debris (USACE)	35	2	90	LS, DA, Rec
FEMA Post-Event Flood Impacts	36	15	90	Rec
Economic Impact	37	25	60	Rec
Remote Sensing				
Life Saving	38	1	30	LS, DA, Rec
Damage Assessment	39	1	60	DA, Rec
Recovery	40	1	90	Rec

Figure 5-6: New Madrid Geospatial Activities

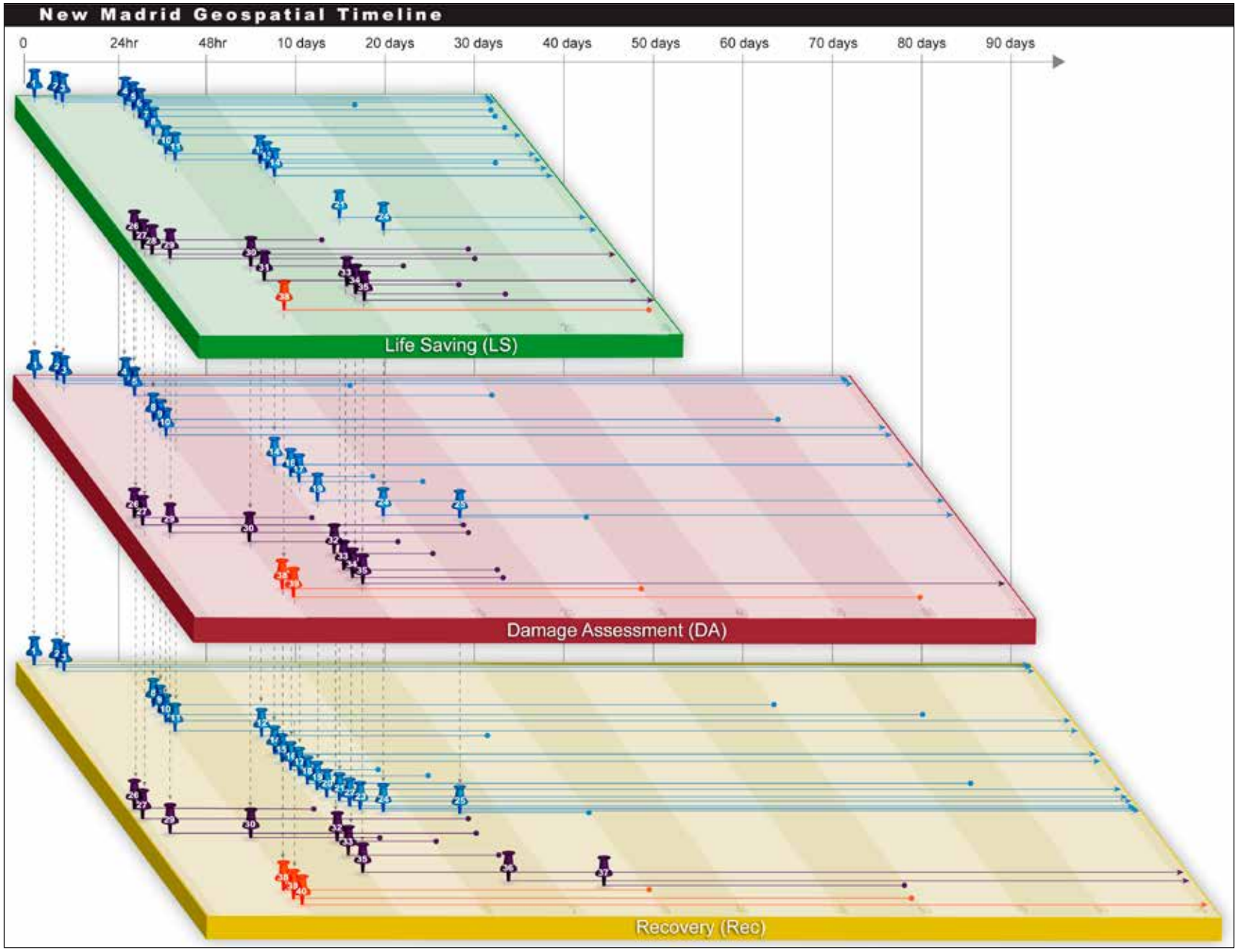


Figure 5-7: New Madrid Geospatial Timeline

- This graphic represents the "as-is" nature of these activities during this type of event.

The graphics are intended to align the key activities in the GeoCONOPS with core geospatial activities. This alignment illustrates the complexities and overlap of geospatial products and information during the initial 90 days following the NMSZ event.

The following sub-sections define many of the activities undertaken within the PPD-8 Mission Areas. Within each Mission Area, sample EEIs are provided for individual activities (see section 2.1.5 for background on EEIs). While EEI lists may be slightly unique to a specific functional area, facility, and/or event type, they generally share common themes and use similar titles regardless of their source. In all instances, EEIs are activity generated information; therefore, an activity could begin on day 1 while the information may not be available for another 36 hours.

Under the NRF, federal activities are undertaken by each of the 15 ESFs (see section 1.5 for background on the ESFs). With representation at the NRCC, RRCCs and each JFO, key ESF information is reported and shared across the community. The ESFs are responsible for the following functional areas:

- ESF #1 – Transportation
- ESF #2 – Communications
- ESF #3 – Public Works and Engineering
- ESF #4 – Firefighting
- ESF #5 – Information and Planning
- ESF #6 – Mass Care, Emergency Assistance, Housing, and Human Services
- ESF #7 – Logistics
- ESF #8 – Public Health and Medical Services
- ESF #9 – Search and Rescue (SAR)
- ESF #10 – Oil and Hazardous Materials Response
- ESF #11 – Agriculture and Natural Resources
- ESF #12 – Energy
- ESF #13 – Public Safety and Security
- ESF #14 – Long-Term Community Recovery
- ESF #15 – External Affairs

For reference, ESF definitions and descriptions are outlined in Section 1.5 of this document.

5.2.2.1 Response Mission

The Response mission is time-critical and locally driven, with assets deployed and managed through NIMS and/or ICS. At the federal level, response resources are mobilized and deployed from across the country (as with any catastrophic event). Several factors in the New Madrid scenario directly impact the execution of Response missions: no warning, multi-state area of operations, continued aftershocks, and the potential damage and loss of functionality to communications systems. Combined, these factors generate and maintain high-levels of uncertainty across the lifesaving community, placing significant information requirement on the geospatial professionals supporting their efforts.

Many of the response activities overlap between missions as the information they provide is useful for many areas of the event. It is important to understand that the information acquired for a specific mission can and will be repurposed to support activities across the event. The ESFs, through their operations or the compilation of information reported by entities within their specific domain, are expected to provide much of the detailed information on the disaster event, fulfilling the requirements of the EEIs. Information supporting the Response Mission is categorized by EEI in ***Table 5–3***.

Critical Transportation

Transportation infrastructure within the impacted area would be devastated. Following assessments of damages roads, bridges, rail lines, and airports, plans would be made for the transportation of relief workers and commodities. Major over-the-road routes would be repaired utilizing temporary solutions. Initially these routes may be closed to civilian vehicles to ensure assistance is available and that public safety is insured.

Airports would be repaired to accommodate military aircraft. Air traffic control systems would be down for some time, preventing commercial flights. Temporary military and/or contracted resources would control the airspace as commercial systems are brought on-line. Rotary aircraft would be required to meet many of the initial response and relief efforts. Temporary flight restrictions would also be in place.

Rail lines would be severely damaged and virtually useless in the hardest-hit areas of the region. The combination of transportation would be utilized to their potential to stock-pile resources and move staff and commodities into the area. As functional landing zones, airports, roads, and highways are identified, geospatial tools would assist in identifying and displaying these key transportation links and hubs.

Fatality Management Services

Disaster Mortuary Operational Response Teams (DMORT) operations begin in 24–36 hours to assist with the remains of non-survivors. Fatality management services are a byproduct of the situation and must be deployed early into the event. This mission requires the creation and maintenance of a business process and supporting database to collect, maintain, and retrieve information on the names of the deceased and the location of the recovery. This data is highly sensitive and is vital to meeting the aggressive requirements of the communities impacted.

Table 5–3: Sample Response EEIs by ESF *1 of 3*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Boundaries of Disaster Area	USGS Earthquake Notification System	ESF #5	1 hour	26
	USGS ShakeMap (intensity)	ESF #5	1 hour	27
	Major Oil/HAZMAT Release	ESF #10	12 hours	30
	Summary of Impacts	ESF #5	24 hours	1
	Imagery Derived Boundaries	ESF #5	24 hours	38
	USACE Dam Failure Inundation (Modeled)	ESF #3	5 days	33
Access to Disaster Area	High Impact Urban Areas	ESF #3	12 hours	11
	Road Closure Estimates	ESF #5	12 hours	29
	Bridge & Tunnel Damage Estimates	ESF #5	12 hours	29
	Debris Estimates	ESF #5	12 hours	29
	Road Closures	ESF #1	24 hours	8
	Isolated Communities	ESF #5	24 hours	3
	Bridge & Tunnel Damage - Reported	ESF #1	48 hours	1
	River Transportation Status	ESF #1	10 days	24
	Airport Status Reports	ESF #1	24 hours	8
Jurisdictional Boundaries	Communities Impacted (USGS ShakeMap)	ESF #5	1 hour	27
	Impacted Communities (Reported)	ESF #5	24 hours	29
Hazard-Specific Information	Vulnerable Structure Reports	ESF #5	12 hours	29
	Active Fires	ESF #4	24 hours	6
	Unsafe Areas	ESF #5	24 hours	3
	Secondary Structural Hazards	ESF#5	48 hours	5
	Vulnerable Structures (modeled)	ESF #3	3 days	14
Weather	NOAA/NWS Forecasted Weather	ESF #5	12 hours	28
	NOAA/NWS Forecasted Weather	ESF #9	24 hours	7

Best Practices - Estimating Search and Rescue Requirements

Following an earthquake, there is a strong correlation between building collapse and US&R requirements. HAZUS provides a useful tool to assist in scaling mission requirements for ESF #9 (SAR) in response to a catastrophic event. FEMA has developed a methodology to calculate the collapse rates of completely damaged structures, based on their building types (e.g., concrete, wood, unreinforced masonry). Through these estimations, the required number of US&R teams can be identified across impacted areas to assist in triaged deployments. Requirements are identified for the following types of US&R TFs:

- US&R Type I (trained and equipped for heavy reinforced concrete operations)
- US&R Type II (heavy wall, heavy floor, concrete-steel construction)
- US&R Type III (unreinforced masonry construction)
- US&R Type IV (light frame construction)

The product of this analysis for the New Madrid catastrophic planning initiative is a summary of requirements for each type of US&R task force. The requirements analysis is aggregated by state, number of structures assessed per day per team, and other variables that can be used to quantify mission requirements. Demand is most acute for Type I and Type III task forces, with anticipated demand dominated by Memphis and western Tennessee.

For additional SAR-specific Best Practices see SAR Geo-Referencing on page 110.

Services would be set up by the local governments to assist families in locating the remains of their loved ones. Information collected through the DMORT process would be sanitized and made available to assist in these services. The details would be expected to include location recovered, date, time, and basic details on cause of death.

Infrastructure Systems

Infrastructure across the region would be significantly damaged. Initial response efforts would focus on stabilizing the high-hazard facilities and systems. Efforts to minimize the cascading effects of everything from nuclear facilities to failing dams would be undertaken. Spatial technologies would be used to identify and triage specific infrastructure targets for inspections and response activities.

Mass Care Services

The provision of critical food, shelter, and water is key in supporting the impacted communities across the NMSZ. Initial feeding options focus on low maintenance foods such as military-style Meals Ready to Eat (MREs) and bottled water. As these commodities require delivery to shelters, households, and PODs across the region, geospatial tools can be used in conjunction with the American Red Cross and USACE methodologies to identify and prioritize requirements across the area of impact.

In this event, the demand for bottled water will be difficult to fill beyond the immediate deployment of available resources. Other solutions such as water trailers, tanker ships, and river-water processing options may provide the impacted communities with clean potable water. Geospatial methodologies are utilized to identify request locations and ingress/egress options based upon analysis of demographics and other dynamic critical factors.

Table 5–3: Sample Response EEIs by ESF (continued) *2 of 3*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Demographics	Estimated Exposed Populations (USGS ShakeMap/PAGER)	ESF #5	1 hour	27
	Impact Upon Income, Ethnicity, & Age (USGS PAGER)	ESF #5	1 hour	27
	Impacted Population Estimates	ESF #5	1 hour	29
Predictive Modeling	USGS Ground Shaking (ShakeMap)	ESF #5	1 hour	27
	HAZUS Outputs (General)	ESF #5	6 hours	29
	USACE Ice/Water Requirements	ESF #6	24 hours	31
	HAZMAT Locations	ESF #10	24 hours	30
Damage Assessments	USACE Post Earthquake Flood Modeling	ESF #3	48 hours	33
	USACE Debris	ESF #3	48 hours	35
	IMAAC	ESF #5	48 hours	34
	USACE Dam Failure Impacts	ESF #3	5 days	33
	FEMA RNA Team Reports	ESF #5	24 hours	4
	River Transportation Status	ESF #1	48 hours	24
	General Imagery Analysis	ESF #5	4 days	38
	FEMA MAT Reports	ESF #5	15 days	25
Airport	Modeled Airport Impact	ESF #1	12 hours	29
	Airport Status	ESF #1	24 hours	8
Status of Communities	State/Local Situation Reports	ESF #5	6 hours	3
	Current Shelter Requirements	ESF #6	6 hours	2
	Distribution Site Location/Status	ESF #6	4 days	10
Status of Transportation	Evacuation Routes	ESF #1	12 hours	3
	Road, Rail, Pipeline, Port, & Airport Status	ESF #1	24 hours	8
Status of Communications	Land-Line, Cellular, and Internet access status	ESF #2	12 hours	1

Table 5–3: Sample Response EEIs by ESF (continued) *3 of 3*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Status of Emergency Operations Centers	Federal EOC Status	ESF #5	1 hour	1
	JFO/GIU Locations	ESF #5	24 hours	14
Status of Critical Infrastructure	Federal Critical infrastructure Status	ESF #5	1 hour	1
	State/local Critical infrastructure Status	ESF #5	12 hours	3
Status of State/ local EOCs	State/Local EOC Status	ESF #5	12 hours	3
Status of Medical Services	Estimated Hospital Functionality	ESF #5	4 hours	29
	Disaster Medical Team Deployment Status	ESF #8	24 hours	12
	Veterinary Team Deployment Status	ESF #8	3 days	13
	Hospital Status	ESF #8	6 days	21
Status of Energy Systems	Damage to Power Infrastructure	ESF #12	24 hours	1
Status of Personnel	FEMA IMAT Deployment	ESF #5	1 hour	5
Status of Remote Sensing Operations	Remote Sensing Status	ESF #5	12 hours	38
Donations/ Voluntary Agency Activities	Shelter Status	ESF #6	48 hours	2
Public Safety	Alert Notifications (reported)	ESF #5	12 hours	1
	National Guard Security Team Status	ESF #5	24 hours	11
	High Hazard/Unsafe Areas	ESF #5	36 hours	38
Hazardous, Toxic, and Radiological Issues	Public Safety Notices	ESF #8	12 hours	1
	Public Safety Notices	ESF #12	12 hours	1

As the NMSZ scenario results in an immense number of displaced households across a multi-state region, options and strategies for shelter provision are unique. Significant impediments to response to a New Madrid catastrophic earthquake include: accessibility to shelters, weather conditions, and major damage to water and power infrastructure. HAZUS, ShakeCast, and PAGER are among the geospatial tools available to support initial Shelter decision making. These spatial models provide estimates on populations requiring shelter, residential structure damage, and areas impacted all key elements in determining regional shelter requirements.

Shelters are typically operated by the American Red Cross, however, following this event shelters would also "stood-up" by organizations witnessing requirements as well as unorganized options occurring as people congregate after reaching a perceived safe zone. While the NSS maintains geospatial information on the activities of "official" shelters, the ad hoc shelters will require assistance and will be difficult to locate early into the event.

Many factors will determine the overall requirements for shelter facilities, including damage intensity, weather conditions, and the socio-economic profile of the impacted population. As specific needs are identified, there will be delays in getting resources into the damaged areas and difficulties in mobilizing enough commodities to support the event survivors. Additionally, emergency managers must factor the requirements of special needs populations in developing and executing shelter plans.

Formal evacuations for the New Madrid event would be minimal as there would be few places to accommodate the enormous volume of survivors. As the event response evolves, short and long-term options would become available in areas where they could be supported. Geospatial analysis would assist in determining appropriate locations based on population size, levels of damage, and local infrastructure.

Best Practices - NGA Domestic Mobile Integrated Geospatial-Intelligence System

The National Geospatial-Intelligence Agency (NGA) Domestic Mobile Integrated Geospatial-Intelligence System, or DMIGS, is a mobile, self-contained unit that provides on-site geospatial intelligence (GEOINT) support to U.S. lead federal agencies responding to federal, state and local governments in times of domestic crises, natural disasters or special events. The DMIGS fleet consists of two, 44-foot long vehicles plus a support vehicle that integrates GEOINT hardware and software with a robust communication system enabling NGA to deploy up to six analysts in support of operational requirements.

DMIGS systems are deployed as "full-service" NGA deployment capabilities when other NGA capabilities such as lightweight unclassified "flyaway" communications and production capabilities or on-line on-demand GEOINT resources are unable to fulfill requirements. DMIGS deployments are typically required when on-site workspace, power, space or communications do not support embedded "flyaway" operations or when other than strictly unclassified GEOINT support is required.

During a number of National Special Security Events such as the Super Bowl, the All-Star Game, the Winter Olympics, national political conventions and natural disasters, including hurricanes Katrina and Rita, NGA previously used equipment designed primarily for military customers. This experience demonstrated the need for equipment specifically designed for domestic situations. DMIGS was designed to support numerous homeland security missions by providing timely Geospatial-Intelligence capabilities directly in the hands of those first responders in forward deployed operations.

The first DMIGS vehicle became operational in August 2006, with the second vehicle coming online in April 2009. The fleet has provided significant support to numerous special and political events, including the Presidential Inauguration of 2008, as well as U.S. natural disasters recovery operations, including the devastating tornadoes in the South, Midwest flooding, Hurricane Irene in 2011 and to Hurricane Sandy in 2012.

Mass Search and Rescue Operations

The multi-state area of operations in a NMSZ scenario and the time-critical nature of SAR missions combine to heighten the importance of effectively utilizing geospatial tools to identify and prioritize the deployment of federal SAR assets. At the NRCC level, geospatial products will initially be focused at the impacted region and designed to develop strategic plans for the distribution of SAR resources.

SAR operations at the federal level are initiated immediately following the New Madrid event. Initial activation identifies teams for alert status and their availability for deployment to the area of operations. Single or multiple Incident Management Teams (IMT) provide direct geospatial support, with additional products coming from the NRCC, RRCCs, and other federal entities. Geospatial products utilized within the IMT support the development of strategic, operational, and tactical plans for the deployment of SAR teams.

US&R activities focus on the rescue of persons trapped in confined structures. GAs assist in determining areas with high probabilities of structural collapse and spatially locating communities reporting structural failures and/or trapped individuals. The Inland Search teams would assist communities with their efforts clearing rural communities and searching for unaccounted people outside collapsed structures. Water rescue teams are mobilized to assist in river rescue and within areas flooded by levee collapse or diversion of normal river courses.

On-scene Security and Protection

Public safety would be a significant issue across the areas heavily impacted by the earthquake. The local law enforcement staff would be struggling to support their professional duties as they are also victims of the event, having lost property and loved ones. Police forces would be pulled from the surrounding communities and would be augmented by National Guard forces.

Security for the responders would be required at multiple locations across the region. US&R teams would need protection as they would be operating in devastated communities. Temporary operation centers would require protection as well.

The demands of the event would immediately overwhelm the country's law enforcement officers requiring contracted security to assist.

Public Health and Medical Services

Like SAR teams, medical teams with varying capacities are mobilized to treat potentially thousands of injured disaster survivors. Medical support includes standing-up temporary hospitals to support staff and patients displaced by damaged hospital facilities and to provide hospital services to address incident-related injuries. As potential sites need to be identified prior to the team and other resource deployments, GAs analyze all available information to identify suitable locations for these facilities.

Emergency evacuations from the field transport survivors to sites appropriate for rotor wing Landing Zones (LZ), vehicular, and foot traffic. These sites are needed throughout the region as survivors are rescued, triaged, and transported to locations inside and outside the impacted area. Sites need to accommodate both aircraft and over-road mechanisms of transportation. In order to support and sustain transportation activities, information such as access routes (ingress/ egress) and airspace closures will need to be updated frequently.

The Critical Medical Support mission requires large volumes of equipment and supplies for delivery to locations across the region. The nature of these shipments requires pre-planned transportation routes and an adequate level of security to ensure the commodities arrive at the locations where they are required.

The geospatial products available to support medical response planning in a catastrophic earthquake include HAZUS estimates of casualties from structural and bridge damage, and loss of functionality due to damaged medical facilities. Analyses are used to scale mission requirements and to identify areas with critical medical services requirements.

Table 5–4: Sample Recovery EEIs by ESF

1 of 3

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Boundaries of Disaster Area	USGS Earthquake Notification System	ESF #5	1 hour	26
	USGS ShakeMap (intensity)	ESF #5	1 hour	27
	Major Oil/HAZMAT Release	ESF #10	12 hours	30
	Summary of Impacts	ESF #5	24 hours	1
	Imagery Derived Boundaries	ESF #5	24 hours	38
	Energy Infrastructure Failures	ESF #12	24 hours	32
	USACE Dam Failure Inundation (Modeled)	ESF #3	5 days	33
Access to Disaster Area	High Impact Urban Areas	ESF #3	12 hours	11
	Road Closures	ESF #1	24 hours	8
	Isolated Communities	ESF #5	24 hours	3
	Bridge & Tunnel Damage - Reported	ESF #1	48 hours	1
	Debris Removal Status	ESF #3	7 days	20
	River Transportation Status	ESF #1	10 days	24
	Airport Status Reports	ESF #1	24 hours	8
Jurisdictional Boundaries	Impacted Communities (Reported)	ESF #5	24 hours	29
Socio-Economic Impacts	IA Applicant Estimates	ESF #6	48 hours	9
	SBA Applicant Estimates	ESF #6	48 hours	18
	FEMA PA Inspection Locations	ESF #3	7 days	19
Hazard-Specific Information	Vulnerable Structure Reports	ESF #5	12 hours	29
	Unsafe Areas	ESF #5	24 hours	3
	Secondary Structural Hazards	ESF #5	48 hours	5
Weather	NOAA/NWS Forecasted Weather	ESF #5	12 hours	28
	NOAA/NWS Forecasted Weather	ESF #5	24 hours	7
Demographics	Estimated Exposed Populations (USGS ShakeMap/PAGER)	ESF #5	1 hour	27
	Impact Upon Income, Ethnicity, & Age (USGS PAGER)	ESF #5	1 hour	27
	Impacted Population Estimates	ESF #5	1 hour	29

Table 5–4: Sample Recovery EEIs by ESF (continued) *2 of 3*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Predictive Modeling	USGS Ground Shaking (ShakeMap)	ESF #5	1 hour	27
	HAZMAT Locations	ESF #10	24 hours	30
	USACE Post Earthquake Flood Modeling	ESF #3	48 hours	33
	USACE Debris	ESF #3	48 hours	35
	USACE Dam Failure Impacts	ESF #3	5 days	33
Damage Assessments	IA Applicant Locations	ESF #6	24 hours	9
	SBA Applicant Locations	ESF #6	24 hours	18
	River Transportation Status	ESF #1	48 hours	24
	General Imagery Analysis	ESF #5	4 days	38
	IDP - Structure Damages	ESF #5	5 days	39
	IDP - Transportation Damages	ESF #5	5 days	39
	FEMA PDA Team Reports	ESF #5	6 days	17
	ARC Damage Assessment Team Reports	ESF #6	6 days	15
	Debris Removal Status	ESF #3	7 days	20
	FEMA PA Inspection Locations	ESF #3	7 days	19
	Imagery Analysis (pre vs. post-event imagery)	ESF #5	30 days	40
Airport	Airport Status	ESF #1	24 hours	8
	FEMA PDA Team Reports	ESF #5	6 days	17
Status of Communities	Regional Environmental Assessments	ESF #10	9 days	22
	State/Local Situation Reports	ESF #5	6 hours	3
	Current Shelter Requirements	ESF #6	6 hours	2
	Distribution Site Location/Status	ESF #6	4 days	10
	FEMA PDA Team Reports	ESF #5	6 days	17
	Temporary Housing Status	ESF #6	8 days	23
	IDP - Post-Event Construction Monitoring	ESF #5	30 days	40

5.2.2.2 Recovery Mission

In the New Madrid scenario, Response operations may last for 30 days and beyond, and will overlap greatly with Recovery activities. After 15–20 days, rescue efforts wind down as the focus transitions to medical, feeding, and sheltering support activities. The short-term recovery focuses aggressively on providing a core level of government services, sheltering of displaced households, and implementing measures to stabilize the situation. Information supporting the Recovery Mission is categorized by EEI in ***(Table 5–4 on page 95)***. The New Madrid Geospatial Timeline highlights the recovery activities for the first 90 days ***(Figure 5-8 on page 98).***

Public Information and Warning

Public information would be critical in the recovery phase of this event. The governments involved would need to explore all available options to ensure that messaging was reaching all survivors in the region. With most of the communication infrastructure damaged, citizens would revert to radio and antenna-based television to receive information on the event.

Outside the damaged area efforts would be in place to keep the country current on the situation and assist off-site citizens with connecting with their loved ones. Media resources would provide assistance with these tasks as a public service. Spatial analysis would help identify communities cut off from communications and monitor the theater for areas requiring special messaging options.

Economic Recovery

Economic Recovery efforts would be initiated with analysis exploring the magnitude of damage and the long-term consequences of the event. The direct activities associated with this effort would begin in the months that follow. The geospatial data collected and created during the response and recovery phases would all support the long-term economic recovery of the region.

Table 5–4: Sample Recovery EEIs by ESF (continued) *3 of 3*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Status of Transportation	Evacuation Routes	ESF #1	12 hours	3
	Road, Rail, Pipeline, Port, & Airport Status	ESF #1	24 hours	8
Status of Communications	Land-Line, Cellular, and Internet access status	ESF #2	12 hours	1
Status of Emergency Operations Centers	Federal EOC Status	ESF #5	1 hour	1
	JFO/GIU Locations	ESF #5	24 hours	14
	DRC Locations/Status	ESF #5	2 days	15
Status of Critical Infrastructure	Federal Critical infrastructure Status	ESF #5	1 hour	1
	State/local Critical infrastructure Status	ESF #5	12 hours	3
Status of State/local EOCs	State/Local EOC Status	ESF #5	12 hours	3
Status of Medical Services	Estimated Hospital Functionality	ESF #5	4 hours	29
	Disaster Medical Team Deployment Status	ESF #8	24 hours	12
	Hospital Status	ESF #8	6 days	21
Status of Energy Systems	Power Outages	ESF #12	12 hours	32
	Damage to Power Infrastructure	ESF #12	24 hours	1
Status of Declarations	Declaration Status	ESF #5	1 hour	1
Status of Remote Sensing Operations	Remote Sensing Status	ESF #5	12 hours	38
Donations/Voluntary Agency Activities	Shelter Status	ESF #6	48 hours	2
Public Safety	Alert Notifications (reported)	ESF #5	12 hours	1
	National Guard Security Team Status	ESF #5	24 hours	11
	High Hazard/Unsafe Areas	ESF #5	36 hours	38
Hazardous, Toxic, and Radiological Issues	Public Safety Notices	ESF #8	12 hours	1
	Public Safety Notices	ESF #12	12 hours	1

Health and Social Services

Medical and health requirements would be significant following the earthquake. With many non-fatal injuries, the walking-wounded would be desperate to locate medical care to assist them. Much of the day-to-day medical facilities would be devastated and struggling to maintain care for their patients admitted prior to the event. Emergency rooms may be damaged beyond functionality or may simply be without power. With the large quantity of assistance requests across the region, geospatial analysis could assist in locating pending requests for staff, commodities, and power and build transportation routes between facilities.

Other social services would be required to assist in mental health and special needs populations. The geospatial staff would utilize damage severity and demographics to assist in identifying targeted populations and services. Other analysis would include estimates of casualties from structural and direct impact, routing, and potential locations for federal resources deployments. Analyses are used to scale mission requirements and to identify areas where critical medical services requirements are needed.

Housing

The IA Program is the government's connection to the citizens impacted by disaster events. This program provides financial assistance for food, clothing, housing and other personal needs through government funds, voluntary agencies, and low interest loans.

Applicants for the FEMA IA program are required to call FEMA's toll-free number from any location and provide their personal information in order to receive assistance for their personal losses. This process collects key information including damage address, mailing address, and physical address.

This location information enables ESF #6 to identify where the damage occurred and where applicants are currently located. In the days and weeks following the event, many individuals move to formal shelters, move in with family and friends outside of the damaged areas, or move to regions beyond the impacted area. These simple address fields support analyses to determine shelter needs, survivor re-population, and return options for the foreseeable future.

Housing inspections assess structures for habitability and estimate repair/replacement costs. Following a New Madrid scenario event, residential damages are expected to exceed the ability of inspectors to conduct visits to personal properties in a timely manner. Geospatial technology will be used to provide expedited financial assistance based on damage assessment data derived from imagery, models, and ground truth sources. This effort will focus on communities with the greatest impacts to assist in making immediate approval for applicants to receive financial assistance as quickly as possible.

The Emergency Housing programs are vital to the impacted communities. Options are available for long-term housing (1–2 years) in the form of rental assistance, hotel vouchers, shelter environments, and other alternatives. Unlike notice events, many individuals with the financial means to leave will be stranded in the area. Temporary shelters will meet the immediate requirements but cannot support housing beyond 30–60 days.

Infrastructure Systems

FEMA's PA program is activated following the event. FEMA HQ plans for PA missions in support of multiple JFOs within each of the impacted states. As part of the PDA Teams, PA staff are deployed to the field to assess overall impacts, returning with reported data and maps. While these reports may not be geospatial in nature, their location information is analyzed for spatial content to derive their specific location incorporated into the event data holdings.

Communities in areas of highest earthquake intensity are expected to suffer significant losses to their infrastructure. Due to limitations in staff and resources immediately available for inspections, partial repairs will be required for critical public assets. These activities will include: repairing road damages for single lane travel, removing debris to clear single lanes of traffic, repairing levees and other water control structures, and constructing temporary routes around damaged transportation structures such as bridges and overpasses.

Under PA, the Debris mission will be challenging given the broad area of impact, anticipated damages, and loss of functionality to bridges and transportation systems. As sites need to be identified for interim storage and long-term disposal, geospatial analyses provide key information for selecting sites that are suitable for the PA activities. To assist in reducing to volume of debris material requiring removal, incinerators may be permanently sited and constructed.

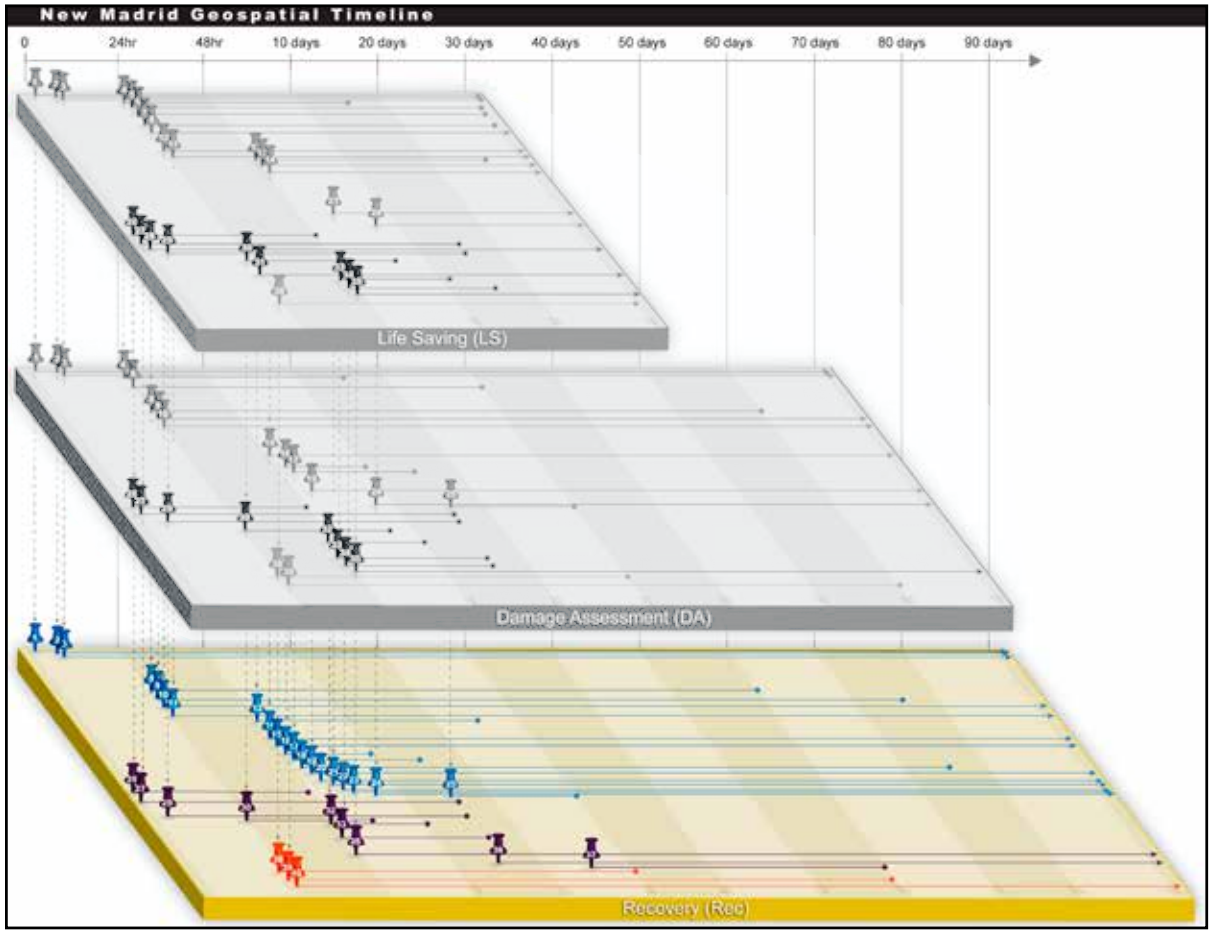


Figure 5-8: Geospatial Timeline – Recovery

The PA inspection teams visit project locations and collect detailed attribute information as well as photos of the damages and any temporary repair efforts to assist in the distribution of program funds. The data collected during the inspection process will feed into their databases to support the determination of eligibility and expense breakdowns. In addition, this information provides a source of ground-truth information useful in identifying the impacted areas, making general assessments by community, and satisfying the overwhelming requirements for information. As the PA program supports publicly owned facilities, the inspection data is not bound by the Privacy act and is useful to the public for many secondary purposes such as status monitoring and community recovery applications.

5.2.2.3 Mitigation Mission

The aftermath of a damaging or catastrophic earthquake provides a window of opportunity for the implementation of mitigation measures that target essential facilities (police, fire, hospitals, shelters), businesses, residences, and lifelines (transportation and utilities). Mitigation measures—including the adoption of seismic provisions in building codes, seismic retrofits of buildings, and non-structural mitigation measures (e.g., fastening water heaters)—can improve the performance of buildings and contents in the next major event.

Post-earthquake investigations are coordinated through the National Earthquake Hazards Reduction Program (NEHRP), under the direction of NIST and FEMA. These programs focus on building and lifeline performance in damaging earthquakes and utilize the findings to improve risk reduction practices. This analysis is also incorporated into Long-Term Community Recovery initiatives.

Residential building safety inspections are a critical post-earthquake function. Tens of thousands of residential structures will need to be evaluated to determine structural safety for re-habitation. Efficient building safety assessments will increase the supply of safe structures and reduce demand for housing assistance under the IA Program. FEMA's Rapid Observation of Vulnerability and Estimation of Risk (ROVER) is an open source software application developed for the Earthquake Program that provides FEMA and other users with a database of structure that are vulnerable to earthquakes. ROVER can be used to prioritize and carry out post-event building safety evaluations, and facilitate the sharing of data in the field. This tool supplements and complements other building safety initiatives.

Information supporting the Mitigation Mission is categorized by ESF in ***(Table 5–5 on page 100)***.

Long-term Vulnerability Reduction

Following the core response and recovery activities, mitigation programs will look to reduce the region's vulnerabilities in future earthquake events. This effort will utilize geospatial information collected before, during, and after the event. Analysis will examine the communities, infrastructure, key resources, and lifelines within the region and look to define specific vulnerabilities and measures to reduce future physical and economic losses.

Spatial data and visualization will be critical in developing an understanding of the areas of interest and their interdependencies. Analytical tools will assist in modeling the long-term impacts of mitigation activities and project their benefits over time. Ultimately, plans will be developed by state or community to assist in achieving a measurable decrease in long-term vulnerability across the region.

Threat and Hazard Identification

Following the New Madrid earthquake, FEMA Mitigation would begin working with USGS and other earth science entities to determine any related threats and hazards in the near-future. These would

Best Practices - Modeling Socio-Economic Vulnerability

The demographic characteristics of certain populations make them more vulnerable to the impacts of disasters than others. It is widely recognized that jurisdictions with high concentrations of households in poverty face significant challenges in short-term response and long-term recovery. In a study of the social impacts of a catastrophic earthquake in the NMSZ (Mid America Earthquake Center, August, 2009), several indicators of socio-economic vulnerability are identified:

- Income level (including percentage of population in poverty)
- Command of the English language
- Age (percentage of population over 65 and under 5 years of age)
- Disabilities (and other special needs)
- Prisoners
- Medical needs

A series of maps have been produced by FEMA visualizing the distribution of vulnerable populations in the "high impact" counties of the NMSZ. These maps can be overlaid with data outputs from ShakeMap to quickly identify counties with high shaking intensity and high concentrations of vulnerable populations resulting from a major NMSZ earthquake. This information can be used to more effectively deploy assets immediately following the event.

Exposure analysis is a series of informed assumptions on the location, nature, and scope of damages and social losses. It serves as initial input for the development of the COP. Exposure analysis for a New Madrid earthquake combines: 1) data and knowledge of building practices and building inventory in areas with the highest intensity of earthquake shaking, 2) knowledge of how buildings and lifelines perform at various levels of ground shaking, and 3) knowledge of population at risk, including their vulnerabilities and "coping capabilities."

include potential aftershocks and the impacts on other fault structures within the region with the potential to generate additional earthquake events.

Due to the enormous geographic area impacted by this event, LIDAR and other forms of imagery would be critical in identifying any physical changes to the earth such as uplifts, offsets, and subsidence. The collection missions would require coordination with federal and state responders and may need to be scheduled on regular intervals to monitor change over time. As specific areas of interest are identified, ground-based sensor systems could be installed to provide more detailed and immediate monitoring of the earth's surface.

Another significant issue in the region would be the many rivers, lakes, and watercourses. The New Madrid event would cause rivers to drastically change courses, potentially re-routing through the built environment. The same elevation data collected in support of ground monitoring would allow for the initial development of new maps for the water features. This data would then be improved with detailed surveys. The potential for all river-based shipping to be disrupted is high due to collapsed bridges, river banks, and structures in addition to the changes in the rivers physical locations. The data derived from these efforts would be the first step in re-opening the rivers to shipping.

5.2.2.4 Prevention Mission

The Prevention mission is focused on capabilities to avoid and prevent acts of terrorism and has no direct role in this scenario.

5.2.2.5 Protection Mission

Protection mission activities address the capabilities to safeguard the citizens, residents, visitors, and critical assets, systems, and networks against all risks. While many of the capabilities are focused at terrorism-related efforts, natural events are supported as well. In this scenario, the overall impact to "normalcy" within the region will fracture the general safety and security measures expected to be available within our boarders.

Table 5–5: Sample Mitigation EEIs by ESF

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Access to Disaster Area	Road Closure Estimates	ESF #5	12 hours	29
	Bridge & Tunnel Damage Estimates	ESF #5	12 hours	29
	Debris Estimates	ESF #5	12 hours	29
Jurisdictional Boundaries	Communities Impacted (USGS ShakeMap)	ESF #5	1 hour	27
Socio-Economic Impacts	Estimated Monetary Losses	ESF #5	12 hours	29
	Estimated Residential Damage	ESF #5	12 hours	29
Hazard-Specific Information	Vulnerable Structure Reports	ESF #5	12 hours	29
	Secondary Structural Hazards	ESF #5	48 hours	5
Predictive Modeling	HAZUS Outputs (General)	ESF #5	6 hours	29
	FEMA Post-Event Flood Modeling	ESF #5	4 days	36
	Economic Impact Modeling (HAZUS)	ESF #5	24 hours	37
Damage Assessments	FEMA MAT Reports	ESF #5	15 days	25

Access Control and Identity Verification

Access control during this event would be required to protect citizens, relief workers, and critical assets. With the large area impacted, the resources required to support this capability would likely be brought in from areas outside the impacted area. Local law enforcement would be overwhelmed and additional security staff would be needed to prevent looting and general mayhem in within the communities. Residential areas may require basic government identification to gain access. The lack of available fuel sources would minimize civilian vehicle traffic in the weeks following the event while damaged and blocked roadways would further minimize driving options.

Relief workers would include government staff, contractors, and volunteers. Due to the magnitude of damage and the large geography impacted, access control will be difficult in the early days and weeks following the event. As relief efforts progress, it would be expected that areas around key resources, infrastructure, and communities may require specific credentials to access. Efforts would be made to ensure that access restrictions would not delay relief efforts in any way.

Key facilities would include specific infrastructure assets as well as the many temporary offices activated to lead relief efforts. On-site security for these facilities would require specific credentials and be closed to the general public. Security staff would be a combination of federal, local, and contracted employees to ensure the safety and security of the staff and facilities.

Geospatial support would include displaying protected facilities, assessing area security threats, maintaining boundaries of closed areas, and the identification of the entities responsible for undertaking the security measures. Coordination efforts around this information would be significant, as there would be many entities involved in the partnerships.

Physical Protective Measures

Following this event, many CI assets would become vulnerable to multiple outward threats. As security systems fail and infrastructure is damaged, opportunities arise for unauthorized access and associated issues. The CI portion of the response efforts would utilize imagery sources and inspection teams to identify specific vulnerabilities and ensure that they are secured as soon as able. While this responsibility falls onto the owners/operators, trumpery and long-term support would be required in many cases to ensure that the citizens and relief workers are protected against any threats.

Supply Chain Integrity and Security

Following this event supply chain integrity would be fractured and security would be an issue. The combined efforts of the government, private-sector, and volunteer agencies would require assistance and oversight to ensure that commodities are distributed across the region in an organized strategy. Initial requirements would be filled by government and military resources, with warehousing facilities residing on military bases and other government

Table 5–6: Sample Situational Awareness EEIs by ESF *1 of 5*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Boundaries of Disaster Area	USGS Earthquake Notification System	ESF #5	1 hour	26
	USGS ShakeMap (intensity)	ESF #5	1 hour	27
	Major Oil/HAZMAT Release	ESF #10	12 hours	30
	Summary of Impacts	ESF #5	24 hours	1
	Imagery Derived Boundaries	ESF #5	24 hours	38
	Energy Infrastructure Failures	ESF #12	24 hours	32
	USACE Dam Failure Inundation (Modeled)	ESF #3	5 days	33
Access to Disaster Area	Road Closure Estimates	ESF #5	12 hours	29
	Bridge & Tunnel Damage Estimates	ESF #5	12 hours	29
	Debris Estimates	ESF #5	12 hours	29
	Road Closures	ESF #1	24 hours	8
	Isolated Communities	ESF #5	24 hours	3
	Bridge & Tunnel Damage - Reported	ESF #1	48 hours	1
	River Transportation Status	ESF #1	10 days	24
	Airport Status Reports	ESF #1	24 hours	8
Jurisdictional Boundaries	Communities Impacted (USGS ShakeMap)	ESF #5	1 hour	27
	Impacted Communities (Reported)	ESF #5	24 hours	29
Hazard-Specific Information	Vulnerable Structure Reports	ESF #5	12 hours	29
	Active Fires	ESF #4	24 hours	6
	Unsafe Areas	ESF #5	24 hours	3
	Secondary Structural Hazards	ESF#5	48 hours	5
	Vulnerable Structures (modeled)	ESF #3	3 days	14
Weather	NOAA/NWS Forecasted Weather	ESF #5	12 hours	28
	NOAA/NWS Forecasted Weather	ESF #9	24 hours	7

facilities. As the event progresses, commodities would be staged at commercial facilities and distributed through various means. Government-based resources would be tracked using GPS technologies to monitor locations and estimate arrival times. Private shipments may or may not require text-based or other reporting mechanisms to allow them to be managed in tandem.

Security measures would be in place to ensure that shipments are accomplished without interruption. As citizens become desperate, opportunities arise for commodity interception and re-routing. Physical facilities involved in the temporary supply chain will require security as well to ensure the safety of staff and the protection of stored resources.

5.2.3 Situational Awareness

Damage assessments provide a vital flow of information to the response community. In an event of this magnitude, communications technologies would be greatly impacted, limiting the ability of communities and citizens to request assistance or report on their status. Through the use of imagery, models, and ground truth data, the scale of the event and overall impact will be initially estimated and later validated ***(Table 5–6 on page 101).***

The data collected and compiled through Damage Assessment activities defines the locations and levels of magnitude of event-related impacts. The combination of imagery resources, models, and ground truth data provide rapid estimates and quantitative field observations to assist in making critical decisions in the early phases of the disaster response operation. In the New Madrid scenario, the multi-state area of impact will require a large volume of staff and an unusually long duration of inspections. In addition, the potential for aftershocks could complicate damage assessment missions as re-inspections will be required in response to aftershock events.

Table 5–6: Sample Situational Awareness EEIs by ESF (continued) *2 of 5*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Boundaries of Disaster Area	USGS Earthquake Notification System	ESF #5	1 hour	26
	USGS ShakeMap (intensity)	ESF #5	1 hour	27
	Major Oil/HAZMAT Release	ESF #10	12 hours	30
	Summary of Impacts	ESF #5	24 hours	1
	Imagery Derived Boundaries	ESF #5	24 hours	38
	Energy Infrastructure Failures	ESF #12	24 hours	32
	USACE Dam Failure Inundation (Modeled)	ESF #3	5 days	33
Access to Disaster Area	Road Closure Estimates	ESF #5	12 hours	29
	Bridge & Tunnel Damage Estimates	ESF #5	12 hours	29
	Debris Estimates	ESF #5	12 hours	29
	Road Closures	ESF #1	24 hours	8
	Isolated Communities	ESF #5	24 hours	3
	Bridge & Tunnel Damage - Reported	ESF #1	48 hours	1
	River Transportation Status	ESF #1	10 days	24
	Airport Status Reports	ESF #1	24 hours	8
Jurisdictional Boundaries	Communities Impacted (USGS ShakeMap)	ESF #5	1 hour	27
	Impacted Communities (Reported)	ESF #5	24 hours	29
Hazard-Specific Information	Vulnerable Structure Reports	ESF #5	12 hours	29
	Active Fires	ESF #4	24 hours	6
	Unsafe Areas	ESF #5	24 hours	3
	Secondary Structural Hazards	ESF#5	48 hours	5
	Vulnerable Structures (modeled)	ESF #3	3 days	14
Weather	NOAA/NWS Forecasted Weather	ESF #5	12 hours	28
	NOAA/NWS Forecasted Weather	ESF #9	24 hours	7

Imagery & Derived Products

Many challenges exist when supporting the imagery requirements for an event of this magnitude. Satellite-based imagery resources will be unaffected by the event; however, their ability to download data within the United States will be limited within the impacted area. This data will suffer minor delays in reaching the stakeholders at the field level due to basic connectivity issues such as: locally damaged infrastructure, operating in temporary facilities, and intermittent power outages.

Airborne resources will initially be delayed as the majority of aircraft required for these missions will be sent from outside the impacted area. Complications with aircraft-based sensors will include access to fuel, smoke and other airborne hazards, and, ultimately, the enormity of data collection required across the area.

While this section is focused on imagery, specific sensor and vendor information has not been included as similar sensors are available through multiple sources and technology is quickly evolving.

Satellite Imagery

Under the International Charter, all participating satellite platforms will be available to the United States government through FEMA as the coordinator. These resources satisfy high-level requirements for general damage assessment, including ground deformation, power outages, fires, and other key themes of information through provision of base imagery in several formats.

As impacted areas are defined in a general classification, higher resolution data is collected to further assess earthquake damage. The FEMA NRCC RS Coordinator collects information on locations that require/request assessments and assist in the triage to determine mission tasking and the balancing of available resources. This effort will require the

Table 5–6: Sample Situational Awareness EEIs by ESF (continued) *3 of 5*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Boundaries of Disaster Area	USGS Earthquake Notification System	ESF #5	1 hour	26
	USGS ShakeMap (intensity)	ESF #5	1 hour	27
	Major Oil/HAZMAT Release	ESF #10	12 hours	30
	Summary of Impacts	ESF #5	24 hours	1
	Imagery Derived Boundaries	ESF #5	24 hours	38
	Energy Infrastructure Failures	ESF #12	24 hours	32
	USACE Dam Failure Inundation (Modeled)	ESF #3	5 days	33
Access to Disaster Area	Road Closure Estimates	ESF #5	12 hours	29
	Bridge & Tunnel Damage Estimates	ESF #5	12 hours	29
	Debris Estimates	ESF #5	12 hours	29
	Road Closures	ESF #1	24 hours	8
	Isolated Communities	ESF #5	24 hours	3
	Bridge & Tunnel Damage - Reported	ESF #1	48 hours	1
	River Transportation Status	ESF #1	10 days	24
	Airport Status Reports	ESF #1	24 hours	8
Jurisdictional Boundaries	Communities Impacted (USGS ShakeMap)	ESF #5	1 hour	27
	Impacted Communities (Reported)	ESF #5	24 hours	29
Hazard-Specific Information	Vulnerable Structure Reports	ESF #5	12 hours	29
	Active Fires	ESF #4	24 hours	6
	Unsafe Areas	ESF #5	24 hours	3
	Secondary Structural Hazards	ESF#5	48 hours	5
	Vulnerable Structures (modeled)	ESF #3	3 days	14
Weather	NOAA/NWS Forecasted Weather	ESF #5	12 hours	28
	NOAA/NWS Forecasted Weather	ESF #9	24 hours	7

Table 5–6: Sample Situational Awareness EEIs by ESF (continued) *4 of 5*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Demographics	Estimated Exposed Populations (USGS ShakeMap/PAGER)	ESF #5	1 hour	27
	Impact Upon Income, Ethnicity, & Age (USGS PAGER)	ESF #5	1 hour	27
	Impacted Population Estimates	ESF #5	1 hour	29
Predictive Modeling	USGS Ground Shaking (ShakeMap)	ESF #5	1 hour	27
	HAZUS Outputs (General)	ESF #5	6 hours	29
	HAZMAT Locations	ESF #10	24 hours	30
	USACE Post Earthquake Flood Modeling	ESF #3	48 hours	33
	USACE Debris	ESF #3	48 hours	35
	IMAAC	ESF #5	48 hours	34
	USACE Dam Failure Impacts	ESF #3	5 days	33
Damage Assessments	FEMA RNA Team Reports	ESF #5	24 hours	4
	IA Applicant Locations	ESF #6	24 hours	9
	SBA Applicant Locations	ESF #6	24 hours	18
	River Transportation Status	ESF #1	48 hours	24
	General Imagery Analysis	ESF #5	4 days	38
	IDP - Structure Damages	ESF #5	5 days	39
	IDP - Transportation Damages	ESF #5	5 days	39
	FEMA PDA Team Reports	ESF #5	6 days	17
	ARC Damage Assessment Team Reports	ESF #6	6 days	15
Airport	Modeled Airport Impact	ESF #1	12 hours	29
	Airport Status	ESF #1	24 hours	8
	FEMA PDA Team Reports	ESF #5	6 days	17

tasking of satellite resources to move from large, course coverage areas to tighter and higher resolution imagery collections thus removing these assets from the broader collection mission.

The Response Mission will require high resolution and spatially accurate data products to support their emergency activities. In the absence of field reports, ingress routes to target locations can be determined with proper imagery data and analysis. In addition, the areas around these targets will be visible and support mission planning for landing zones, base camp selections, and other geographies requiring SAR teams.

At 3–5 days into the response operations, imagery dissemination will be problematic. The broad area of impact will generate proportional data volumes of available imagery to supply the multitude of waiting customers. With network communications hindered across the region, other options will be pursued for sharing both imagery and derived products across the response community.

Airborne Imagery

Aircraft will serve as the second wave of imagery sources and provide the high-resolution products required for assessments of individual structures and systems. The airborne mission will have a slow start-up, as resources are deployed from outside the impacted area. With FEMA coordinating RS activities, it is imperative that ESF-based functions are engaged with the NRCC to identify their requirements and report their geospatial activities. For entities operating under their own authorities, airborne missions will be directed and funded by the responsible parties.

Lifesaving missions will benefit greatly from the increased resolution and coverage these platforms provide. In addition to color imagery, aircraft can also provide the following:

- **LIDAR** – to assist in determining elevation changes that impact ingress and structures
- **IR (thermal)** – sensors identify fires and ground-based hazardous releases
- **Oblique** – providing a side view allowing for determinations of structure damage and habitability
- **Full Motion Video** – feed EOCs with real-time video of impacted areas.

In addition to the urgent need to assist in recovery, public safety and force protection will require high levels of data collection in strategic areas to maintain law and order in the region. Oblique imagery further supports these efforts as it provides the ability to view the sides of buildings to further assess individual structures and to determine locations suitable for rebuilding the law enforcement communities across the region.

Unmanned Aerial Vehicles (UAVs) also have a significant role in the NMSZ event as imaging resources will be required in many areas across the geography. UAVs are provided by both government and private companies to assist in the damage assessment imagery mission. To mitigate legal concerns with the use of these aircraft, event-specific policies and guidance must be required before these resources can be fully utilized.

Mission Overlap

In some situations, satellite imagery and aircraft imagery are competing resources in the form of multiple platforms with similar instrumentation. With an event of this magnitude, a strategy will be developed to make best use of the available assets and ensure that efforts are not duplicated. Satellite solutions will provide the early sources of imagery followed by airborne systems as the requirements transition from regional to local views.

Table 5–6: Sample Situational Awareness EEIs by ESF (continued) *5 of 5*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availability	Activity Code
Status of Communities	State/Local Situation Reports	ESF #5	6 hours	3
	Current Shelter Requirements	ESF #6	6 hours	2
	Distribution Site Location/Status	ESF #6	4 days	10
	FEMA PDA Team Reports	ESF #5	6 days	17
Status of Transportation	Evacuation Routes	ESF #1	12 hours	3
	Road, Rail, Pipeline, Port, & Airport Status	ESF #1	24 hours	8
Status of Communications	Land-Line, Cellular, and Internet access status	ESF #2	12 hours	1
Status of Emergency Operations Centers	Federal EOC Status	ESF #5	1 hour	1
	JFO/GIU Locations	ESF #5	24 hours	14
Status of Critical Infrastructure	Federal Critical infrastructure Status	ESF #5	1 hour	1
	State/local Critical infrastructure Status	ESF #5	12 hours	3
Status of State/local EOCs	State/Local EOC Status	ESF #5	12 hours	3
Status of Medical Services	Estimated Hospital Functionality	ESF #5	4 hours	29
Status of Energy Systems	Power Outages	ESF #12	12 hours	32
	Damage to Power Infrastructure	ESF #12	24 hours	1
Status of Personnel	FEMA IMAT Deployment	ESF #5	1 hour	5
Status of Remote Sensing Operations	Remote Sensing Status	ESF #5	12 hours	38
Donations/Voluntary Agency Activities	Shelter Status	ESF #6	48 hours	2
Public Safety	Alert Notifications (reported)	ESF #5	12 hours	1
	High Hazard/Unsafe Areas	ESF #5	36 hours	38
Hazardous, Toxic, and Radiological Issues	Public Safety Notices	ESF #8	12 hours	1
	Public Safety Notices	ESF #12	12 hours	1

Close coordination will be required between FEMA and the multitude of federal, state, and local partners. Efforts will be made to ensure that there are multiple uses for all imagery collected and that these data will be available to everyone with requirements to access it.

Exploitation

Imagery alone cannot be the single data source for situational awareness, as in most cases it only provides background information. The greatest return on imagery investment is on derived imagery. IDPs expand on basic imagery by including simple attributes (e.g., destroyed, flooded, fire) as well as more detailed information (e.g., degree of damage, damage type, estimated water depth). These IDPs are developed based on customer requirements and vary greatly across the stakeholder community. In many cases, IDP requirements can be combined into a single analytical request and provided to several customers.

As the executive agent for RS Coordination, FEMA has a role in coordinating the IDPs as well. With every specific data collection requirement, IDP development must be part of the deliverable regardless of the source. As IDP data will be utilized in briefings, map products, and web viewers across the country, it is imperative that information does not conflict and that sources are properly and easily defined.

Dissemination

The dissemination of imagery for the New Madrid event will be difficult as the data volumes generated over the impacted area will quickly exceed the capabilities of existing systems to provide storage and delivery. As the authoritative agent for data compilation and dissemination of imagery-based data, the USGS Earth Resources Observation and Science (EROS) Data Center will be the federal hub of post-event data. In addition, the providers (government or commercial) can be expected to serve

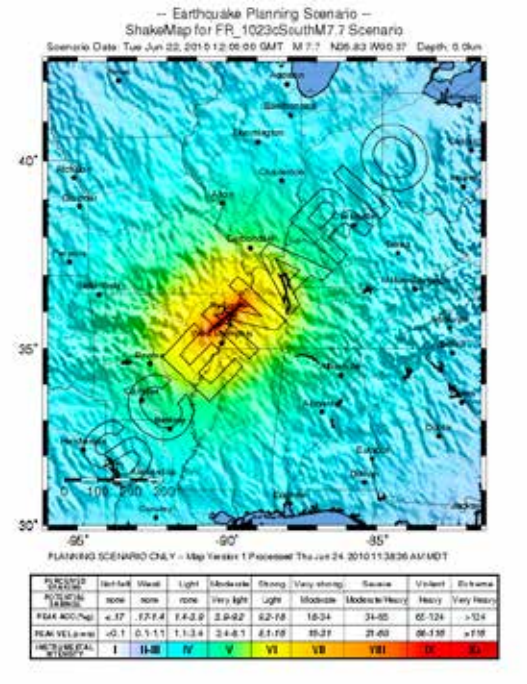
Best Practices - USGS Earthquake Products & Situational Awareness

Situational awareness is the continual process of collecting, analyzing, and disseminating information and knowledge on hazards and their impacts. Following a disaster event, authoritative geospatial information and products will flow from multiple sources as they become available. Authoritative modeled data for earthquakes is available almost immediately from the USGS and assists with key decision making immediately following a catastrophic event, before field data can be collected.

The USGS National Earthquake Information Center (NEIC) located in Boulder, Colorado maintains a suite of tools that contribute significantly to earthquake situational awareness. These products provide near real-time information on the location, magnitude, and intensity of earthquakes around the globe. Within the US, USGS earthquake notification and impact assessment tools and products include:

- **USGS Earthquake Notification Service (ENS)** –ENS provides real time text information to any email address providing the location and magnitude of an earthquake. The messages contain the basic information to plot the epicenter location and initiate model runs within HAZUS and other applications.
- **USGS ShakeMap** – ShakeMap portrays earthquake extent and distribution of intensity across the earth's surface within an hour of the earthquake event. ShakeMap generates color-coded maps of the spatial variations of shaking intensity, indicating areas with areas with the strongest shaking in simple visual patterns. When used as the scenario input with HAZUS, the model performs analysis against inventory data on population, essential facilities, transportation and utility lifelines, and general building stock to rapidly assess impacts on the population and built inventory exposed to earthquake shaking intensity.
- **USGS Prompt Assessment of Global Earthquakes for Response (PAGER)** - PAGER uses ShakeMap results as the primary shaking input and incorporates these analyses with comprehensive population data to compute the population exposed to each level of shaking intensity. The next version of PAGER uses simplified loss modeling approaches to quantify estimated casualties and economic losses.
- **USGS Shake Map Broadcast (ShakeCAST)** – ShakeCAST is an automated system for retrieving specific ShakeMap products and analyzing the shake intensity against a user's inventory of structures to assess potential impacts. This information can be used for setting inspection priorities for post-event activities and reporting on potential losses.

These products provide valuable information in the critical hours immediately following the earthquake. As a suite of data solutions, these applications support the core information requirements for situational awareness following an earthquake event.



data to the stakeholders as allowed by data licenses. Third-party distribution options will be provided through various public and private internet-based spatial environments.

The sharing of vector data sets will be closely coordinated as IDPs are easily transmitted across the community and must have adequate metadata to ensure they are used correctly and kept current. As multiple sources compile similar data for different geographies these localized data will be rolled up by theme to support big-picture views and seamless coverage for coordination efforts at all levels.

Models

The modeling communities begin work immediately following the New Madrid event and provide updates as improved information is available and/or following aftershocks in the region. These applications play an important role in the first 12 to 24 hours following a major or catastrophic earthquake, when detailed and accurate damage assessments are unavailable. SME analysis of the modeling methodologies and outputs play a critical role in interpreting the data and identifying proper use of the analyses to support damage assessment and lifesaving activities.

HAZUS, PAGER, ShakeCast, ShakeMap and other impact assessment applications will provide analyses immediately following the event. The outputs of these geospatial models provide initial parameters of the areas of impact and estimated damage. These are used in conjunction with field assessments to delineate the area of operations and the nature and scope of damage. Other modeling activities will include:

- The USACE will begin to assess the region for debris-related requirements as well as water and ice missions.
- The Earth Science communities will arrive to assess geologic phenomenon to ground-truth their models.

Table 5–7: Estimates of Causalities - Terror Scenario

Attack Timeline	Estimated Casualties	Cumulative Casualties
Vest IED 1	<50	50
Vest IED 2	<50	100
Vest IED 3	<50	150
LVB Stadium Entrance	<150	300
Public Transit IED	<75	375
Parking Facility IED	<50	425
Emergency Room IED	<50	475

Table 5–8: Estimate of "At Risk" and Shelter Seeking Population - Terror Scenario

Radius Surrounding Attach (Miles)	Population Increments
0.1	800
0.25	6,000
0.5	22,000

- IMAAC will perform assessments on airborne hazards following the event and provide authoritative information on them.

Each of these models provides an output product consisting of combinations of reports, maps, and geospatial data. These geospatial-based products are vital in sharing the results with the stakeholder community. Users require complete metadata to ensure proper use of the data and to ensure that updates are acquired and presented to their customers.

The modeling communities produce many similar products, which may be applicable to more than one mission. The geospatial products will have subtle differences, and interpretations of results should be supported by SMEs, including authoritative sources for the subject domain.

Field Data Collection

Imagery and models provide key data for early operations and can be used in conjunction with field information to provide improved situational awareness, complementing on-ground damage assessments and field data collection. Data from the field is critical to supporting multiple federal and state lifesaving, damage assessment, and Recovery Missions. The inclusion of field data also lends credibility to imagery derived and modeled data feeds. Field data collection activities will include:

- **Incident Management Assistance Teams (IMAT)** – Federal interagency team
- **Rapid Needs Assessment (RNA)** – Federal and state interagency team
- **PA Inspection Teams** – Federal and state interagency team
- **American Red Cross Inspection Teams** – Paid and volunteer staff
- **IA PDA Teams** – Federal and state interagency team

These and other field data sources provide additional perspectives into the reality of the field. While most of the data collected is done to support specific

operational authorities, the data can be easily repurposed in support of the Damage Assessment mission.

Frequently, inspection teams for different programs travel independently creating a level of duplication in data collected and creating low-level confusion amongst the home and property owners who must provide access to multiple groups at different dates/times. These data can be quickly linked and compiled to determine key trends in impact and/or losses.

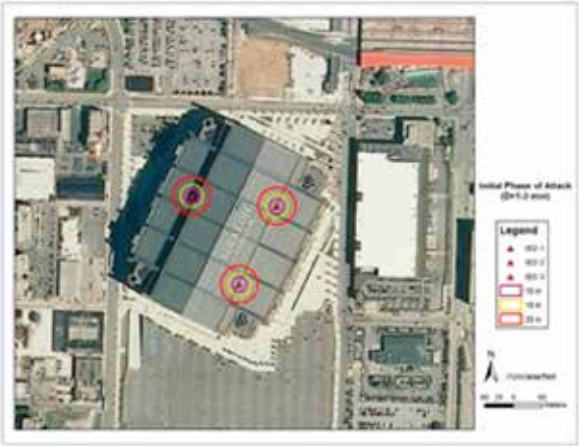


Figure 5-9: Three Initial IED Explosions within Stadium

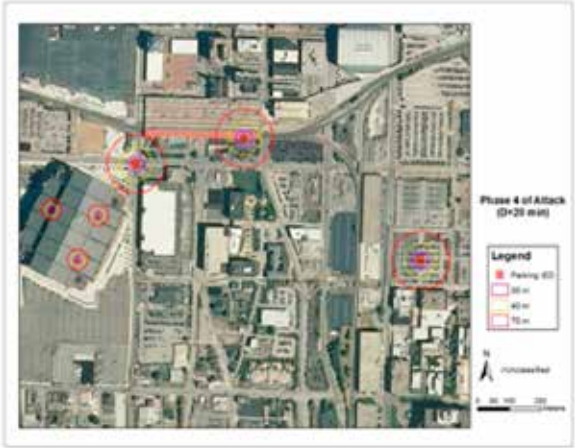


Figure 5-11: Public Transit IED Explosion at Indianapolis Amtrak

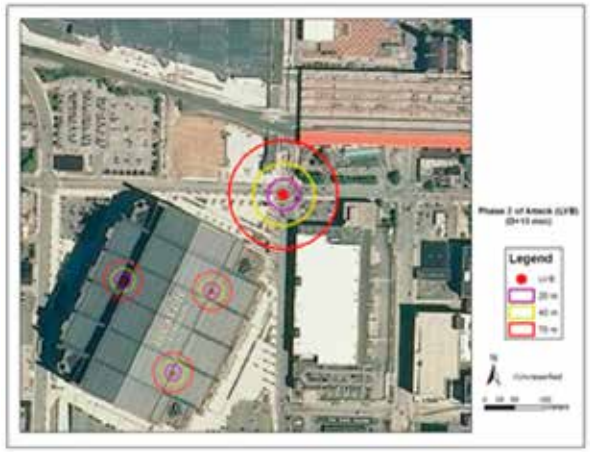


Figure 5-10: Large Vehicle Bomb (LVB) Explosion at Entrance

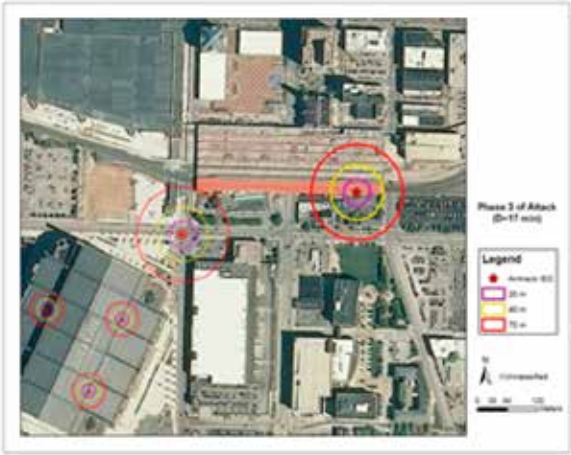


Figure 5-12: IED Explosion in Public Parking Lot

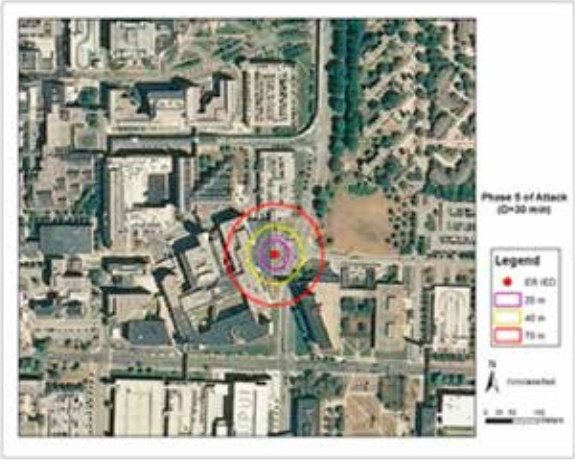


Figure 5-13: IED Explosion outside of Indiana University Hospital ER

5.3 The Lucas Oil Stadium Terror Scenario

This section of the GeoCONOPS explores the details of applying geospatial technologies in support of anticipated incident-related efforts following a no-notice terrorist attack at Lucas Oil Stadium in Indianapolis, Indiana. The scenario was developed by DHS and modified slightly by the GeoCONOPS team for contingency planning efforts to assist in defining the government's response to a terrorist-type event.

Geospatial Analysis methods were used to estimate losses in the affected area. For the purposes of this scenario, an unknown terrorist group employed a multi-prong attack with the primary goal to move personnel into predetermined locations, where the use of vehicle bombs, suicide bombers, and improvised explosive devices (IEDs) could be used to inflict casualties and create general terror within the populace.

The GeoCONOPS references this scenario to outline the anticipated geospatial activities that would

occur as a result of this attack. Documenting the timing for application of geospatial tools provides an understanding of activities resulting from this no-notice event. Geospatial technologies can be applied to similar efforts following an actual terrorist or other man-made catastrophic event or support terrorism exercises.

Scenario Timeline

- (D – 1 hr.) During an event, three suicide bombers are strategically pre-positioned inside the stadium with IEDs on their bodies.
- (D+1–3 min.) The first suicide bomber detonates his IED followed by the other two within a three-minute time frame. Occupants of the stadium who are not immediately affected by the blasts attempt to evacuate resulting in further casualties.
- (D+4 min.) Occupants evacuating the stadium move toward one of several general locations outside the stadium. A portion of the occupants will remain in the immediate area, clogging ingress for emergency responders.

  Some will head toward public transportation.
  - Others will head toward parking lots to retrieve their vehicles and depart the area.
  - Occupants will be in various states of physical and mental condition ranging from incapacitated to fully mobile with mental states to include shock and panic.
- (D+15 min.) Second Attack, the main thrust of the attack is the second one at the evacuation points.
  - Main evacuee collection area (a main street outside the stadium), a Large Vehicle Bomb (LVB) disguised as an emergency service vehicle is detonated.
  - Blast dispersal and damage causes additional casualties/injuries, plus further panic.
- (D+17 min.) A few minutes after the detonation of the LVB, a second set of devices are detonated at a public transportation gathering.

Figure 5-14: Vehicle Restriction and Secure Perimeter including Checkpoints

- (D+20 min.) Third attack, another vehicle bomb is detonated in a parking facility near the stadium.
- (D+30 min.) Fourth attack, disguised as an emergency vehicle, is detonated in front of the emergency room entrance of Indiana University Hospital.
  - Blast dispersal and damage causes additional casualties and injuries.
  - Incoming emergency vehicles to all local hospitals must now be searched for explosives, thus slowing down getting the injured to a medical facility.

5.3.1 Modeled Blast Impact

Modeling and analysis efforts provide an initial perspective into the scope of damage in the wake of the series of explosions, including social impacts (casualties, shelter requirements, displaced households, etc.), damage to buildings and essential facilities, and damage and loss of functionality to transportation and utility lifelines. As the event unfolds, modeled information provides the basis for determining potential impacts. This information is then replaced and validated as Response and Recovery efforts collect on-scene information supporting their operations.

Casualties

The use of various IEDs spread to several locations and detonated at staggered intervals causes just under 500 casualties and injuries in a stadium containing up to 70,000 people. Within the stadium, the three explosions cause fatalities and many minor injuries. The public confusion and panic contribute additional injuries and possibly fatalities as efforts are made to escape the scene. The largest detonation at the gathering point outside the stadium causes the greatest number of causalities. The explosion at the hospital, while causing fewer casualties, forces the injured to travel or be transported to hospitals locations, further delaying urgent medical care and generating additional fear and confusion across the public. Causalities are further defined in ***Table 5–7***.

Displaced Populations

The event is isolated from residential areas, therefore, causing minimal displacement of the population. If a device contained a radiological or chemical component, it would have caused the evacuation of affected apartment buildings and businesses in the downtown area. Business operations in the immediate area are directly impacted as their customers, suppliers, and employees will not be able to access the area immediately following the event and may not return for some time.

Economic impacts of the attacks will have longer term repercussions in terms of business relocation, loss of tax revenue, fall in property values, and a drop in tourism and its impact on the retail, hotel, and leisure industries. Business and consumer confidence is adversely affected.

Evacuation/Shelter Requirements

Shelter requirements are limited due to the nature of the event. Nearby buildings directly affected by the blast will be evacuated to ensure the integrity of the structures before citizens can return to their

Table 5–9: Sample Response Mission EEIs by ESF *1 of 3*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availibility
Damage Assessment	IMAAC	ESF #5	1 Hour
	Forensic Analysis	ESF #5	12 Hours
	GIS Blast Modeling	ESF #5	6 Hours
	General Imagery Analysis	ESF #5	4 Days
	IDP - Structure Damages	ESF #5	5 Days
	IDP - Transportation Damages	ESF #5	5 Days
	ARC Damage Assessment Team Reports	ESF #6	6 Days
	Remote Sensing Aerial Coverage	ESF #5	1 Hour
Status of Emergency Operations Centers	Federal EOC Status	ESF #5	1 Hour
	JFO/GIU Locations	ESF #5	2 Hours
Status of Critical Infrastructure	Federal Critical Infrastructure Status	ESF #5	4 Hours
	State/local Critical Infrastructure Status	ESF #5	4 Hours
Status of State / Local EOCS	State/local EOC Status	ESF #5	2 Hours
Status of Emergency Systems	Estimated Hospital Functionality	ESF #5	4 Hours
	Disaster Medical Team Deployment Status	ESF #8	1 Hour
	Hospital Status	ESF #8	2 Hours
Access to Disaster Area	High Impact Urban Areas	ESF #3	1 Hour
	Road Closure Estimates	ESF #5	1 Hour
	Bridge & Overpass Damage Estimates	ESF #5	2 Hours
	Debris Estimates	ESF #5	1 Hour
	Road Closures	ESF #1	2 Hours
	Isolated Victims	ESF #5	2 Hours
	Debris Removal Status	ESF #3	12 Hours
Weather	NOAA/NWS Forecasted Weather	ESF #5	12 Hours
	NOAA/NWS Forecasted Weather	ESF #9	24 Hours
Jurisdictional Boundaries	Communities Impacted	ESF #5	1 Hour
	Impacted Communities (Reported)	ESF #5	24 Hours
Status of Communications	Land-Line, Cellular, and Internet access status Updates	ESF #2	12 Hours

homes and workplaces. Shelter requirements in the immediate area are minimal and several off-site facilities are activated to accommodate what are expected to be low requirements. In a case of suspected radiological or chemical release, residents would be instructed to Shelter In-Place, sealing a single area (an example being a room) from outside contaminants and shutting off all HVAC systems. These actions requests would be delivered to the affected population by the local authorities through the media, direct calls, and emergency notification systems. ***Table 5–8 on page 107*** identifies estimates to assist in making shelter decisions.

Structure Damage

The explosions cause structural damage to the stadium and several buildings adjacent to the IEDs, compromising their structural integrity. The larger explosion at the outside gathering area causes massive window damage in the immediate area. At the parking facility, vehicles and citizens are directly impacted with flying debris. The explosion at the hospital destroys the emergency reception area, collapsing the covered entryway and disabling the emergency room functionality.

Efforts to model damages will be driven by early efforts to model the individual explosions. These products would be distributed to Law Enforcement and Emergency Response Personnel as soon as possible and serve as a foundation for additional geospatial products that will be required in the future. Accurate blast modeling will show responders the potential extent of damaged areas from a bird's eye view, letting them see the whole picture. ***Figure 5-9 on page 108*** through ***Figure 5-14 on page 109,*** represent the blast impacts.

Table 5–9: Sample Response Mission EEIs by ESF (continued) *2 of 3*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availibility
Demographics	Impacted Population Estimates	ESF #5	1 Hour
Status of Communities	State/Local Situation Reports	ESF #5	6 Hours
	Current Shelter Requirements	ESF #6	6 Hours
	Regional Environmental Assessments	ESF #10	9 Days
	State/Local Situation Reports	ESF #5	6 Hours
	Temporary Housing Status	ESF #6	4 Days
	IDP - Post-Event Construction Monitoring	ESF #5	15 Days
	Distribution Site Location/Status	ESF #6	3 Days
Status of Transportation	Evacuation Routes	ESF #1	12 Hours
	Road, Rail, Pipeline, Port, & Airport Status	ESF #1	24 Hours
Status of Medical Services	Estimated Hospital Functionality	ESF #5	4 Hours
	Disaster Medical Team Deployment Status	ESF #8	24 Hours
	Hospital Status	ESF #8	6 Days
Status of Energy Systems	Power Outages	ESF #12	12 Hours
	Damage to Power Infrastructure	ESF #12	24 Hours
Status of Personnel	FEMA IMAT Deployment	ESF #5	1 Hour
Status of Remote Sensing Operations	Remote Sensing Status	ESF #5	12 Hours
Voluntary Agency Activities	Shelter Status	ESF #6	48 Hours
Public Safety	Alert Notifications (reported)	ESF #5	12 Hours
	National Guard Security Team Status	ESF #5	24 Hours
	High Hazard/Unsafe Areas	ESF #5	36 Hours
Hazardous, Toxic, and Radiological Issues	Public Safety Notices	ESF #8	12 Hours
	Public Safety Notices	ESF #8	12 Hours

Essential Facilities (Critical Infrastructure)

The assessment of Essential Facilities would happen immediately following the event. Analysis of the blast impacts and various infrastructure systems and key facilities would be completed and distributed to federal, state, and local responders. In this situation there is minimal impact to infrastructure outside of the direct damages to the targeted buildings. All other systems are only impacted by intermittent power issues in the first couple days, proving to be of minimal impact.

Transportation System Damage

Immediate damage to the road-bed outside the stadium creates an impassible obstacle causing traffic to re-route. The Amtrak station damage stops rail transportation in the area as the tracks are blocked with debris and potentially damaged as well. Idle City buses are immediately dispatched to the scene in effort to evacuate citizens to transportation centers and shelter locations.

The local transportation routes are severely affected by the series of explosions. With blast debris and a rush of citizens fleeing on foot, the initial aftermath would cripple the ingress and egress routes as local law enforcement and medical support respond while at the same time maintaining concern that other IEDs could be in other vehicles. The mass rush of people vacating the area by car will cause gridlock across a large area, lasting for several hours. Further complications arise as citizens abandon their vehicles in effort to get to safety. This combined chaos inhibits access by first responders and injured citizens, leading to additional deaths.

Water and Power Outages

The blast causes loss of power in the immediate area due to damage to in-ground infrastructure, overhead electrical lines, and transformers. Water systems are not impacted outside of leakage in the immediate vicinity of the stadium and Amtrak station. The greater area is largely unaffected as the power and water systems are redundant in nature. The localized blast at the university medical facility causes their back-up generators to kick in to maintain critical support functions until patients can be moved to other facilities. Structures in the area of the stadium may experience temporary loss of power in the days immediately following the event.

Table 5–9: Sample Response Mission EEIs by ESF (continued) *3 of 3*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availibility
Hazard-Specific Information	Vulnerable Structure Reports	ESF #5	12 Hours
	Active Fires	ESF #4	24 Hours
	Unsafe Areas	ESF #5	24 Hours
	Secondary Structural Hazards	ESF #5	48 Hours
	Vulnerable Structures (modeled)	ESF #3	3 Days
Airport Status	Airport Status	ESF #1	24 Hours
	FEMA PDA Team Reports	ESF #5	24 Hours

Public Health

With the hospital's emergency department severely damaged, it cannot accept any additional patients, forcing ambulance traffic and self-transports to divert to other facilities. Patients are being redirected to other area hospitals that are reporting lack of beds and staff available to provide care. Minor medical support continues to arrive on site and at the shelter locations. Any significant injuries are sent to area hospitals. Map products are provided at these facilities and hospital intake is coordinated with the on-site staff in effort to streamline patient intake and confidence.

Site Security

One of the first priorities following the attacks on the Lucas Oil Stadium will be the need to create security perimeters surrounding the damaged areas. The need for comprehensive and timely GIS products will play a critical role in the construction of these perimeters. Law Enforcement and Emergency Response personnel need to understand the entire situation so that construction of the various perimeters can be completed in a timely and efficient manner. Below is an example of a Security Perimeter graphic that would be created immediately following the attacks and distributed to the proper authorities for implementation. ***Figure 5-14 on page 109*** displays a Site Security map.

Scenario Summary

Although the blast impacts will be confined to a relatively small area, the consequences for the exposed population will be significant.

- Economic losses will be in the millions of dollars.
- There is localized damage to utility infrastructure.
- Transportation corridors are heavily congested, and in some cases blocked, due to citizens leaving the area and police checkpoints.

- Damage to some of the essential facilities will limit the response capabilities of fire, medical, law enforcement, and emergency management in the area most impacted.
- Fear of similar attacks sparks spontaneous and unprovoked evacuations of a few large office buildings, schools, and a shopping mall.
- Direct damage to the buildings in the immediate vicinity will generate significant US&R team requirements.
- Requirement for temporary shelters after the event due to lack of utility services.

5.3.2 PPD-8 Mission Area Support

Geospatial activities are dispersed throughout all of the major PPD-8 Mission areas: Prevention, Protection, Mitigation, Response, and Recovery. These five mission areas serve as an aid in organizing our national preparedness activities in support of this terrorist scenario, and do not constrain or limit integration across mission areas and core capabilities. Within these five mission areas, core capabilities are outlined that may have geospatial support requirements.

5.3.2.1 Response

Response includes those capabilities necessary to save lives, protect property and the environment, and meet basic human needs after the terrorist event has occurred. For the purpose of the GeoCONOPS, the geospatial support required for a terrorist event will be a scaled response defined by the magnitude of the attack. Response includes support to Critical Transportation, Environmental Response/Health and Safety, Fatality Management Services, Infrastructure Systems, Mass Care Services, Mass SAR Operations, On-scene Security and Protection, Operational Communications, Public and Private Services and Resources, Public Health and Medical Services, and

Best Practices - Interagency Modeling and Atmospheric Assessment Center

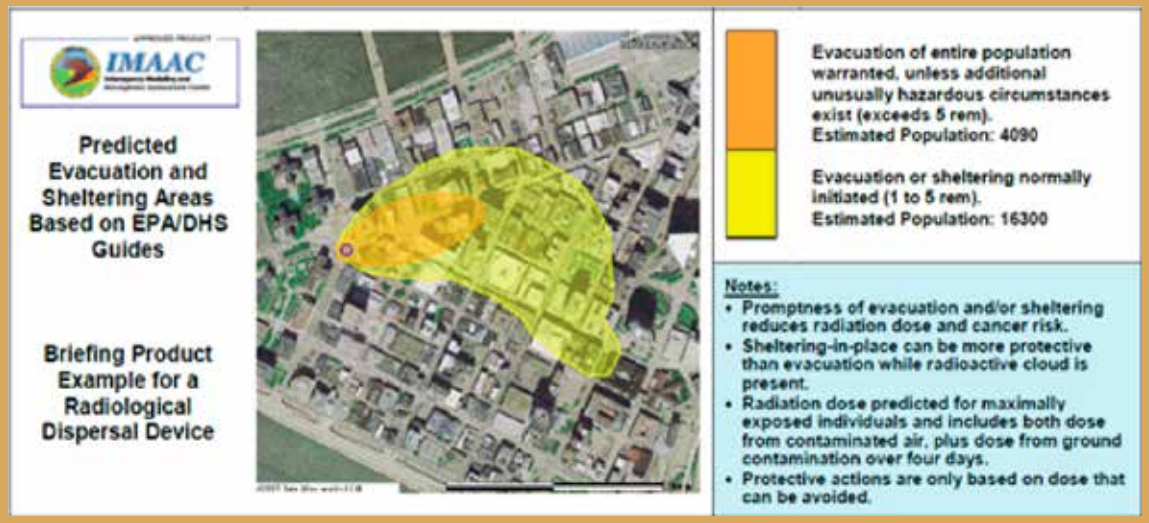
The IMAAC provides a single point for the coordination and dissemination of federal dispersion modeling and hazard prediction products that represent the federal position during actual or potential incidents involving hazardous atmospheric releases. Through plume modeling analysis, the IMAAC provides emergency responders and decision makers with predictions of hazards associated with atmospheric releases to aid in protecting the public and the environment.

Led by DHS, the IMAAC is a partnership among eight federal agencies, each with supporting capabilities and/or responsibilities for plume modeling. These agencies include: DHS, DOE, DoD, NOAA, NASA, EPA, NRC, and DHHS.

The IMAAC utilizes a variety of databases, to include geospatial, meteorological, and demographic, for data input to model calculations and produce assessment products. The IMAAC products provide actionable information to inform emergency response decisions. These products show the hazard areas, affected populations, potential casualties and/or fatalities, damage estimates, and health effect, public protective action, and worker protection levels. The IMAAC also provides support for exercises. The IMAAC products are distributed via email and available within the HISN.

Any local, state, tribal, or federal agency may activate IMAAC for emergencies involving atmospheric release. IMAAC assistance can be requested through the DHS NOC.

The IMAAC has responded to numerous real-world events, including chemical fires and train derailments, in-situ burns from the Deepwater Horizon oil spill, and sulfur dioxide volcanic emissions in Hawaii.



Situational Assessment. Specific data available through the Response Mission is identified in ***Table 5–9***.

Critical Transportation

The attack around Lucas Stadium affected several of the transportation routes. These routes are used not only by the first responders but for the evacuation and delivery of additional response personnel, equipment, and services into the area. Geospatial support will assist in determining the affected routes and defining formal ingress and egress paths. Data developed would be shared through the City EOC and FEMA in effort to ensure access by local responders and the community to safeguard personnel and provide information on the condition of roadways, bridges, formal access points, and temporary restrictions (such as lane closure) to safely and accurately route vehicles.

Environmental Response/Health and Safety

The health and safety of the public is of prime concern. In the aftermath of the attack, the government needs to ensure the availability of guidance and resources to address all-hazards including hazardous materials, such as the potential release of the chemical substance. Geospatial support to this effort will include the mapping of the detonations to ensure awareness of potential danger zones, dust fall-out, and other environmental hazards for the citizens and responders. Subjects such as air quality, hazardous airborne building materials, and potential chemicals would be monitored and mapped on regular intervals.

Fatality Management Services

Early models will project fatality estimates and on-scene body recovery activity will begin immediately. Data collection for each individual will include recovery location, injury descriptions, and victim

Best Practices - SAR Geo-Referencing

Federal, state, tribal, territorial, local, and volunteer SAR responders face numerous challenges, including those relating to a lack of geospatial awareness. Resource de-confliction is a matter of safety for mobile assets such as aircraft. Additionally, it aids in the efficient and effective use of limited resources so that all areas receive appropriate, available SAR response assets.

Three specific geo-referencing issues were identified during the response to Hurricane Katrina:

- How do SAR responders navigate when landmarks, such as street signs and homes, are unavailable?
- How do SAR responders communicate position in a common language?
- SAR resource de-confliction: the ability to ensure multiple assets are not inappropriately operating in the same area.

To geo-reference is to define location in physical space and is crucial to making aerial and satellite imagery useful for mapping. Geo-referencing explains how position data (e.g., GPS locations) relate to imagery and to a physical location. Different maps may use different projection systems. Geo-referencing tools contain methods to combine and overlay these maps with minimum distortion. Using geo-referencing methods, data obtained from observation or surveying may be given a point of reference from topographic maps already available.

Three predominate geo-referencing methods are used for SAR operations anywhere in the United States:

- USNG
- Latitude/Longitude
- Global Area Reference System (GARS)

A fundamental requirement for a geo-reference system is the ability to easily interface between the Incident Command, land, maritime, and aeronautical SAR responders. Because each has unique geo-referencing requirements, effective interface between each component is vital to a successful SAR response. The geo-referencing matrix below minimizes confusion and provides guidance on what geo-referencing system each SAR responder is typically using. Additional information provided by the National Search and Rescue Committee is available at http://www.uscg.mil/hq/cg5/cg534/NSARC.asp.

SAR Geo-referencing Matrix

Geo-reference System User	United States National Grid (USNG)	Latitude/Longitude DD-MM.mm	GARS
Land SAR Responder	Primary	Secondary	N/A
Aeronautical SAR Responders	Secondary	Primary	Tertiary
Air Space Deconfliction	N/A	Primary	N/A
Land SAR Responder/ Aeronautical SAR Responder Interface.	Primary	Secondary	N/A
Incident Command: Air SAR Coordination	Secondary	Primary	N/A
Land SAR Coordination	Primary	Secondary	N/A
Area organization and accountability	Secondary	Tertiary	Primary

For additional SAR-specific Best Practices see Estimating Search and Rescue Requirements on page 87.

Table 5–10: Sample Recovery Mission EEIs by ESF *1 of 2*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availibility
Boundaries of Disaster Area	Potential HAZMAT Release	ESF #5	3 Hours
	Summary of Impacts	ESF #5	8 Hours
	Imagery Derived Boundaries	ESF #5	2 Hours
	Infrastructure Failures	ESF #12	8 Hours
Access to Disaster Area	High Impact Urban Areas	ESF #3	1 Hour
	Road Closure Estimates	ESF #5	1 Hour
	Bridge & Overpass Damage Estimates	ESF #5	2 Hours
	Debris Estimates	ESF #5	1 Hour
	Road Closures	ESF #1	2 Hours
	Isolated Victims	ESF #5	2 Hours
	Debris Removal Status	ESF #3	12 Hours
Jurisdictional Boundaries	Communities Impacted (Reported)	ESF #5	2 Hours
	Communities Impacted (Eyewitness)	ESF #5	4 Hours
Socio-Economic Impacts	Estimated Monetary Losses	ESF #5	48 Hours
	Estimated Residential Damage	ESF #5	48 Hours
Hazard-Specific Information	Vulnerable Structure Reports	ESF #5	12 Hours
	Unsafe Areas	ESF #5	24 Hours
	Secondary Structural Hazards	ESF #5	48 Hours
	Vulnerable Structures (modeled)	ESF #3	12 Hours
Demographics	Estimated Exposed Populations	ESF #5	1 Hour
	Impact Upon Income, Ethnicity, & Age	ESF #5	1 Hour
Damage Assessments	IA Applicant Locations	ESF #6	24 Hours
	SBA Applicant Locations	ESF #6	24 Hours
	River Transportation Status	ESF #1	48 Hours
	General Imagery Analysis	ESF #5	12 Hours
	IDP - Structure Damages	ESF #5	5 days
	IDP - Transportation Damages	ESF #5	6 Days
	FEMA PDA Team Reports	ESF #6	24 Hours
	ARC Damage Assessment Team Reports	ESF #6	2 Days

identification. Human remains may be processed in a secure mortuary facility. The related information collected may be immediately elevated to a classified state as efforts to support evidence collection and other analysis will be performed.

In a terrorist event with causalities, the magnitude of the attack will dictate the size and scope of the required mortuary services. The mortuary mission lies in the hands of the local government with assistance provided through FEMA. DMORT operations begin in 24–36 hours to assist with the remains of non survivors. This mission requires the creation and maintenance of a business process and supporting database to collect, maintain, and retrieve information on the names of the deceased and the location of the recovery.

Infrastructure Systems

The terrorist attacks outlined at Lucas Stadium and the other locations will have minimal effect on CI. Initial spatial analysis would be completed through interactions with federal, state, and local SMEs. In this scenario, analysis shows minimal impact to any major infrastructure assets. Geospatial support plays a vital role in identifying all of the CI in the area. Pre-existing map and data products are accessible at multiple venues and any direct impacts would be identified and shared with the emergency management community to ensure the local authorities of the current information to make command decisions.

Public Health and Medical Services

Medical support includes standing up temporary care facilities to meet the requirements of the emergency staff and patients affected by the event. Medical teams with be dispatched from local hospitals to treat on-site injuries. As the operations progress, minor support would be available on site and injured

Table 5–10: Sample Recovery Mission EEIs by ESF (continued) *2 of 2*

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availibility
Damage Assessments	Debris Removal Status	ESF #3	2 Days
	FEMA PA Inspection Locations	ESF #3	7 Days
	FEMA MAT Reports ESF	ESF #5	2 Days
	Imagery Analysis (pre vs. post-event Imagery)	ESF #5	2 Days
Status of Medical Services	Estimated Hospital Functionality	ESF #5	4 Hours
	Disaster Medical Team Deployment Status	ESF #8	24 Hours
	Hospital Status	ESF #8	24 Hours
Status of Energy Systems	Power Outages	ESF #12	12 Hours
	Damage to Power Infrastructure	ESF #12	24 Hours
Voluntary Agency Activities	Shelter Status	ESF #6	12 Hours
Public Safety	Alert Notifications (reported)	ESF #5	2 Hours
	National Guard Security Team Status	ESF #5	24 Hours
	High Hazard/Unsafe Areas	ESF #5	24 Hours
Hazardous, Toxic, and Radiological Issues	Public Safety Notices	ESF #8	12 Hours
	Public Safety Notices	ESF #8	12 Hours

citizens who have fled the scene are directed to various hospitals.

The geospatial products available to support medical response efforts would include estimates of casualties from structural and direct impact, routing, and potential locations for federal resources due to loss of functionality at the local medical facility. Analyses are used to scale mission requirements and to identify areas where critical medical services requirements are required.

Shelter and Evacuation

Two shelters are activated at area schools. While these facilities are expected to have low volumes of long-term evacuees, they serve as a hub for event communications and the provision of various services to include federal assistance and locating friends and relatives. In addition, they will provide mass-feeding for the surge of stadium attendees as they await access to their vehicles and transportation home.

Emergency evacuations from the area will be required to transport the critically injured to care facilities. Since the closest hospital was also targeted, the distance that these patients may have to travel may be significant. The use of helicopters will be required due to the mass confusion occurring near the event locations. GAs would assist in assessing the surrounding area to determine adequate LZs for these assets as well as locations for temporary medical support. Sites will be required to treat the survivors that are rescued, triaged, and then transported to care facilities outside the impacted area. Sites need to accommodate both aircraft and over-road mechanisms of transportation. In order to support and sustain transportation activities, information such as access routes (ingress/egress) and airspace closures will need to be updated frequently.

Search and Rescue Operations

Although the area of operations in this event may be confined, the time-critical nature of SAR missions combine to heighten the importance of effectively utilizing geospatial tools to identify and prioritize the deployment of federal SAR assets. At the NRCC level, geospatial products will initially be focused at the impacted area and potential population affected. Blast radius models would be produced quickly and used by the on-scene commander to determine where to concentrate recourses. If a suspected plume was identified, then it would be authoritatively mapped by the IMAAC and/or DTRA and distributed to ensure rescue efforts are deployed in these areas.

US&R TFs would be deployed by FEMA immediately following this event. In addition, the state would deploy their own resources [Indiana Task Force 1 (IN-TF1)] and could request assistance from their neighboring states. Many of the US&R TFs have GAs within their ranks. These individuals provide direct support to the team with tactical products to include structure information, floor plans, site maps, and search management products.

IMTs are deployed to support the operational requirements US&R TFs and manage the US&R mission. The IMT brings logistics, planning, and geospatial staff to the theater. Working with local authorities, the geospatial staff would provide products to manage the site operations specific to SAR. Geospatial products utilized within the IMT support the development of strategic and operational

plans for US&R teams and general activities focus on the rescue of persons trapped in confined structures. GAs would assist in determining areas with high probabilities of structural collapse and spatially locating all information related to their operations.

On-scene Security and Protection

In the initial aftermath of the event, little will be known about the blast effects. This includes size, causalities, secondary effects, and if hazardous materials such as chemical or even radiation were involved. While lifesaving and life-sustaining operations are being carried out, and well after they are completed, the area will likely be considered a crime scene and treated as such. Damage to building and infrastructure will not be immediately known and so will be considered severe. Access to the site will be restricted. In the event of a terrorist attack, senior level government officials, including the President, will visit the affected, which will be led and coordinated by the US Secret Service.

On-site security efforts will be covered by local, state, and federal resources. Badging requirements will be put in place to control access to the scenes and protect the responders and evidence. Closed areas and security check points will be a vital part of the mapping data shared across the community. As the operations evolve, these elements will change to accommodate responder access, the removal of debris, and the coming reconstruction.

The attack will also cause the FAA to enact Temporary Flight Restrictions (TFR) over the Indianapolis area to restrict aircraft operations. A flight restriction issued under the authority of 14 Code of Federal Regulations (CFR) Section 91.137, is intended to protect persons or property, on the ground or in the air, from a specific hazard. It prohibits all aircraft from operating in the designated area, unless it is participating in disaster/hazard relief activities and is being operated under the direction of the official in charge of on-scene emergency response activities.

Geospatial support will include the mapping of the closed and restricted areas, which will be critical to all responders and the general public to ensure their safety. This effort will be crucial to ensure the safety of the responders as they work to look for survivors and the clearing of debris. The general public needs to be aware of areas off limits to enable the responders to do their task efficiently without outside interference and the concern for additional injuries.

Operational Communications

To ensure a safe and secure environment after the attack, operational communications with law enforcement and related security and protection operations will be required. Local commercial communications systems will be initially overwhelmed and service disruption will most likely occur. Geospatial support will revolve around products that detail the current damage areas and the identification of safe routes and areas that will ensure local authorities keep the public safe.

Radio communications continue to be vital across the emergency services community. With responders arriving from across the country, problems may arise with interoperability issues. The National interagency Fire Center (NIFC) could provide radio kits and radio repeater assets to assist. Geospatial technologies could be utilized to identify placement details and radio communication extents.

Public and Private Services and Resources

The provision to provide essential public and private services and resources to the affected area is another vital concern. Although this attack is limited in scope, emergency power to critical facilities, like the local medical facilities will need to be satisfied. In this situation, short-term power and fuel may be required to support the response efforts. The geospatial support will be called upon to provide the command centers with the required data to include the determination of potential parking lot space to accommodate refueling and the warehousing or supplies.

5.3.2.2 Recovery

In this terrorist event, Lifesaving operations may last for 3–7 days and will overlap greatly with Recovery activities. These activities would include term medical care, temporary feeding, and sheltering support. After 10–15 days, rescue efforts wind down as the focus transitions to Recovery operations.

The short-term recovery will focus aggressively on providing a core level of services, temporary housing (if required), and financial support to displaced workers and businesses in effort to stabilize the local situation. Longer term efforts will include the timely restoration of damaged facilities and the strengthening and revitalization of the infrastructure, housing, a sustainable economy, and the health, social, cultural, historic, and environmental fabric of the affected communities. Specific data available through the Recovery Mission is identified in ***Table 5–10 on page 115***.

Public Information and Warning

The delivery of reliable and actionable information following this event will be of utmost importance. With the multiple attack locations, citizens across the country will be fearful of another attack in the immediate area as well as other locations across the country. Immediate analysis of similar venues in other areas of the US will assist in ensuring that messaging is delivered to other communities. Notices will be delivered through multiple media sources to notify the citizens of shelter locations, assistance centers, available hospitals, and reunification facilities.

Table 5–11: Sample Mitigation Mission EEIs by ESF

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availibility
Hazard-Specific Information	Vulnerable Structures (Modeled)	ESF #5	1 Hour
	Vulnerable Structures (Inspected)	ESF #5	4 days
	Potential unexploded weapons	ESF #5	2 Hours
Status of Critical Infrastructure	Federal Critical Infrastructure Status	ESF #5	1 Hour
	State/local Critical Infrastructure Status	ESF #5	12 Hours
Status of State/local EOCs	State/local EOC Status	ESF #5	1 Hour
Status of Medical Services	Estimated Hospital Functionality	ESF #5	3 Hours
	Estimated Hospital Locations within Vicinity	ESF #5	1 Hour
Status of Personnel	FEMA MAT Deployment Locations	ESF #5	1 Hour
	Search and Rescue Deployment	ESF #5	1 Hour

Economic Recovery

The overall effect on the economy will be two-fold. Locally, the economic losses due to damaged and destroyed structures may strain local budgets, and federal assistance will be required for reconstruction. On a national level, the fears of markets will take initial downturn in the aftermath depending on the severity of the attack. Locally, the goal is to return residential, economic, and business activities to a healthy state in the affected area. Geospatial support would encompass many of the products that have already been produced in support of the initial emergency; such has hazard areas, transportation issues, and damage assessment products. Additional efforts would be in place to model economic losses for the near and distant timeframes.

Health and Social Services

Following this terrorist event, recovery encompasses more than the restoration of a community's physical structures. Of equal importance is providing a continuum of care to support individuals in maintaining or restoring health, safety, and independence, and in meeting the needs of survivors who experienced financial, emotional, and physical hardships.

Geospatial support to this area could assist in identifying individuals exposed to the event in effort to provide them with assistance related to post-traumatic stress concerns based on their opportunities to witness the explosions or aftermath. In addition, the tracking of individuals requesting assistance can be tied back to their locations at the time of the event, assisting health researchers in understanding the trauma witnessed by each individual.

Housing

The terrorist attack will have minimal impact on the local housing as the attack did not occur in any residential areas. If this event had a radiological or chemical element to the explosion, then a plume of potential harmful particles could cause the evacuation of apartment buildings and other facilities, which would result in the temporary relocation of the affected population.

The IA Program collects key information including damage address, mailing address, and current address. This location information enables ESF #6 to identify where the damage occurred and where applicants are currently located. In the days and weeks following the event, individuals move to formal shelters, move in with family and friends outside of the damaged areas, or move to regions beyond the impacted area. These simple address fields support analyses to determine shelter needs, survivor re-population, and return options for the foreseeable future.

Infrastructure Systems

FEMA's PA program is activated following the terrorist event. As part of the PDA Teams, PA staff are deployed to the field to assess the overall impact, returning with reported data and maps. While these reports may not be geospatial in nature, their location information is analyzed for spatial content to derive their specific location incorporated into the event data holdings.

Impact to the Amtrak station is critical to the commuter traffic in the area. Efforts to expedite the repair to the facility will be validated through spatial analysis of the commuter traffic patterns on the rail-line. The re-opening of the rail line will stabilize the users of this transportation system immediately and bring normalcy back to the community. Any prolonged service disruptions will impact both the citizens and the Amtrak operators.

Damages to the public facilities to include the hospital must be assessed as soon as possible. Plans for debris removal and temporary repairs must be defined as a means for re-opening access and ensuring public safety and security. Geospatial staff

Table 5–12: Sample Prevention Mission EEIs by ESF

Essential Elements of Information	Geospatial Product/ Analysis	Authoritative Source	Estimated Availibility
Boundaries of Special Events	Potential Community Impact	N/A	N/A
	Vulnerability Assessments	N/A	N/A
Hazard-Specific Information	Vulnerable Structure Reports	N/A	N/A
	Vulnerable Structures (Modeled)	N/A	N/A
Predictive Modeling	HAZMAT Locations	N/A	N/A
	Bomb Blast Modeling	N/A	N/A
	Plume Modeling	N/A	N/A
Emergency Operations Centers	Federal EOC Status	N/A	N/A
	JFO/GIU Locations	N/A	N/A
Status of Medical Services	Estimated Hospital Capacities	N/A	N/A

supporting these efforts will assist in modeling the debris volumes and produce products to monitor completion activities.

Natural and Cultural Resources

Large public projects are subject to a special considerations review to include environmental impact assessment and condition of cultural resources assessment. These reviews consist of analyzing environmental data to understand proximity of the project to environmental considerations. Efforts are made to understand the locations of historical structures to minimize the impact of recovery efforts on these structures. Activities include mapping the location of historical structures and districts and the provisioning of historical map documents.

5.3.2.3 Mitigation

Mitigation includes those capabilities necessary to reduce loss of life and property by lessening the impact of disasters. It is focused on the premise that individuals, the private sector, communities, CI, and the nation as a whole are made more resilient when the consequences and impacts, the duration, and the financial and human costs to respond to and recover from adverse incidents are all reduced. Mitigation efforts include Community Resilience, Long-term Vulnerability Reduction, Risk and Disaster Resilience Assessment, and Threats and Hazard Identification. Specific data available through the Mitigation Mission is identified in ***Table 5–11***.

Community Resilience

Although mitigation is the responsibility of the Whole Community, much of the mitigation activity occurs at the local level. The assessment of risk and resilience must, therefore, begin at the community level and serve to inform our state, regional, and national planning. In this scenario, local efforts could focus on future planning for similar events to include evacuation planning for facilities and vulnerability assessments for other venues. Geospatial products for these planning efforts would include venue evacuation plans and traffic re-routing plans utilizing modeling and access to key local data.

Long-term Vulnerability Reduction

One of the areas communities can look to for the implementation of mitigation measures that target essential facilities (police, fire, hospitals, shelters), businesses, residences, and lifelines (transportation and utilities) is FEMA. The FEMA-developed "Reference Manual to Mitigate Potential Terrorist Attack Against Buildings" (FEMA 426) provides guidance to the building science community of architects and engineers to reduce physical damage to buildings, related infrastructure, and people caused by terrorist assaults.

This event scenario would result in structural changes being made to the buildings directly impacted in this attack. Traffic control, pedestrian access, camera monitoring, and other topics would be assessed. Geospatial tools would assist in the analysis looking at line-of-site, access opportunities, and transportation choke-points.

Risk and Disaster Resilience Assessment

States and local communities must 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. Disaster risk reduction aims to reduce socio-economic vulnerabilities to disaster as well as dealing with the environmental and other hazards that trigger them. Geospatial support in the development of risk assessments would provide direct and practical connections between data analysis, modeling, and decision making within a spatial context using a variety of geospatial tools. These analytical products aid the communities in identifying risks and vulnerabilities to CI.

5.3.2.4 Prevention

Terrorist events are predominately "No-Notice Events" and, therefore, have minimal pre-event emergency activities associated with them. Preventing an imminent terrorist threat to the homeland requires the capabilities necessary to avoid, prevent, or stop a threatened or actual act of terrorism. The threat is dynamic and complex and combating it is not the sole responsibility of a single entity or community. It involves a robust and collaborative investigative process to include the intelligence, law enforcement, and homeland defense communities. Ensuring the security of the nation also requires the execution of terrorism prevention through extensive collaboration with government and nongovernmental entities, international partners, and the private sector. Specific data available through the Prevention Mission is identified in ***Table 5–12***.

Forensics and Attribution

In this scenario, the overall attack involved a systematic series of individual explosions. With this, the prevention efforts immediately following would have a high focus on identifying any follow-on attacks. Evidence collection, probably led by the FBI, would be key in linking the attackers and their specific weapons to other individuals and/or venues around the country. All resources would be working aggressively to harvest intelligence information and analyze it against content and geography. These activities would take place at the JTTFs, Fusion Centers, and other law enforcement facilities. Geospatial tools would support the visualization of all relevant information and be utilized in the analysis of key intelligence collected.

Intelligence and Information Sharing

The sharing of information for a terror- or other law enforcement-related event is much different than that of a natural event. Much of the early information collected will be restricted for much of the community. Various levels of security will be in place and there will be difficulties in the general sharing of information. Tools such as HSIN, Intellipedia, and internal Law Enforcement systems will be populated with key information and require the proper credentials to access.

It is imperative that the entities responding to and supporting the operations around this event maintain connections to the Whole Community. Sensitive information must be shared as appropriate and resources must be in place to remove unnecessary details to facilitate sharing across the community. GAs will be working in tandem on similar projects. Contacts maintained through the local JTTF and Fusion Center will assure that information movement is maintained and that all parties have visibility on critical information themes.

Interdiction and Disruption

The success of an operation to delay, divert, intercept, or secure a terrorist threat requires a coordinated effort. The use of intelligence and information sharing is vital to the successful conclusion of this type of operation. In this scenario, two vehicles appearing to be attached to Emergency Response are utilized by the combatants. Immediate analysis would look for similar vehicle purchases in the area and across the country. Retired ambulances and other apparatus are often sold with their original paint and some identification rendering them a simple solution for deceiving the public. If additional vehicle purchases are discovered, geospatial analysis could further analyze the details of this information and potentially track other vehicles from their point of sale using credit card receipts, fuel transactions, and traffic cameras.

One of the steps in interdiction and prevention efforts is the increased efforts in intelligence gathering and analytical capabilities. Obtaining information about the identity, goals, plans, and vulnerabilities of terrorists is extremely difficult but would be a high priority following this event. Resources such as the Regional Information Sharing System (RISS), the High Intensity Drug Trafficking Areas (HIDTAs) databases, the El Paso Intelligence Center (EPIC), and the International Association of Law Enforcement Intelligence Analysts (IALEIA) could be leveraged to assist in the intelligence gathering.

Screening, Search, and Detection

The identification, discovery, and location of potential threats and/or hazards appropriate to the event can occur through active and passive surveillance and search procedures. This may include the use of systematic examinations and assessments, sensor technologies, or physical investigation and intelligence. Geospatial support would work in tandem with intelligence means to track suspected cargo to predict destinations. Once identified and tracked, local authorities would perform the screening and searching of the suspected items to ensure the safety of the public.

5.3.2.5 Protection

Protection includes capabilities to safeguard the homeland against acts of terrorism and man-made or natural disasters. It is focused on actions to protect the citizens, residents, visitors, and critical assets, systems, and networks against the greatest risks to our nation in a manner that allows our interests, aspirations, and way of life to thrive. We will create conditions for a safer, more secure, and more resilient nation by enhancing protection through cooperation and collaboration with all sectors of society. Specific data available through the Protection Mission is identified in ***Table 5–13 on page 121***.

Access Control and Identity Verification

While access control is largely associated with fixed facilities, field operations of this type would require significant levels of support in maintaining a safe

Table 5–13: Sample Protection Mission EEIs by ESF

Essential Elements of Information	Geospatial Product/Analysis	Authoritative Source	Estimated Availibility
Boundaries of Areas of Interest (AOI)	Critical Infrastructure	N/A	N/A
	National Special Security Events (NSSEs)	N/A	N/A
Public Safety	High Hazard/Unsafe Areas	N/A	N/A
Status of Medical Service	Estimated Hospital Functionality	N/A	N/A
Status of Transportation	Evacuation Route Selection	N/A	N/A
	Road, Rail, Pipeline, Port, & Airport Status	N/A	N/A
Pre-Event Protection Plans	Barrier Construction Materials	N/A	N/A
	Security Personnel	N/A	N/A
Predictive Modeling	Potential Plume Mapping	N/A	N/A
	Potential Building Damage Mapping	N/A	N/A
	Areas of Interest (AOI) surrounding event	N/A	N/A
	Alternative Evacuation Routes	N/A	N/A

and secure environment following the event. While most federal staff will be badged through their home organizations, consolidating the verification activities at temporary access points would be a challenge. State and local staff along with contract support staff would require on-site badging and expedited verification of identities. Geospatial systems would assist in these efforts with the potential to geo-locate individuals and equipment in real-time. These efforts would provide additional site security and support individual safety at the same time.

Intelligence and Information Sharing

Much like the Prevention Mission, Protection measures will leverage similar intelligence and information sharing requirements. Utilization of this information would directly support the protection of the site, responders, and workers in the area. Access control systems could be linked through a data environment to share location information on a multitude of different themes. Supporting the sharing across the community would be vital in supporting the overall protection mission.

Interdiction and Disruption

Protection-based measures for interdiction would include physical check-point screenings of individuals and vehicles. Analysis-based support could assist with vehicle license validation and tracking. Perimeter security and cameras would support monitoring to disrupt any efforts to gain unapproved access to the site.

Physical Protective Measures

The on-site protection would include high levels of security staff, perimeter fencing, and cameras to monitor site access. Spatial products would define the extents of protection and locations of all resources employed and bring in additional relevant data as required. Through the Access Control measured mentioned above, data systems could track individuals as they enter the scene, monitor their routes as they work, and check them out upon departure. The simple notion of verifying that all workers are accounted for and that the check in/out metrics are balanced throughout the event will ensure the safety of the community.

5.3.3 Situational Awareness

In this attack scenario, critical information will need to be provided to all decision makers with decision-relevant information regarding the nature and extent of the event, any cascading effects, and the status of the response. This situational awareness will include the assessment of actual damage using a variety of means, including airborne/satellite imagery and on-site field reports.

The NOC, detailed in Section 4 of this GeoCONOPS, serves as the nation's nerve center for information collection and sharing. Pursuant to section 515 of the Homeland Security Act of 2002, the NOC is the principal operations center for DHS providing situational awareness and a COP for the entire federal government, and for state, local, and tribal governments as appropriate. It ensures that critical event-related information reaches government decision makers and enables the Secretary and other leaders to make informed decisions and identify courses of action during an event or threat. In concert with the NOC, the FBI's JTTF will conduct terrorism-related investigations, sharing relevant as it comes available. Analytic and information-sharing

efforts carried out by the JTTFs support investigative efforts and interact with the Fusion Centers.

Damage Assessment

Damage assessments provide a vital flow of information to the response community. In this event, the damage will be localized in nature, although with multiple explosions, the damaged areas will be spread throughout several locations. Through the initial use of ground truth data, the needed data models, and, to a lesser extent, imagery, the scale of the event and overall impact will be initially estimated and later validated. Initial ground truth data will provide the first responders with the immediate impact area in effort to assist in their efforts to effectively focus their efforts. The combination of data sources will provide rapid estimates and quantitative field observations to assist in making critical decisions in the early phases of the disaster response operation.

Imagery and Derived Products

For this event, the use of imagery will be limited as the impact area will be localized. Satellite-based imagery resources, although unaffected by the event will be used for post event analysis, but their immediate use will be of little value. Airborne resources can be deployed quickly and based upon the extent of the damage can be used to assist in some lifesaving missions.

Satellite Imagery

Under the International Charter, all participating satellite platforms will be available to the United States government through FEMA as the coordinator. These resources will satisfy high-level requirements for general damage assessment. The FEMA NRCC RS Coordinator will coordinate these collection efforts and assist in determining mission tasking and the balancing of available resources. If required, this effort will require the tasking of satellite resources to move from large, course coverage areas to tighter and higher resolution imagery collections thus removing these assets from the broader collection mission.

The Lifesaving Missions will require high resolution and spatially accurate data products to support their emergency activities. Initial field reporting will provide the ground truth on ingress routes to effected area. The use of proper imagery data and analysis will also aid in recovery efforts.

Airborne Imagery

Aircraft will serve as the primary source of imagery sources and provide the high-resolution products required for assessments of individual structures and systems. The airborne mission can have a fairly rapid start as the state coordinates with the local National Guard. Aircraft can provide aerial surveillance and reconnaissance for law enforcement to assist in the recovery efforts as well. With FEMA coordinating RS activities, it is imperative that ESF-based functions are engaged with the NRCC and JFO operations to identify requirements and report their geospatial activities. Lifesaving missions will benefit greatly from the increased resolution and coverage these platforms provide.

In addition to the urgent need to assist in recovery, public safety and force protection will require high levels of data collection in these areas to maintain law and order in the immediate vicinity. Oblique imagery further supports these efforts as it provides the ability to view the sides of buildings to further assess individual structures and determine locations suitable for rebuilding.

Mission Overlap

In some situations, satellite imagery and aircraft imagery are competing resources in the form of multiple platforms with similar instrumentation. With a localized event, a strategy will be developed to make best use of the available assets and ensure that efforts are not duplicated. Close coordination will be required between FEMA and the multitude of federal, state, and local partners. Efforts will be made to ensure that there are multiple uses for all imagery collected and that these data will be available to everyone with requirements to access it.

Exploitation

Imagery alone cannot be the single data source for situational awareness, as in most cases it only provides background information. The greatest return on imagery investment is the Imagery Derived Products (IDPs). These products expand on basic imagery by including simple attributes (e.g., destroyed, damaged) as well as more detailed information (e.g., degree of damage, damage type). These IDPs are developed based on customer requirements and vary greatly across the stakeholder community. In many cases, IDP requirements can be combined into a single analytical request and provided to several customers. In this setting, IDP analysis would also include debris volume monitoring and tracking.

As the executive agent for RS Coordination, FEMA has a role in coordinating the IDPs as well. With every specific data collection requirement, IDP development must be part of the deliverable regardless of the source. As IDP data will be utilized in briefings, map products, and web viewers across the country, it is imperative that information does not conflict and that sources are properly and easily defined.

Imagery Dissemination

The dissemination of the various imagery products in support of the terrorist event will be made available as needed. As the authoritative agent for data compilation and dissemination of imagery-based data, the USGS EROS Data Center will be the federal hub of post-event data. In addition, the imagery providers (government or commercial) can be expected to serve data to the stakeholders as allowed

by data licensing. Third-party distribution options will be available through various public and private internet-based spatial environments as well, ensuring that full access is available.

Models

The modeling communities will begin work immediately to estimate damages and model suspected radiological or chemical plume if detected. Damage models and plume data play a vital role in the first 12 to 24 hours following an event prior to factual details coming available. SMEs in the model methodologies and outputs play a critical role in interpreting the data and identifying proper use of the analyses to support damage assessment and lifesaving missions. These are used in conjunction with field assessments to delineate the area of operations and the nature and scope of damage.

The DTRA is the DoD's official Combat Support Agency for countering weapons of mass destruction (WMD). DTRA addresses the entire spectrum of blast, chemical, biological, radiological, nuclear, and high-yield explosive threats. DTRA would provide modeled information initially from an off-site location and would deploy resources into the theater to initiate activities focused at increased accuracy and information quality for the response and law enforcement communities.

In addition to DTRA, the National Guard Civil Support Teams (CSTs) would provide support as well and coordinate their efforts with DTRA and others. The DHS IMAAC would provide modeled information on the airborne threats, utilizing the various national laboratories to conduct their analysis.

In support of the recovery missions, USACE would provide support for modeled debris, food, and water for this event. In their support role to the FEMA PA program, their early modeling efforts would be replaced by ground data collected as they conduct the debris removal mission. Long-term modeling efforts will be utilized to support preparedness, mitigation, and judicial issues for the duration of the event efforts.

Each of these models provides an output product consisting of combinations of reports, maps, and geospatial data. These geospatial based products are vital in sharing the results with the stakeholder community. The modeling communities produce many similar products, which may be applicable to more than one mission. The geospatial products will have subtle differences, and interpretations of results should be supported by SMEs, including authoritative sources for the subject domain.

Field Data Collction

Imagery and models provide key data for early operations and will be used in conjunction with field information to provide improved situational awareness, complementing on-ground damage assessments and field data collection. First-hand data from the field will be the most important assessment in the initial response to the event supporting multiple missions. The inclusion of field data also lends credibility to imagery derived and modeled data feeds. Field data collection activities will include:

- Incident Management Assistance Teams (IMAT) – Federal interagency team
- Rapid Needs Assessment (RNA) – Federal and state interagency team
- PA Inspection Teams – Federal and state interagency team
- American Red Cross Inspection Teams – Paid and volunteer staff
- IA PDA Teams – Federal and state interagency team
- National Guard CSTs
- NRC Radiological Monitoring Teams.

These and other field data sources provide additional perspectives into the reality of the field. While most of the data collected is done to support specific operational authorities, the data can be easily repurposed in support of the damage assessment and recovery efforts.

Geospatial Products

Emergency response and law enforcement decision makers at all levels need to understand the overall situation and magnitude of the event. Several specific information themes will support this, including:

- Blast Radius for each incident
- Casualties Projections (Current and expected over time)
- Remains Recovery Locations
- Displaced Population
- Shelter Requirements
- Structure Damage
- Essential Facilities
- Transportation Systems Damage
- Water and Power Outages.

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Appendix A: Mission Engineering Methodology Overview

The collection of geospatial-specific requirements across the federal entities supporting the NRF required execution of proven methodology to ensure that information is efficiently collected, analyzed, and consolidated into one uniform document. The Mission Engineering® (ME) methodology provides this approach as an assessment of holistic operations supporting the GMO's GeoCONOPS. The premise of ME is to start from the strategic vision of the organization and then build downward, using a graphically rich framework to characterize and understand how the individual processes, activities, and interactions of the organization fit within the intended realms of missions, customers, suppliers, and responsibilities. The ME approach results in a definition of current operating practices and ties these to the strategic operations such that it is possible to simultaneously identify desirable "to-be" processes that are logical supplements to the current "as-is" practices.

This methodology was used to assess the geospatial community and baseline interactions between and among various federal entities, information sharing

needs, technologies, products, and processes. The ME approach consists of progressive phases (Community Analysis and Operations Analysis) that increase in substantive detail such that the end product not only reflects the four key mission objectives, but also the detailed information needed to execute these missions from the federal partners. All the ME phases are highly iterative and can be tailored to capture, analyze, visualize, and communicate organizational needs.

In development of this GeoCONOPS, these assessments focused upon the Geospatial community's operational environment and processes to enable DHS and the federal mission partners to make more knowledgeable, timely, and defined use of geospatial information and products.

Community Analysis

The Community Analysis phase characterizes how the Geospatial community operates within and supports the overall DHS community. The intent of this phase is to describe and characterize the various actors and stakeholders, their relationships, as well as tools that compose the current geospatial support to emergency response operations at the national, regional, and field levels. ME products in this phase illustrate mission-critical, business, and operations support services as well as the information flows between and among actors and stakeholders.

The GeoCONOPS Community Model ***(see Figure A-1)*** provides a graphical representation of the operational framework that:

- Identifies actors and stakeholders that support the Geospatial community mission
- Identifies the information environment, actor responsibilities, and transactional information exchanges
- Documents methods for sharing data within and outside the Geospatial community
- Illustrates high-level processes across the geospatial mission operations and the correlating relationships of these processes with stakeholders.

Operations Analysis

The Operational Analysis phase decomposes the Geospatial community further to visualize the processes that the actors and stakeholders follow to achieve their mission needs and responsibilities.

Information Transaction Inventory (ITI) captures specific details regarding the movement of geospatial information into, across, and out of the Geospatial community. The ITI defines the fundamental processes involved in information assimilation and analytical effort, clarifies current information transactions, and demonstrates what data interfaces exist, which systems currently integrate information transactions, and the frequency of the information transactions.

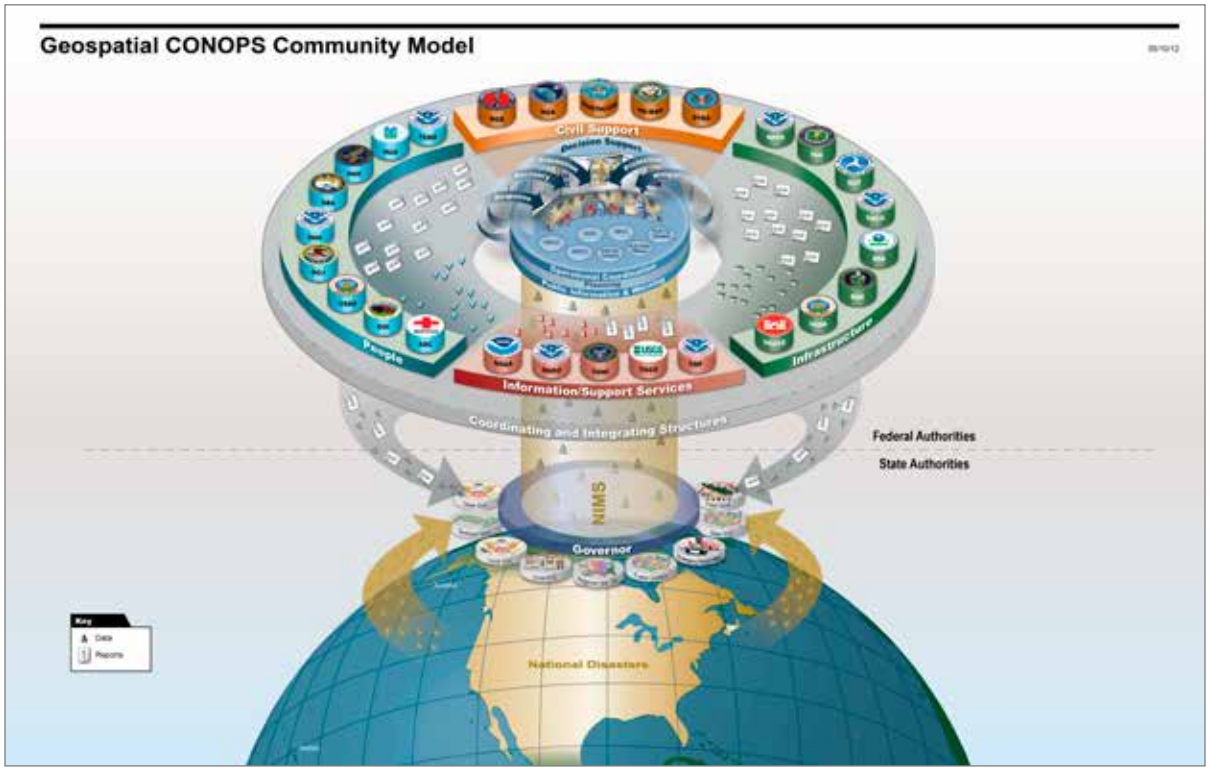

Figure A-1: Geospatial CONOPS Community Model

Appendix B: Authoritative Data Matrix

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
Agriculture/Food								
Animal Health Surveillance	Animal Health Surveillance	Point	USDA	n/a		http://www.aphis.usda.gov/vs/nahss/index.htm	5, 11	Prevention, Response
Mobile Food	Mobile Commissary - Base	Point	DOI/NIFC	n/a		unavailable	4, 5, 6, 9	Response, Recovery
	Mobile Commissary - Mobilized Locations	Point	DOI/NIFC	n/a		unavailable	4, 5, 6	Response, Recovery
	Mobile Food Unit - Base	Point	DOI/NIFC	n/a		unavailable	4, 5, 6	Prevention, Response, Recovery
	Mobile Food Unit - Mobilized Locations	Point	DOI/NIFC	n/a		unavailable	4, 5, 6, 14	Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
Processing/ Packaging/ Production	Animal Aquaculture Facilities	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Response, Recovery
	Animal Food Manufacturing	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11, 14	Prevention, Response, Recovery
	Animal Slaughter and Processing Facilities	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Prevention, Response
	Beef / Cattle Ranches and Farms	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11, 13	Prevention, Protection, Response, Recovery
	Botanical and Zoological Gardens	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11, 13	Prevention, Protection, Mitigate, Response, Recovery
	Bottled Water Manufacturing	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 8, 13, 14	Prevention, Protection, Response, Recovery
	Breweries/Distilleries	Point	Dun & Bradstreet (FDA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 8, 13, 14	Prevention, Protection, Response, Recovery
	Canneries	Point	Dun & Bradstreet (FDA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 8, 13, 14	Prevention, Protection, Response, Recovery
	Cattle Feedlots	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 7, 11, 13	Prevention, Protection, Response, Recovery
	Dairy Product Manufacturing	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 11, 13	Prevention, Protection, Response, Recovery
	Fruit and Tree Nut Farms	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 11	Prevention, Protection, Response, Recovery
	Fruit and Vegetable Preserving and Specialty Food Manufacturing	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Prevention, Protection, Response, Recovery
	Grain Mills	Point	Dun & Bradstreet (FDA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Prevention, Response
	Greenhouse Nursery and Floriculture Production	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Prevention, Response
	Hog and Pig Farms	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 11	Prevention, Protection, Response
	Hunting / Trapping and Game Propagation	Point	Dun & Bradstreet (D&B)		HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	
	Ice Manufacturing	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 11, 14	Response
	Meals Ready to Eat (MRE) Production	Point	DoD/DCMA	n/a		unavailable	4, 5, 6, 8, 9	Prevention, Response
	Meat Packing And Processing Plants	Point	Dun & Bradstreet (FDA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 11	Prevention, Protection, Response
	Oilseed and Grain Farms		Dun & Bradstreet (D&B)				5, 11	Response
	Other Food Manufacturing	Point	FDA	n/a		unavailable	5, 8	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Poultry and Egg Production Farms	Point	Dun & Bradstreet (D&B)		HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Protection, Response
	Poultry Slaughtering / Processing Facilities	Point	Dun & Bradstreet (D&B)		HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Protection, Response
	Seafood Product Preperation and Packaging	Point	International Association of Refrigerated Warehouses	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10	Protection, Response
	Soft Drink Manufacturing	Point	Dun & Bradstreet (FDA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8	Protection, Response
	Sugar and Confectionary Product Manufacturing	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8	Protection, Response
	Vegetable and Melon Farms	Point	Dun & Bradstreet (D&B)		HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Protection, Response
	Tobacco Product Manufacturing	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Protection, Response
Product Distribution	Bakeries	Point	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8	Protection, Response
	Food Importation/Distribution Centers	Point	FDA	n/a		unavailable	5, 8	Protection, Response
	Water Distribution Centers	Point	FEMA	n/a		unavailable	5, 6, 8	Protection, Response
Product Storage	Bulk Food Storage	Point	FEMA	n/a		unavailable	5, 8	Protection, Response
	Ice Storage	Point	FEMA	n/a		unavailable	5, 6, 8	Protection, Response
	Meals Ready to Eat (MRE) Storage	Point	DoD/DCMA	n/a		unavailable	5, 6, 8	Protection, Response
Product Transportation	Food Importation Ports	Point	FDA	n/a		unavailable	5, 8	Protection, Response
Supply	Cattle Ranch/Farms	Polygon	USDA	n/a		http://www.ers.usda.gov/topics/animal-products/cattle-beef.aspx#.UbcVnJxyaYk	5, 11	Protection, Response
	Crop Businesses	Point	USDA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Protection, Response
	Crop Production Farms and Facilities	Polygon	USDA	n/a		unavailable	5, 11	Protection, Response
	Cropland (National Agricultural Statics Service)	Polygon	USDA	n/a		http://www.nass.usda.gov/research/Cropland/SARS1a.htm	5, 11	Protection, Response
	Dairy Businesses	Point	USDA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Protection, Response
	Dairy Cattle Farms	Polygon	Dun & Bradstreet (FDA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Egg Production Farms	Polygon	USDA	n/a		http://www.ers.usda.gov/topics/animal-products/poultry-eggs.aspx#.UbcWJpxyaYk	5, 11	Protection, Response
	Sheep/Goat Farms	Polygon	USDA	n/a		http://www.ers.usda.gov/topics/animal-products/sheep,-lamb-mutton.aspx#.UbcWYpxyaYk	5, 11	Response
Support Facilities	Agriculture Chemical Manufacture	Point	USDA	n/a		unavailable	5, 10, 11	Protection, Response
	State Fairgrounds	Point	NGA-PMHP	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 11,	Protection, Mitigation, Response
	US Agriculture Census	Point	USDA	n/a		unavailable	5, 11	
	Veterinary Pharmaceutical Manufacture	Point	USDA	n/a		unavailable	5, 10, 11	Protection, Response
	Veterinary Services	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 13	Prevention, Protection, Mitigation, Response, Recovery
Banking/Finance								
Banking and Credit	Automated Check Clearing Houses	Point	Federal Reserve	n/a		unavailable	5, 13	Protection, Response
	Banking Institutions-National Credit Union Administration (NCUA)	Point	NCUA	n/a		http://www.ncua.gov/Legal/GuidesEtc/Pages/CUDirectory.aspx	5, 13	Protection, Response
	Branches/Agencies of Foreign Banks	Point	FDIC	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Credit Unions HQ	Point	National Credit Union Administration	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Farm Credit Administration (FCA) Financial Institutions	Point	FCA	n/a		unavailable	5, 13	Protection
	FDIC Insured Banking Administration Offices	Point	FDIC	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	FDIC Insured Banks- Main Office	Point	FDIC	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Federal Check Processing Units	Point	Federal Reserve	n/a		unavailable	5, 13	Protection
	Federal Reserve Banks / Central Reserve Depositories	Point	Dun & Bradstreet (FDIC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Federal Reserve Banks District Branches	Point	Federal Reserve	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Federal Reserve Banks Districts	Polygon	Federal Reserve	n/a		http://www.federalreserve.gov/Pubs/frseries/frseri3.htm	5, 13	Protection
	Federal Reserve Headquarters	Point	Federal Reserve	n/a		unavailable	5, 13	Protection

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Financial Processing Centers	Point	Dun & Bradstreet (FDIC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Foreign Trade / International Banking	Point	Dun & Bradstreet (FDIC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Insurance Companies	Point	Dun & Bradstreet (FDIC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Money Service Business (MSB) Financial Institutions	Point	Dept of Treasury	n/a		unavailable	5, 13	Protection
	OCC Regulated Banks	Point	Dept of Treasury	n/a		unavailable	5, 13	Protection
	Printing Facilities	Point	Dept of Treasury	n/a		unavailable	5, 13	Protection
	Stock Exchanges	Point	FDIC	n/a		unavailable	5, 13	Protection
	US Mint Engraving	Point	TGI (Dept of Treasury)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	US Mint Facilities	Point	Dept of Treasury	n/a		http://www.usmint.gov/about_the_mint/index.cfm?action=mint_facilities	5, 13	Protection
Securities/Commodities/Financial Investments	Brokerages	Point	Dun & Bradstreet	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Bullion Repositories	Point	Dun & Bradstreet	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Commodity Exchanges	Point	Dun & Bradstreet (FDIC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Investment Brokerage Headquarters	Point	US SEC	n/a		unavailable	5, 13	Protection
	Large Mutual Fund Facilities	Point	https://gii.dhs.gov/arcrest/services/ Working Group	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Securities and Commodity Exchanges	Point	US SEC	n/a		unavailable	5, 13	Protection
	Stock Regulatory Agencies	Point	US SEC	n/a		unavailable	5, 13	Protection
Base Map								
Bodies of Water	Great Lakes	Polygon	Navteq (USGS NHD)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Lakes	Polygon	Navteq (USGS NHD)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Inland Waterways	Polyline	USGS (National Atlas)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Inland Waterways	Polygon	USGS (National Atlas)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Oceans	Polygon	Navteq (USGS NHD)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Rivers	Polygon	USGS NHD	n/a		http://nhd.usgs.gov/data.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Streams	Polyline	USGS NHD	n/a		http://nhd.usgs.gov/data.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NHD Area High Resolution	Polygon	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NHD Flowline High Resolution	Polyline	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NHD Line High Resolution	Polyline	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NHD Waterbody Medium Resolution	Polygon	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NHD Area Medium Resolution	Polygon	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NHD Flowline Medium Resolution	Polyline	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NHD Line Medium Resolution	Polyline	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NHD Waterbody High Resolution	Polygon	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Water	Polygon	Navteq (USGS NHD)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Borders	Canada / US Border	Polyline	NGA	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Border Crossings - Canada and Mexico	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Economic Exclusion Zones (EEZS)	Polygon	DHS/USCG	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Lines of Demarcation	Point	DHS/USCG	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Mexico / US Border	Polyline	NGA	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Non Crossings Port of Entries	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Ports of Entry (POE)	Point	DHS/CBP	n/a		http://www.cbp.gov/xp/cgov/toolbox/contacts/ports/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Territorial Waters Boundary	Polygon	DHS/USCG	n/a		http://www.cbp.gov/xp/cgov/toolbox/contacts/ports/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Water Ports of Entry (POE)	Point	DHS/CBP	n/a		http://www.cbp.gov/xp/cgov/toolbox/contacts/ports/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Boundaries	Bathymetry Boundaries	Polygon	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Bathymetry Linear	Polyline	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	City AOI 133	Polygon	NGA-PMH	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	City Limits	Polygon	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Common Land Unit (CLU)	Polygon	USDA/FSA	n/a	HSIP Gold	http://datagateway.nrcs.usda.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Counties	Polygon	USGS, US Census	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	EPA Regions	Polygon	NGA	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Federal Lands	Polygon	USGS National Atlas	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Islands	Polygon	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Forest	Polygon	USDA/USFS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Forest Grasslands	Polygon	USDA/USFS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Political Boundaries	Polygon	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Political Boundaries	Polyline	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Postal Inspection Service Boundaries	Point	USPS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection
	Postal Inspection Service Boundaries	Polygon	USPS	n/a		unavailable	5, 13	Protection
	Radiological Administrative Districts	Polygon	DOE	n/a		unavailable	5, 13	Protection
	Urban Clusters	Polygon	US Census	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Protection
	Urbanized Area	Polygon	US Census	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Protection
	US Fish and Wildlife Service Lands	Polygon	DOI/USFWS	n/a		unavailable	5, 14	Protection, Recovery
Conservation Areas	Endangered/Protected Species Habitat Areas	Polygon	DOI/USFWS (States, Natureserve)	n/a		http://criticalhabitat.fws.gov/	5, 14	Recovery
	Endangered/Protected Species Habitats	Point	DOI/USFWS (States, Natureserve)	n/a		http://criticalhabitat.fws.gov/	5, 14	Recovery
	Land Use Boundaries	Polygon	Navteq	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 14	Recovery
	Migratory Bird Paths	Polygon	DOI/USFWS	n/a		https://migbirdapps.fws.gov/	5, 14	Recovery
	National Fire Plan – Hazardous Fuels Reduction Program	Polygon	DOI (USDA)	n/a		http://www.nationalatlas.gov/atlasftp.html #firplnp	5, 14	Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	National Marine Sanctuaries	Polygon	NOAA	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 14	Recovery
	Wildlife Refuges	Polygon	DOI/USFWS (State/Local)	n/a		http://www.fws.gov/refuges/	5, 14	Recovery
Elevation	Digital Terrain Elevation Data (DTED) Level 2 (30M POST)	Grid	NGA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Gulf Depth Contours	Polygon	NOAA	n/a		http://www.ncddc.noaa.gov/website/Metadata/bathy_contours.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	LIDAR - Building Feature Extraction Data	Grid	NGA	n/a		unavailable	5, 13	Protection
	LIDAR - Data (1M POST)	Grid	NGA (DoD/USACE, USGS)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Elevation Data set (NED) (10-30M POST)	Grid	USGS	n/a		http://ned.usgs.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	North American Bathymetry	Grid	NOAA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USA 10 Meter Elevation	Grid	USGS	n/a		http://nationalmap.gov/viewer.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Geonames	Administration Features	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Antarctica Features	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Community Features	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Concise Features	Point	USGS/GNIS	No		http://geonames.usgs.gov/domestic/download_data.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Cultural Features	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Government Units	Point	USGS/GNIS	No		http://geonames.usgs.gov/domestic/download_data.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Historical Features	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hydrography Lines	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hydrography Point	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Landform View	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Named Places	Point	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Populated Places	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Structures	Point	USGS/GNIS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Transportation Features	Point	USGS/GNIS		HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Land	Land Cover (200M RES)	Polygon	USGS	n/a		http://www.nationalatlas.gov/atlasftp.html#lancovi	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Indian Reservations	Polygon	DOI/BIA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Soil	Polygon	USGS (NRCS, States)	n/a		http://soildatamart.nrcs.usda.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Wetlands	Polygon	DOI/USFWS	n/a		http://www.fws.gov/wetlands/Data/Mapper.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Non-Political Boundaries	Time Zones (GMT)	Polygon	USGS	n/a		http://nationalatlas.gov/printable.html#timezones	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Water Polygon Boundaries	Polygon	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Watershed	Polyline	USGS National Atlas	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Watershed Areas	Polygon	USGS National Atlas	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Political Boundaries	Cities	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	City Civil Divisions	Polygon	USGS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	HSIP Urbanized Areas	Polygon	NGA	n/a		http://nationalatlas.gov/mld/urbanap.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Populated Place Boundaries	Polygon	USGS	n/a		http://nationalatlas.gov/boundaries.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Urban Area Security Initiative 2005 Cities	Polygon	DHS	n/a		http://www.dhs.gov/xlibrary/assets/UASI_FY04_Allocations.doc	5, 13	Protection, Recovery
	US Congressional Districts	Polygon	US Census	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	US Counties	Polygon	Navteq	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	US States	Polygon	US Census Bureau	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	US Territories and Possessions	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Raster Maps	Compressed ARC Digitized Raster Graphics (CADRG)	Raster	NGA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FAA Digital Aeronautical Chart	Raster	FAA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NOAA Raster Navigational Charts	Raster	NOAA	n/a		http://www.nauticalcharts.noaa.gov/mcd/Raster/index.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	USGS 1:100,000 DRG	Raster	USGS	n/a		http://tahoe.usgs.gov/DRG.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USGS 1:20,000 DRG	Raster	USGS	n/a		http://tahoe.usgs.gov/DRG.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USGS 1:24,000 DRG	Raster	USGS	n/a		http://tahoe.usgs.gov/DRG.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USGS 1:25,000 DRG	Raster	USGS	n/a		http://tahoe.usgs.gov/DRG.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USGS 1:250,000 DRG	Raster	USGS	n/a		http://tahoe.usgs.gov/DRG.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USGS 1:30,000 DRG	Raster	USGS	n/a		http://tahoe.usgs.gov/DRG.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USGS 1:63,360 DRG	Raster	USGS	n/a		http://tahoe.usgs.gov/DRG.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Residential	Apartments	Point	FEMA	n/a		http://asd.fema.gov/inter/hportal/home.htm	5, 6, 13	Response, Recovery
	Mobile Home Park Points	Point	FEMA	n/a		unavailable	5, 6, 13	Response, Recovery
	Mobile Home Parks	Polygon	FEMA	n/a		http://asd.fema.gov/inter/hportal/home.htm	5, 6, 13	Response, Recovery
	Multi Family Residences	Point	FEMA	n/a		http://asd.fema.gov/inter/hportal/home.htm	5, 6, 13	Protection, Response
Video	Exit Video	Video	DHS	n/a		unavailable	5, 6, 13	Protection, Response
	Video Logs	Video	DHS	n/a		unavailable	5, 6, 13	Protection, Response
Cadastre								
Property Ownership	Property Boundaries	Polygon	USGS (Local Assessor, FEMA (MapMod), AGI)	n/a		http://nationalatlas.gov/boundaries.html	5, 6, 13	Protection, Mitigation, Response, Recovery
	Structure Points	Point	USGS (Local Assessor, FEMA (MapMod), AGI)	n/a		unavailable	5, 6, 13	Protection, Mitigation, Response, Recovery
Chemical and Hazardous Materials								
Manufacturing Facilities	Canada/Mexico Chemical Plants	Point	Dept of State (EPA)	n/a		unavailable	5, 10, 13	Protection, Response
	Biological Products Manufacturing	Point	Dun & Bradstreet (D&B)	n/a		https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	Chemical Plants - Canadian	Point	Dept of State	n/a		unavailable	5, 10, 13	Protection, Response
	Chemicals Industries	Point	Dun & Bradstreet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	EPA Facility Registry System (FRS) Facilities	Point	EPA	n/s	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response

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	Explosives Manufacturing	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	Facilities with Response Plans	Point	EPA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	Nitrogenous Fertilizer Plants	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	Pharmaceutical Preparations Manufacturing	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	Phosphatic Fertilizer Plants	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	Facilities with Risk Management Programs	Point	EPA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
Release	Toxics Release Inventory	Point	EPA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
Storage	Chemical Munitions Storage Sites	Point	DoD/FEMA	n/a		unavailable	5, 10, 13	Protection, Response
	Hazardous Waste Handlers	Point	EPA	n/a		http://www.lib.ncsu.edu/gis/search/datainfo.php?datasetid=2528_HAZUSmh1	5, 10, 13	Protection, Response
	RCRA Hazardous Waste	Point	EPA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
Superfund Sites	Superfund Sites (NPL)	Point	EPA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
Transportation	Hazardous Material Routes	Polyline	NTAD	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
Commercial Assets								
Industry	Coal Fields	Polygon	USGS (DOE)	n/a		http://pubs.usgs.gov/of/1997/ofr-97-0461/	5, 10, 13	Protection, Response
	Coal Marine Terminals	Point	DOE	n/a		unavailable	5, 10, 13	Protection, Response
	Commercial Building Construction Companies	Point	DoD/USACE	n/a		unavailable	5	Response
	Commercial Road Construction Companies	Point	DOT	n/a		unavailable	5	Response
	Logging Operations	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11	Response
	Debris Removal and Disposal Companies	Point	DoD/USACE	n/a		unavailable	3, 5, 11	Response
	Industrial Complexes	Polygon	Navteq		HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Response
	Metal Manufacturing	Point	DOC	n/a		unavailable	5	Response
	Nonferrous Metal Processing Plants	Point	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Refractive Abrasive and Other Industrial Mineral Operations	Point	USGS	n/a		http://tin.er.usgs.gov/mrds/	5	Response

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	Salvage Companies	Point	DHS/USCG	n/a		unavailable	3, 5	Response
	Sand and Gravel Operations	Point	USGS	n/a		http://www.nationalatlas.gov/mld/sndgrvx.html	3, 5	Response
	Tall Commercial Buildings	Point	DHS (FEMA HAZUS, EMPORIS)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Textile Manufacturing	Point	DOC	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Trailer Production and Storage	Point	FEMA	n/a		unavailable	3, 5	Response
Lodging	Campgrounds and RV Parks	Point	FEMA (BLM, USFS, USFWS, DoD/USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6	Response
	Hotels and Motels	Point	Navteq	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 13	Protection, Response
Manufacturing	Apparel Manufacturing	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Armament Manufacturing	Point	Dun & Bradstreet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Computer and Electronic Product Manufacturing	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Leather and Allied Products	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Electrical Equipment Appliance and Component Manufacturing	Point	Dun & Bradstreet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Medical Equipment and Supplies	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8	Response
	Nonmetallic Mineral Products	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Paper	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Plastics and Rubber Products	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Printing and Related Support	Point		No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Machinery Manufacturing	Point	Dun & Bradstreet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Fabricated Metal Products	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Furniture and Related Products	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	General Manufacturing	Point	TGI (Dept of Commerce)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Steel Plants	Point	TGI (Dept of Commerce)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Wood Products	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Transportation Equipment	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
	Textile Plants	Point	TGI (Dept of Commerce)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Response
Mining	Agricultural Minerals Operations	Point	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5, 11	Response
	Coal Fields US	Point	USGS (DOE)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5, 11	Response
	Construction Mineral Operations	Point	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5, 11	Response
	Crushed Stone Operations - US	Point	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5, 11	Response
	Ferrous Metal Mines	Point	USGS (DOL/MSHA)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 11	Response
	Ferrous Metal Processing Plants	Point	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 11	Response
	Mines and Mineral Resources	Point	TGI (DOC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 11	Response
	Mining Industrial Manufacturing	Point	TGI (DOC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 3, 11	Response
	Miscellaneous Industrial Mineral Operations	Point	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 11	Response
	Nonferrous Metal Mines	Point	USGS (DOL/MSHA)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 11	Response
	Refract Abrasive Other Ind Mineral Operations	Point	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 11	Response
	Sand / Gravel Operations - US	Point	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 3, 11	Response
	Uranium, Radium, and Vanadium Operations	Point	USGS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 11	Response
Public Venues	All Places Of Worship	Point	TechniGraphics, Inc (TGS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Amphitheaters	Point	USGS/GNIS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Amusement, Theme, and Water Parks	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Bowl Game Locations	Point	NGA-PMHP	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Casinos	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Catholic Churches	Point	TechniGraphics, Inc (TGS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Cemetery Boundaries	Polygon	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Community Centers	Point	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Community Parks	Point	USGS/GNIS	n/a	HSIP Gold	http://www.nps.gov/findapark/index.htm#	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Convention Centers	Point	USGS/GNIS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Cruise Line Terminals	Point	DHS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Drinking Establishments	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Gambling Facilities/Resorts	Point	DOC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Golf Course Boundaries	Polygon	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Golf Courses	Point	Navteq (USGS/GNIS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Highway Rest Areas	Point	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Indy Racing League Racetracks	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Jewish Synagogues	Point	TechniGraphics, Inc (TGS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Libraries	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Major League Baseball Stadiums	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Major League Soccer Stadiums	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Major Thoroughbred Horse Racing Tracks	Point	NGA-PMHP	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Marinas	Point	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Mosques	Point	TGI (IONIC/MCH)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Movie Theaters	Point	DOC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Museums	Point	Navteq (USGS/GNIS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Basketball Association Arenas	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Football League Stadiums	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Hockey League Arenas	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Parks & Monument Boundaries	Polygon	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NCAA Division I Basketball Arenas	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NCAA Division I Football Stadiums	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Parks	Point	Navteq (USGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Protestant Churches	Point	TechniGraphics, Inc (TGS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Racetracks Motor	Point	USGS/GNIS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Raceways - Busch Series	Point	NGA-PMHP	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Raceways - NASCAR	Point	NGA-PMHP	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Religious Organization Facilities	Point	IRS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Ski Resorts	Point	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Sports Arenas	Point	NGA-PHMP	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Sports Complex	Point	Navteq (USGS/GNIS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Sports Complex Boundaries	Polygon	Navteq (USGS/GNIS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Stadiums	Point	NGA-PMHP	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State / County Local Park Boundaries	Polygon	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State / County Local Parks	Point	Navteq	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State Parks	Point	USGS	n/a		http://www.nps.gov/findapark/index.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Theatres and Performing Arts Centers	Point	NGA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Tracks IRL	Point	NGA-PMHP	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Vineyards / Wineries	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 11, 13	Prevention, Protection, Mitigation, Response, Recovery
	Womens National Basketball Association Arenas	Point	NGA	No		https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Zoos, Aquariums and Botanical Gardens	Point	USGS/GNIS	n/a		http://www.americanzoos.info/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Retail Facilities	Firearms Retailers and Wholesalers	Point	ATF	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Grocery Stores	Point	Dun & Bradstreet (DOE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Large Corporate Headquarters (Fortune 500)	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Shopping Center Boundaries	Polyline	Navteq	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Shopping Malls	Point	Navteq	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Dams								
Dams	Dam Hazard Areas	Polygon	DoD/USACE	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Dam Points	Point	TechniGraphics, Inc (TGS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Dams	Polyline	TechniGraphics, Inc (TGS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Levees	Polyline	DoD/USACE	n/a		http://nld.usace.army.mil/egis/f?p=471:1:	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Defense Industrial Base								
Defense Industrial Base	Defense Industrial Base (DIB) Facilities	Polygon	Defense Contract Management Agency (DCMA)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Emergency Services								
American Red Cross	ARC Deployments	Point	ARC	n/a		unavailable	5, 6, 13	Protection, Response
	Bio-Med Division and Region Boundaries	Polygon	ARC	n/a		unavailable	5, 6, 13	Response
	Bio-Med Facilities	Point	ARC	n/a		unavailable	5, 6, 13	Response
	Fixed Communication Facilities	Point	ARC	n/a		unavailable	5, 6, 13	Response
	National Vehicle Fleet "Home" Locations	Point	ARC	n/a		unavailable	5, 6, 13	Response

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	Red Cross	Point	TGI (IONIC/MCH)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 13	Protection, Response
	Red Cross Regions	Polygon	ARC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 13	Protection, Response
	Red Cross Chapter HQs	Point	ARC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 13	Protection, Response
	Red Cross Divisions	Polygon	ARC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 13	Protection, Response
	Red Cross Chapters	Polygon	ARC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 13	Protection, Response
	Service Area Boundaries	Polygon	ARC	n/a		unavailable	5, 6, 13	Protection, Response
	State Service Delivery Area Boundaries	Polygon	ARC	n/a		unavailable	5, 6, 13	Protection, Response
Emergency Management	Evacuation Areas	Polygon	DOT	n/a		http://www.mapdex.org/search/search.cfm?layerkeyword=evacuation%20areas&tab=lyr&type=lyr	5, 6, 13	Protection, Response
	Evacuation Routes	Point	FEMA (State/Local)	n/a		http://ntl.bts.gov/lib/jpodocs/repts_pr/14064.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Federal Emergency Operations Centers	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FEMA Debris Removal Metrics	Polygon	FEMA PA/USACE	n/a		unavailable	3, 5	Response, Recovery
	FEMA Debris Volume Estimates	Polygon	FEMA PA/USACE	n/a		unavailable	3, 5	Response, Recovery
	FEMA IA Applicants	Point	FEMA IA	n/a		unavailable	5, 6	Response, Recovery
	FEMA IA Expedited Assistance Areas	Polygon	FEMA IA	n/a		unavailable	5, 6	Response, Recovery
	FEMA NFIP Claims	Polygon	FEMA Mitigation	n/a		unavailable	5, 6	Mitigation, Response, Recovery
	FEMA PA Applicant Locations	Point	FEMA PA	n/a		unavailable	3, 5	Response, Recovery
	FEMA PA Deployed Assets	Point	FEMA PA	n/a		unavailable	3, 5	Response, Recovery
	FEMA PA Project Locations	Point	FEMA PA	n/a		unavailable	3, 5	Response, Recovery
	FEMA Recovery Offices	Point	FEMA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FEMA Region Boundaries	Polygon	FEMA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FEMA Regional Hqs	Point	FEMA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FEMA SAR Metrics	Polygon	FEMA	n/a		unavailable	1, 4, 5, 6,	Response
	FEMA SAR Recovery	Point	FEMA	n/a		unavailable	1, 4, 5, 6,	Response
	FEMA SAR Rescues	Point	FEMA	n/a		unavailable	1, 4, 5, 6,	Response
	FEMA SAR Temporary Landing Zones	Point	FEMA	n/a		unavailable	1, 4, 5, 6, 9	Response

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Emergency Management	FEMA Search Grid (2 minute x 2 minute)	Polygon	FEMA	n/a		unavailable	1, 4, 5, 6, 9	Response
	FEMA Search Grid (30 second x 30 second)	Polygon	FEMA	n/a		unavailable	1, 4, 5, 6, 9	Response
	FEMA Search Management Sectors	Polygon	FEMA	n/a		unavailable	1, 4, 5, 6, 9	Response
	FEMA US&R Search Status	Polygon	FEMA	n/a		unavailable	1, 4, 5, 6, 9	Response
	FEMA US&R Search Targets	Point	FEMA	n/a		unavailable	1, 4, 5, 6, 9	Response
	FEMA US&R Unsafe Areas	Polygon	FEMA	n/a		unavailable	1, 4, 5, 6, 9	Response
	Ice/Water Distribution Metrics	Point	DOD/USACE	n/a		unavailable	3, 5	Response
	Ice/Water Model Estimates	Polygon	DOD/USACE	n/a		unavailable	3, 5	Response
	Image Library Footprints	Polygon	FEMA	n/a		http://www.fema.gov/photolibrary/photo_start.do;jsessionid=1A23AEDAB313D3D4F8C85D09AB78AA39.Worker2Public3	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Collection Paths (Aircraft)	Polyline	NOAA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Collection Paths (Aircraft)	Polyline	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Collection Paths (Motion Video)	Polyline	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Collection Paths (Satellite)	Polyline	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Incident Declarations by Census Tract - Local	Polygon	FEMA (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Incident Declarations by County - Local	Polygon	FEMA (State/Local)	n/a		http://www.fema.gov/disasters?field_state_tid=All&field_disaster_type_term_tid=All&field_disaster_declaration_type_value=All&items_per_page=60&=GO	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Incident Declarations by State - Local	Polygon	FEMA (State/Local)	n/a		http://www.fema.gov/disasters?field_state_tid=All&field_disaster_type_term_tid=All&field_disaster_declaration_type_value=All&items_per_page=60&=GO	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Ingestion Exposure Pathway Emergency Planning Zones (EPZs)	Polygon	HIFLD	n/s	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 9	Response

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	Local Emergency Management Hqs	Point	FEMA (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Local EOCs	Point	TGI	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Shelter System	Point	FEMA	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 6, 9,	Protection, Response
	NDMS Federal Coordinating Centers	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NICC Infrastructure of Concern (IOC)	Point	DHS/NICC	n/a		unavailable	5, 9, 13	Protection, Response
	NOC Message Alert Location	Point	DHS/NOC	n/a		unavailable	5, 13	Protection, Response
	Patriot Report Area of Concern	Polygon	DHS/NICC	n/a		unavailable	5, 9, 13	Protection, Response
	Presidential Disaster Declaration Areas	Polygon	FEMA	n/a		http://www.peripresdecusa.org/mainframe.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Presidential Emergency Declaration Areas	Polygon	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Public Safety Answering Points (PSAPs) - 911	Point	TGI	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Quick Look Area of Concern	Polygon	DHS/NICC	n/a		unavailable	5, 13	Protection, Response
	State Emergency Management Hqs	Point	FEMA (State/Local)	n/a		http://www.fema.gov/regional-operations/state-offices-and-agencies-emergency-management	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State EMS Directors	Point	FEMA (State/Local)	n/a		http://www.jems.com/resources/directory/State_EMS_Directors.html	5, 6, 13	Protection, Mitigation, Response, Recovery
Emergency Management	State EOCs	Point	FEMA (State/Local)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State Guard Joint Receiving Points	Point	NGB/State Guard	n/a		http://www.sgaus.org/	5, 13	Protection, Response
	State Guard Logistic Supply Points	Point	NGB/State Guard	n/a		http://www.sgaus.org/	5, 13	Protection, Response
	State Guard Staging Areas	Point	NGB/State Guard	n/a		http://www.sgaus.org/	5, 13	Protection, Response
	State Guard Unit Locations	Point	NGB/State Guard	n/a		http://www.sgaus.org/	5, 13	Protection, Response
	State Homeland Security Contact	Point	DHS (State/Local)	n/a		http://www.dhs.gov/state-homeland-security-contacts	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	US DOT Emergency Regional Transportation Center	Point	DOT	n/a		http://www.dot.gov/mission/administrations/intelligence-security-emergency-response/operations-division	1, 5, 13	Protection, Response
	US National Grid (10,000 km)	Polygon	DHS (NGA)	n/a		http://www.fgdc.gov/usng	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USACE Division EOCs	Point	DoD/USACE	n/a		unavailable	3, 5, 13	Protection, Response

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Emergency Resources	Cot/Sleeping Bag/Blanket Storage	Point	FEMA	n/a		unavailable	5, 6, 9	Response, Recovery
	Emergency Food Supplies	Point	USDA	n/a		unavailable	3, 4, 5, 6, 13	Protection, Response, Recovery
	FEMA US&R Equipment Cache Locations	Point	FEMA	n/a		unavailable	5, 9, 13	Protection, Response
	Generator Placement	Point	DOD/USACE, FEMA	n/a		unavailable	3, 5, 13	Protection, Response
	Mine Equipment and Services	Point	MSHA/MEO	n/a		unavailable	5	Response
	Mobile Generator Storage	Point	FEMA (DoD/USACE, DoD/DLA)	n/a		unavailable	3, 5, 13	Protection, Response
	Mobile Shower Facilities	Point	DOI/NIFC	n/a		unavailable	4, 5, 6, 9	Response
	National Interagency Cache System Locations	Point	DOI/USFS	n/a		unavailable	4, 5, 6, 9	Response
	Tarp/Plastic Sheeting Storage	Point	FEMA	n/a		unavailable	3, 5, 6	Response
Fire	Community Fire Support Infrastructure	Point	USGS GeoMAC	n/a		http://www.geomac.gov/index.shtml	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fire Department Hqs	Point	FEMA (DHS/USFA, State/Local)	n/a		http://apps.usfa.fema.gov/census/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fire Locations - Historic	Point	DOI/NIFC	n/a		http://www.geomac.gov/index.shtml	4, 5	Response
	Fire Retardant Storage	Point	DOI/NIFC	n/a		unavailable	4, 5	Response
	Fire Service Boundary Areas	Polygon	DOI/NIFC	n/a		unavailable	4, 5	Response
	Fire Stations	Point	TGI (DHS/USFA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Firefighting Aviation Assets	Point	USGS GeoMAC	n/a		unavailable	4, 5	Response
	HMS Thermal Imagery - Historic	Raster	USGS GeoMAC	n/a		http://www.geomac.gov/index.shtml	4, 5	Response
	MODIS Thermal Imagery - Historic	Raster	USGS GeoMAC	n/a		http://www.geomac.gov/index.shtml	4, 5	Response
	Primary Fire Response Zone	Polygon	DOI/NIFC	n/a		unavailable	4, 5	Response
	Smoke Jumper Bases	Point	DOI/NIFC	n/a		unavailable	4, 5	Response
	State Fire Marshals	Point	DHS/USFA (DOI/NIFC, State/Local)	n/a		http://www.ehso.com/firemarshalstate.php	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Law Enforcement	ATF Hqs/Offices	Point	ATF	n/a		http://www.atf.gov/contact/field.html	5, 13	Protection, Recovery

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	Correctional Facilities	Point	ATF	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Recovery
	DEA	Point	ATF	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Recovery
	DHS/ICE	Point	DHS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Recovery
	DOI/BIA	Point	DOI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	DOI/BLM	Point	DOI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	DOI/BOR	Point	DOI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	DOI/FWS	Point	DOI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	DOI/NPS	Point	DOI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Explosive Ordnance Disposal (EOD) Units	Point	DoD (Stare/Local)	n/a		http://www.necc.navy.mil/	5, 13	Protection, Response
	FBI	Point	TGI (FBI)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	FBI Field Office Jurisdictions	Polygon	NGA-PMH (FBI)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	FBI Field Office Locations (SAC)	Point	FBI	Yes		https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	FBI Resident Agency (RA) District Boundaries	Polygon	FBI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	FBI Resident Agency (RA) Office Locations	Point	FBI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Federal Bureau of Prison Offices and Training Centers	Point	DOJ	n/a		unavailable	5, 13	Protection, Response
	Federal Bureau of Prisons Institutions	Point	DOJ	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Prison Areas	Polygon	Oak Ridge National Laboratory (DHS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Law Enforcement	Point	ATF	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Local Police	Point	TGI (ATF)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Marine Emergency Units	Point	ATF (USCG, State/Local)	n/a		unavailable	5	Response
	OBP Sectors Detailed	Polygon	DHS/CBP	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	OBP National Capabilities Asset Database (NCAD)	Point	DHS/OOBP	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	OBP Sectors HQ	Polygon	DHS/CBP	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	OBP Stations	Point	DHS/CBP	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Probation and Parole Offices	Point	DOJ	n/a		unavailable	5, 13	Protection, Response
	State Drug Offices	Point	DHHS	n/a		unavailable	5, 13	Protection, Response
	State Police	Point	TGI (ATF)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	University Police	Point	TGI (ATF)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	US Customs	Point	TGI (DHS/CBP)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	US Fish and Wildlife	Point	TGI (DOI/USFWS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	US Marshals Districts	Polygon	US Marshals	n/a		http://www.usmarshals.gov/district/index.html	5, 13	Protection, Response
	US Marshals Offices	Point	TGI (US MARSHALS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	US Park Police	Point	TGI (US Park Police)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	US Secret Service	Point	TGI (US Seceret Service)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
Rescue and Emergency Medical Services	Ambulance Providers	Point	DHHS	n/a		http://www.cms.gov/About-CMS/Agency-Information/RegionalOffices/index.html?redirect=/RegionalOffices/99_RegionalMap.asp#TopOfPage	5, 13	Protection, Response
	Armed Forces Reserve Medical Units	Point	DoD (NGB)	n/a		unavailable	5, 8, 13	Protection, Response
	DOD Air/Medivac Assets	Point	DoD (AAMS ADAMS)	n/a		unavailable	5, 8, 13	Protection, Response
	Emergency Shelters	Point	ARC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	EMS Facilities	Point	TGI, IONIC/MCH (DHHS, DHS, Navteq)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 13	Protection, Response
	Base Helipad Airports	Point	ADAMS / AMS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Rotary Wing 10 Minute Fly Circles	Polygon	ADAMS / AMS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 13	Protection, Response
	Rotary Wing 20 Minute Fly Circles	Polygon	ADAMS / AMS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 13	Protection, Response
	Rotary Wing 30 Minute Fly Circles	Polygon	ADAMS / AMS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 13	Protection, Response
	EMS Operation Stations	Point	DHHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 13	Protection, Response
Energy								

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
Electricity	Electric Control Center	Point	Global Energy Decisions (DOE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Alternative Fueling Stations	Point	NREL	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 12, 13	Protection, Response
	Electric Distribution Lines	Polyline	DOE (State/Local, Global Energy Decisions)	n/a		unavailable	5, 12, 13	Protection, Response
	Electric Generating Units	Point	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Distribution Control Facilites	Point	Ventyx	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Electric Holding Company Areas	Point	Ventyx	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Electric Power Generation Plants	Point	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Electric Retail Service Territories	Polygon	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Electric Sub Stations	Point	Global Energy Decisions (DOE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Electric Transmission Lines	Polyline	Global Energy Decisions (DOE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Energy Control Areas	Polygon	Ventyx	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Planning Areas	Polygon	Ventyx	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Flowgates - Lines	Polyline	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Flowgates - Points	Point	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Power Plants	Point	DOE	n/a		http://www.nucleartourist.com/us/us-plant.htm#USMap	5, 12, 13	Protection, Response
	Substations	Point	Ventyx	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12, 13	Protection, Response
	Transmission Lines	Polyline	Ventyx	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Wind Fields	Polygon	DOE	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Natural Gas	Distribution Service Territories	Polygon	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Import / Export Points	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	LNG Exporting Terminals	Point	DOE	n/a		unavailable	5, 10, 12, 13	Protection, Response
	LNG Facilities	Point	DOE	n/a		unavailable	5, 10, 12,	Protection, Response
	LNG Import Terminals	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	LNG Pipeline Interconnections	Point	DOT/NPMS	n/a		https://www.npms.phmsa.dot.gov/application.asp	5, 10, 12, 13	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	LNG Pipelines	Polyline	DOT/NPMS	n/a		https://www.npms.phmsa.dot.gov/application.asp	5, 10, 12, 13	Protection, Response
	LNG Processing Plant	Point	DOE	n/a		unavailable	5, 10, 12,	Protection, Response
	Natural Distribution Lines	Polyline	DOE	n/a		unavailable	5, 10, 12, 13	Protection, Response
	Natural Gas City Gates	Point	DOE	n/a		unavailable	5, 10, 12,	Protection, Response
	Natural Gas Compressor Stations	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Natural Gas Markets	Polygon	DOE	n/a		https://www.npms.phmsa.dot.gov/application.asp	5, 10, 12, 13	Protection, Response
	Natural Gas Pipeline Interconnections	Point	DOT/NPMS	n/a		https://www.npms.phmsa.dot.gov/application.asp	5, 10, 12, 13	Protection, Response
	Natural Gas Pipelines	Polyline	DOT/NPMS	n/a		https://www.npms.phmsa.dot.gov/application.asp	5, 10, 12, 13	Protection, Response
	Natural Gas Processing Plants	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Natural Gas Storage Facilities	Point	Platts	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Natural Gas Underground Storage	Point	DOE	n/a		https://www.npms.phmsa.dot.gov/application.asp	5, 10, 12, 13	Protection, Response
	Oil / Natural Gas Fields	Polygon	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Oil / Natural Gas Platforms	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Receipt / Delivery Points	Point	Platts	n/a		https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
Petroleum	Gulf Platforms	Point	DOE	n/a		http://www.bsee.gov/BSEE-Newsroom/Offshore-Stats-and-Facts/Offshore-Stats-and-Facts.aspx	5, 10, 12, 13	Protection, Response
	Offshore Interconnect Points	Point	DOT/NPMS	n/a		http://www.bsee.gov/BSEE-Newsroom/Offshore-Stats-and-Facts/Offshore-Stats-and-Facts.aspx	5, 10, 12, 13	Protection, Response
	Offshore Pipelines	Polyline	DOT/NPMS	n/a		http://www.bsee.gov/BSEE-Newsroom/Offshore-Stats-and-Facts/Offshore-Stats-and-Facts.aspx	5, 10, 12, 13	Protection, Response
	Oil Pipelines	Polyline	DOT/NPMS	n/a		https://www.npms.phmsa.dot.gov/application.asp	5, 10, 12, 13	Protection, Response
	Biodiesel Plants	Point	Platts	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	POL Terminals / Storage Facilities / Tank Farms	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Ethanol Plants	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Petroleum Pumping Stations	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Gas Stations	Point	Navteq (DOE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Gas Meter Stations	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Gulf Shipping Fairways	Polygon	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Independent System Operators	Point	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Lubricating Oils / Grease Plants	Point	Dun & Bradstreet (DOE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Oil Refineries	Point	Platts	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Oil Terminals	Point	TGI (DOE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Oil/Gas Facilities	Point	PennWell MAPSearch (DOE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Oil/Gas Pipelines	Polyline	Platts	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Pacific Platforms	Point	BOEMRE	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Oil / Natural Gas Pipeline Interconnects	Point	Platts	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Propane Locations	Point	DHS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Refineries	Point	NGA-PMHP (DOE)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	Strategic Petroleum Reserves	Point	Platts	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12, 13	Protection, Response
	US Oil/Gas Wells	Point	Platts	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 12,	Protection, Response
	Compressor/Pump Stations	Point	EPA	n/a		unavailable	5, 10, 12, 13	Protection, Response
	Motor Vehicle Fuel Terminals	Point	DOE	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Oil/Gas Platforms	Point	DOE	n/a		unavailable	5, 10, 12,	Protection, Response
	Petroleum Storage - Tank Farms	Point	DOE	n/a		unavailable	5, 10, 12, 13	Protection, Response
	Petroleum Storage - Underground	Point	DOE	n/a		unavailable	5, 10, 12, 13	Protection, Response
Regulatory, Oversight and Industry	Energy Control Area	Polygon	Global Energy Decisions (DOE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12	Response
	FERC Regions	Polygon	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12	Response
	NERC Regions	Polygon	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12	Response
	NERC Reliability Coordinators	Point	Ventyx	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12	Response
	NERC Subregion	Polygon	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 12	Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	State Utility Commissions - Energy	Point	DOE (State/Local)	n/a		http://www.naruc.org/commissions.cfm	5, 12	Response
Event Impact								
Animal Impact	Causalities-Animal	Polygon	CDC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Damage - Infrastructure	Bridge/Tunnel Damage	Point	ESF	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Commercial Building Damage	Polyline	FEMA (State/Local EOC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Communications Damage	Point	ESF	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Gas Distribution Damage	Point	ESF	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Government Building Damage	Polyline	FEMA (State/Local EOC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hospitals/Medical Damage	Point	ESF	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NOC Sweat Model	Polygon	DHS/NOC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Power Supply Damage	Point	ESF	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Residential Building Damage	Polyline	FEMA (State/Local EOC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Road Damage	Polyline	FEMA (State/Local EOC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Evacuation	Evacuation Targets/Status	Point	FEMA (State)	n/a		unavailable	1, 5, 6	Response
	Evacuation Tracking - Special Needs	Point	FEMA (State)	n/a		unavailable	1, 5, 6	Response
	Evacuee Reception	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Federal Medical Shelters	Point	VA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Evacuation Routes	Polyline	TGI	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Mandatory Evacuation - State/Local	Polygon	FEMA (State/Local EOC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NRC Evacuation Shelters/Reception Centers	Point	NRC	n/a		unavailable	5, 6, 8, 13	Protection, Response
	Patient Reception	Point	VA	n/a		unavailable	5, 6, 8,	Protection, Response
	Quarantine Areas	Polygon	DHHS	n/a		http://www.cdc.gov/ncezid/dgmq/	5, 6, 8,	Protection, Response
	Veteran Locations	Point	VA	n/a		unavailable	5, 6, 8,	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Veteran Patient Tracking	Point	VA	n/a		unavailable	5, 6, 8, 13	Protection, Response
Event Location	Arms, Ammunition, and Explosive Event	Point	DoD/TRANSCOM	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Burn Extents-Imagery Derived	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Burned Areas	Polygon	USGS	n/a		http://burnseverity.cr.usgs.gov/download_data.php	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Chemical Release	Point	EPA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Coastal Flooding	Polygon	USGS	n/a		http://www.nws.noaa.gov/oh/hic/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Contamination Attack	Polygon	DHS/NOC	n/a		unavailable	5, 8, 10,	Protection, Response
	Cyber Attack	Point	DHS/NOC	n/a		unavailable	5, 8, 10,	Protection, Response
	Damaged Areas (Report Derived)	Polygon	FEMA, JOC, State	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Debris Flows	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Debris Locations	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Disease Impacts	Polygon	CDC	n/a		unavailable	5, 8	Response
	Earthquake Damage-Field Reported Liquefaction	Polygon	USGS	n/a		http://earthquake.usgs.gov/research/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Earthquake Damage-Field Reports	Polygon	USGS	n/a		http://earthquake.usgs.gov/research/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Earthquake Damage-Reported (Did you feel it)	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Earthquake Epicenter	Point	USGS	n/a		http://earthquake.usgs.gov/research/data/?areaID=13	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Earthquake Impact-Measured (MMI)	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Explosive Detonation	Point	FEMA (State/Local EOC)	n/a		unavailable	5, 9	Response
Event Location	FEMA IMAT Reports	Polygon	FEMA	n/a		http://www.fema.gov/fema-mitigation-assessment-team-reports	5, 9	Response
	FEMA Windfields	Polygon	FEMA, NOAA, DOE	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fire Locations	Point	DOI/NIFC	n/a		http://www.geomac.gov/index.shtml	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fire Origins - Active	Point	DOI/NIFC	n/a		http://activefiremaps.fs.fed.us/lg_fire2.php	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Fire Perimeters	Polygon	DOI/NIFC	n/a		http://www.geomac.gov/index.shtml	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flood Extents-Imagery Derived	Polygon	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flood-Fight Measures	Polygon	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	High Water Depth	Polygon	FEMA Mitigation	n/a		http://water.usgs.gov/waterwatch/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	High Water Grid	Grid	FEMA Mitigation	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	High Water Marks	Point	FEMA Mitigation/USGS	n/a		http://waterwatch.usgs.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	HMS Thermal Imagery	Raster	USGS GeoMAC	n/a		http://www.geomac.gov/index.shtml	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Derived Products (Areas)	Polygon	FEMA (NGA)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Derived Products (Targets)	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Post-Event (Aircraft)	Raster	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Post-Event (Motion Video)	Video	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Imagery Post-Event (Satellite)	Raster	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Marine Hazards	Polygon	NOAA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	MODIS Thermal Imagery	Raster	USGS GeoMAC	n/a		http://www.geomac.gov/index.shtml	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Oil Spill Locations	Polygon	NOAA	n/a		http://library.thinkquest.org/C004218/OilLoc.htm	5, 10	Response
	Physical Attack	Point	DHS/NOC	n/a		unavailable	5	Response
	Red Cross Inspections	Point	ARC	n/a		unavailable	5, 6	Response, Recovery
	Red/Yellow Tag Reports	Point	FEMA/State	n/a		unavailable	5, 6	Response, Recovery
	Residential Damage-Imagery Derived	Polygon	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Roof Damage - Imagery Derived	Polygon	DOD/USACE, FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	SBA Applicants	Point	SBA	n/a		unavailable	1 thru 15	Response, Recovery
	Storm Tracks	Polygon	NOAA/NWS	n/a		http://www.stormtracker.noaa.gov/	1 thru 15	Response, Recovery
	Tornado Touchdown - Current	Point	NOAA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tsunami Damage	Polygon	NOAA	n/a		http://www.tsunami.noaa.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
Event Location	Volcano Damage-Field Reports	Point	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Wildfire Damage-Field Reports	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Wildfire Induced Hazards	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Wildfire Perimeters (GeoMAC)	Polygon	USGS	n/a		http://www.geomac.gov/index.shtml	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Impacted Area	911 Telephone Outage Emergency (TOE)	Polygon	FCC (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Earthquake Modified Mercalli Intensity (MMI)	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Earthquake Shake Intensity	Polygon	USGS	n/a		http://earthquake.usgs.gov/eqcenter/eqarchives/ or http://earthquake.usgs.gov/eqcenter/shakemap/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Impact-Human	Causalities-Human	Point	FEMA (CDC, State/Local)	n/a		unavailable	5, 6, 8	Response, Recovery
Modeling	CBRN Model Predictions: DOE Temporary Emergency Exposure Limits (TEEL)	Polygon	IMAAC	n/a		http://www.hss.doe.gov/nuclearsafety/techstds/docs/handbook/DOE-HDBK-1046-2008.pdf	5, 8	Response
	CBRN Model Predictions: Emergency Response Planning Guidelines (ERPG)	Polygon	IMAAC	n/a		http://www.aiha.org/insideaiha/GuidelineDevelopment/ERPG/Pages/default.aspx	5, 8	Response
	CBRN Model Predictions: EPA Protective Action Guidelines (PAG)	Polygon	IMAAC	n/a		http://www.epa.gov/radiation/rert/pags.html	5, 8	Response
	CBRN Model Predictions: SEPA Acute Emergency Guideline Levels (AEGL)	Polygon	IMAAC	n/a		http://www.epa.gov/oppt/aegl/	5, 8	Response
	CBRN Model Predictions: Time Integrated Air Concentrations	Polygon	IMAAC	n/a		unavailable	5, 8	Response
	CBRN Model Predictions: USDA/FDA Derived Intervention Levels (DIL)	Polygon	IMAAC	n/a		unavailable	5, 8	Response
	Earthquake Damage-Modeled	Polygon	USGS	n/a		http://earthquake.usgs.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Earthquake Impact-Modeled Liquefaction	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Model Input - CATS	Text	DTRA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Model Input - HAZUS	Text	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Model Input - HPAC	Text	DTRA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Model Input - HURREVAC	Text	FEMA	n/a		http://www.hurrevac.com/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Model Input - IMAAC	Text	IMAAC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Model Input - NISAC	Text	DHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - CATS	Polygon	DTRA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - HAZUS	Polygon	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - HPAC	Polygon	DTRA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - HURREVAC	Polygon	National Hurricane Center	n/a		http://www.hurrevac.com/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - IMAAC	Polygon	IMAAC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - NISAC	Polygon	DHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - SLOSH	Polygon	FEMA, USACE, NWS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - Surge (SLOSH)	Polygon	FEMA, USACE, NWS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - USACE Debris	Polygon	DOD/USACE	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Impacts - VMWG	Polygon	DOE	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Losses - CATS	Polygon	DHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Losses - HAZUS	Polygon	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Modeled Losses - NISAC	Polygon	DHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Plume Analysis	Point	IMAAC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Plume Exposure Pathway Emergency Planning Zones (EPZs)	Polygon	HIFLD	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Radiological Hazard Warning (RHW)	Point	NRC (FCC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Radiological Hazard Warning (RHW)	Point	NRC (FCC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Modeling	ShakeMap Pager	Point	USGS	n/a		http://earthquake.usgs.gov/eqcenter/shakemap/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Volcano Damage-Modeled	Polygon	USGS	n/a		http://volcanoes.usgs.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Wildfire Damage-Modeled	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Field Operating Locations								
DoD	JTF Joint Operations Center	Point	NORTHCOM/PACOM	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	JTF Joint Operations Center (State)	Point	NGB	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
FEMA	Area Command/Unified Area Command Post	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Disaster Recovery Center (DRC)	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Federal Operational Staging Areas (FOSAS)	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FEMA Mobilization Centers and Staging Areas	Point	FEMA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 6, 13	Protection, Response
	Incident Command Post (ICP)	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Joint Field Office (JFO)	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Joint Information Center (JIC)	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Points of Distribution (POD) Sites	Point	FEMA (USACE, State EOC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Regional Response Coordination Center (RRCC)	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Satellite JFO Facilities	Point	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State Staging Areas	Point	FEMA	n/a		unavailable	1, 5, 6,	Protection, Response
NOAA	Incident Meteorologist (IMETs)	Point	NOAA/NWS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Government Facilities								
Defense Industrial Base	DOD Joint Task Force (JTF) HQ	Point	USNORTHCOM	n/a		http://www.northcom.mil/About/index.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
DHHS	DHHS Facilities	Point	DHHS (VA)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	DHHS Regional Offices	Point	DHHS (VA)	n/a		http://www.hhs.gov/about/regions/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
DHS	CBP AMOC Bases	Point	DHS/CBP	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	(IAL) Dams	Line	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Mitigation, Response, Recovery
	(IAL) Mass Transit	Line	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Mitigation, Response, Recovery
	(IAL) Pipeline System	Line	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Mitigation, Response, Recovery
	(IAL) Points	Point	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Mitigation, Response, Recovery
	(IAL) Railroad Bridges	Line	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Mitigation, Response, Recovery
	(IAL) Railroad Tunnels	Line	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Mitigation, Response, Recovery
	(IAL) Road Bridges	Line	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Mitigation, Response, Recovery
	(IAL) Roads	Line	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Mitigation, Response, Recovery
	(IAL)Road Tunnels	Line	DHS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Mitigation, Response, Recovery
	CBP Border Patrol HQ	Point	DHS/CBP	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	CBP Border Patrol Sectors Detailed	Polygon	DHS/CBP	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	CBP Customs Management Centers	Point	DHS/CBP	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	CBP Office of Field Operations (OFO) Facilities	Point	DHS/CBP	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	CBP Ports of Entry	Point	DHS/CBP	n/a		http://www.cbp.gov/xp/cgov/toolbox/contacts/ports/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	CBP Press Offices	Point	DHS/CBP	n/a		http://www.cbp.gov/xp/cgov/newsroom/press_officers/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FEMA Commercial Storage Sites	Point	FEMA	n/a		unavailable	1, 5, 13	Protection, Response
	FEMA Logistics Centers	Point	FEMA	n/a		unavailable	1, 5, 13	Protection, Response
	FPS Deployment Cities	Point	DHS/ICE/FPS	n/a		unavailable	5, 13	Protection, Response
	FPS Deployments	Point	DHS/ICE	n/a		unavailable	5, 13	Protection, Response
	FPS Offices	Point	DHS/ICE/FPS	n/a		http://www.dhs.gov/about-federal-protective-service	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FPS Protected Buildings/Facilities	Point	DHS/ICE/FPS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	FPS Service Regions	Point	DHS/ICE/FPS	n/a		http://www.dhs.gov/about-federal-protective-service	5, 13	Protection, Response
	ICE Air & Maritime Interdiction	Point	DHS/ICE	n/a		unavailable	5, 13	Protection, Response
	ICE Detention Facilities	Point	DHS/ICE	n/a		http://www.ice.gov/detention-facilities/	5, 13	Protection, Response
	ICE District Council	Point	DHS/ICE	n/a		unavailable	5, 13	Protection, Response
	ICE Field Intelligence	Point	DHS/ICE	n/a		http://www.ice.gov/about/offices/homeland-security-investigations/intel/	5, 13	Protection, Response
	ICE Immigration Courts	Point	DHS/ICE	n/a		http://www.justice.gov/eoir/sibpages/ICadr.htm#Immigration	5, 13	Protection, Response
	ICE Internal Affairs Field Offices	Point	DHS/ICE	n/a		unavailable	5, 13	Protection, Response
	ICE Office of Investigations SAC Offices	Point	DHS/ICE	n/a		http://www.ice.gov/contact/inv/	5, 13	Protection, Response
	ICE Public Affairs	Point	DHS/ICE	n/a		http://www.ice.gov/about/offices/leadership/opa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	ICE SPEC Facilities	Point	DHS/ICE	n/a		unavailable	5, 13	Protection, Response
	PSA Cities	Point	DHS	n/a		unavailable	5, 13	Protection, Response
	PSA District Boundaries	Polygon	DHS	n/a		unavailable	5, 13	Protection, Response
DHS	PSA District Counties	Polygon	DHS	n/a		unavailable	5, 13	Protection, Response
	TSA OCONUS Deployments	Point	DHS/TSA	n/a		unavailable	5, 13	Protection, Response
	TSA Offices/Assets	Point	DHS/TSA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	TSA Organic Airport Assets	Point	DHS/TSA	n/a		unavailable	5, 13	Protection, Response
	USCG Air Station	Point	DHS/USCG	n/a		http://www.globalsecurity.org/military/facility/uscg-air.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USCG Area Command Hqs	Point	DHS/USCG	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USCG Canine Asset Home Bases	Point	DHS/USCG	n/a		unavailable	5, 13	Protection, Response
	USCG Captain of the Port Jurisdictions	Polygon	DHS/USCG	n/a		unavailable	5, 13	Protection, Response
	USCG District Command Hqs	Point	DHS/USCG	n/a		unavailable	5, 13	Protection, Response
	USCG Districts	Polygon	DHS/USCG	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	USCG Homeport/Base Assets	Point	DHS/USCG	n/a		unavailable	5, 13	Protection, Response
	USCG Sectors	Polygon	DHS/USCG	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response

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	USCG Stations	Point	DHS/USCG	n/a		http://www.uscg.mil/history/Station_Index.asp	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USCIS Districts	Polygon	DHS/USCIS	n/a		unavailable	5, 13	Protection, Response
	USCIS Field Offices	Point	DHS/USCIS	n/a		https://egov.uscis.gov/crisgwi/go?action=offices.type&OfficeLocator.office_type=LO	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USCIS Regions	Polygon	DHS/USCIS	n/a		https://egov.uscis.gov/crisgwi/go?action=offices.type&OfficeLocator.office_type=SC	5, 13	Protection, Response
	USCIS Sub-Field Offices	Point	DHS/USCIS	n/a		https://egov.uscis.gov/crisgwi/go?action=offices.type&OfficeLocator.office_type=SC	5, 13	Protection, Response
	USSS Field Offices	Point	USSS	n/a		http://www.secretservice.gov/field_offices.shtml	5, 13	Protection, Response
DOE	DOE Facilities	Point	DOE	n/a		http://www.energy.gov/contact/index.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	DOE Regions	Polygon	DOE	n/a		http://www.eia.gov/maps/	5, 13	Protection, Response
Educational Facilities	College Boundaries	Polygon	Navteq	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Colleges and Universities	Point	Oak Ridge National Laboratory (DHS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Day Care Centers	Point	Oak Ridge National Laboratory (DHS)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flight Schools	Point	Dun & Bradstreet (FAA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Multiple Campus College Institutions	Point	Oak Ridge National Laboratory (DHS)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Private Schools	Point	Oak Ridge National Laboratory (DHS)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Public Schools	Point	Oak Ridge National Laboratory (DHS)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Trade, Vocational and other Post-Secondary Schools (Public & Private)	Point	Dept of Education	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Truck Driving Schools	Point	Oak Ridge National Laboratory (DHS)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Foreign	Chanceries	Point	Dept of State	n/a		http://www.state.gov/s/cpr/rls/fco/209847.htm	5, 13	Protection, Response
	International Affairs Government Offices	Point	Dun & Bradstreet (D&B)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Consulates	Point	Dept of State	n/a		http://www.usembassy.gov/	5, 13	Protection, Response
	DC Chanceries/Embassies	Point	NGA-PMHP	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Diplomatic Missions Offices	Point	NGA-PMHP	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Embassies	Point	Dept of State	n/a		http://www.usembassy.gov/	5, 13	Protection, Response
GSA	Available Federal Office Space	Point	GSA	n/a		http://www.gsa.gov/portal/content/102867	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Federal Government Contracting Entities	Point	GSA (DoD)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	GSA Facilities	Point	GSA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	GSA Owned and Leased Buildings (PBS)	Point	TechniGraphics, Inc (TGS)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Surplus Office Equipment/Office Supplies	Point	GSA	n/a		http://www.gsa.gov/portal/category/21028	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Judicial	Federal Judicial Districts	Polygon	DOJ	n/a		http://www.uscourts.gov/court_locator.aspx	5, 13, 14, 15	Protection, Response, Recovery
	State Appellate Courts	Point	DOJ	n/a		http://www.uscourts.gov/court_locator.aspx	5, 13, 14, 15	Protection, Response, Recovery
	US Court of Appeals	Point	DOJ	n/a		http://www.uscourts.gov/court_locator.aspx	5, 13, 14, 15	Protection, Response, Recovery
	US District Court Jurisdictions	Polygon	FBI	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13, 14, 15	Protection, Response, Recovery
	US District Court	Point	DOJ	n/a		http://www.uscourts.gov/court_locator.aspx	5, 13, 14, 15	Protection, Response, Recovery
Military Installations	Air National Guard Bases	Polygon	ARNG	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	ANG Installation Areas	Polygon	ANG/GIO	Yes		https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	ARNG Installations	Polygon	ARNG	Yes		https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	ARNG Sites	Point	ARNG	Yes		https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Armed Forces Recruiting Centers	Point	DISDI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	ANG Sites	Point	ANG/GIO	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Homeland Response Force	Point	NGB	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Army Aviation Support Facilities (AASF) - USAR	Polygon	USAR	n/a		unavailable	5, 13	Protection, Response
	Army Reserve Locaitons (AFRCs)	Point	United States Army	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	ARNG Combined Sup Maintenance Shop	Point	ARNG	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	ARNG Field Maintenance Shop	Point	ARNG	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	ARNG Man Area Train Equip Site	Point	ARNG	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	ARNG Readiness and Res Center	Point	ARNG	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	ARNG Training Centers	Polygon	ARNG	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	ARNG Unit Training Equip Sites	Point	ARNG	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Aviation Facilities - ARNG	Polygon	ARNG	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Civil Air Patrol (CAP) Facilities	Point	USAF	n/a		unavailable	5, 13	Protection, Response
	Defense Fuel Supply Points (DFSP)	Point	DoD/DLA (DESC)	n/a		unavailable	5, 13	Protection, Response
	National Security Governement Military Facilities	Point	Dun & Bradstreet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Defense Logistics Agency (DLA) Facilities	Polygon	DoD/DLA	n/a		unavailable	5, 13	Protection, Response
	Defense Site Locations	Polygon	DISDI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Defense Site Locations	Point	DISDI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Joint Forces Headquarters	Point	NGB	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	JTF and Subordinate Task Force Hqs	Point	USNORTHCOM	n/a		http://www.northcom.mil/About/index.html	5, 13	Protection, Response
	Military Base Structure Report (BSR)	Point	DoD/DISDI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Military Bases	Polygon	Navteq (DoD/DISDI)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Military Base Boundary	Point	Navteq	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Military Ranges	Polygon	DoD/DISDI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	US Air Force Installations	Polygon	USAF/GeoBase	n/a		http://www.airforce.com/contact-us/base-locator/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	US Army Installations	Polygon	USA GIS-R	n/a		http://www.army.mil/info/organization/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	US Marine Corps Installations	Polygon	USMC/GeoFidelis	n/a		http://usmilitary.about.com/od/marinebase/l/blusmcbase.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	US Navy Installations	Polygon	USN/GeoReadiness	n/a		http://www.navy.mil/navydata/bases/navbases.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	US Navy Supervisor Salvage (NAVSUPSALV) Assets	Point	US NAVY	n/a		unavailable	5, 13	Protection, Response
Other	Space Research and Technology	Point	Dun & Bradstreet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Formerly Used Defense Sites	Polygon	DoD/USACE	n/a		https://egov.uscis.gov/crisgwi/go?action=offices.type&OfficeLocator.office_type=LO	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Other Federal Agency	DOT Regions	Polygon	DOT	n/a		unavailable	5, 13	Protection, Response
	FDA Facilities	Point	FDA	n/a		unavailable	5, 13	Protection, Response
	US Public Health Service (USPHS) Offices	Point	DHHS/USPHS	n/a		http://www.hhs.gov/about/	5, 13	Protection, Response
	USDA Facilities	Point	USDA	n/a		http://offices.sc.egov.usda.gov/locator/app	5, 13	Protection, Response
State/Local	County Seats	Point	USGS/GNIS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	City Halls	Point	Navteq	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Court Houses	Point	Navteq		HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fusion Centers	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Governors Mansions	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Landfills	Point	EPA (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Libraries	Point	Dun & Bradstreet (Dept of Ed)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Local City Council Districts	Polygon	DHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Local City Mayors	Point	DHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Local County Council Districts	Polygon	DHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Local Sanitation Department Facilities	Point	DHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Local Voting Districts (CENSUS)	Polygon	DHS (State/Local)	n/a		http://www2.census.gov/census_2000/datasets/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Major State Government Building	Point	TechniGraphics, Inc (TGS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Regional Councils of Governments	Point	DHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State Capitols	Point	NGA-PMHP	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State Governor	Point	DHS (State/Local)	n/a		http://www.globalcomputing.com/GovernorsContent.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State House	Point	DHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	State Senate	Point	DHS (State/Local)	n/a		http://www.senate.gov/pagelayout/senators/f_two_sections_with_teasers/states.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
USACE	USACE Districts	Point	DoD/USACE	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Response
	USACE Divisions	Polygon	DoD/USACE	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Response
	USACE Projects	Point	DoD/USACE	n/a		unavailable	3, 5	Response
Healthcare and Public Health								
Direct Patient Healthcare	Ambulatory Healthcare Facilities	Point	DHHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Bone Marrow Centers	Point	National Cancer Institute	n/a		http://cancercenters.cancer.gov/cancer_centers/cancer-centers-names.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Burn Beds	Point	American Burnbed Association	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Clinics	Point	HRSA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	DOD Military Healthcare Facilities	Point	DoD/OASD	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Extended Care Facilities	Point	DHHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Health Monitoring Results	Polygon	DHHS	n/a		unavailable	5, 8	Response
	Health Practitioner Offices and Clinics	Point	DHHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hospitals	Point	AHA, VA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hospital Boundaries	Polygon	Navteq	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hospitals - Psychiatric and Substance Abuse	Point	AHA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Medical Requirement Assessments	Polygon	DHHS	n/a		unavailable	5, 8	Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Urgent Care Facilities	Point	TGI, IONIC/MCH (AHA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	VA Healthcare Facilities	Point	VA	n/a		http://www2.va.gov/directory/guide/home.asp?isFlash=1	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
End-of-Life Facilities	Cemeteries and Crematories	Point	USGS GNIS, Veterans Administration	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Coroners and Medical Examiners Offices	Point	DHHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Funeral Homes and Funeral Services	Point	Dun & Bradstreet (DHHS, State/Local)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Mortuaries	Point	DHHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Health Supporting Facilities	Adult Day Care Facilities	Point	DHHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Alcohol and Drug Facilities	Point	DHHS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Blood and Organ Banks	Point	Dun & Bradstreet (DHHS, State/Local)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Cancer Centers/Services	Point	DHHS	n/a		http://cancercenters.cancer.gov/cancer_centers/cancer-centers-names.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Daycare Facilities	Point	DHHS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 14	Response, Recovery
	Diagnostic Imaging Centers	Point	DHHS	n/a		unavailable	5, 8, 14	Response
	Diagnostic Laboratories	Point	DHHS	n/a		unavailable	5, 8, 14	Response
	Home Health/Hospice	Point	DHHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Master Caches	Point	VA	n/a		unavailable	5, 8	Protection, Response, Recovery
	Medical Caches	Point	VA	n/a		unavailable	5, 8	Protection, Response, Recovery
	Medical Supplies, Devices, and Equipment Distribution Facilities	Point	DHHS	n/a		unavailable	5, 6, 8	Protection, Response, Recovery
	National Laboratory Response Network (NLRN) Facilities	Point	DHHS/CDC	n/a		unavailable	5, 6, 8	Protection, Response, Recovery
	Nursing Homes	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 8	Protection, Response, Recovery
	Pharmaceutical Caches - VA	Point	VA	n/a		unavailable	5, 6, 8, 13	Protection, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Pharmaceutical Distributors	Point	FDA	n/a		unavailable	5, 6, 8	Protection, Response, Recovery
	Pharmaceutical Manufacturing Facilities	Point	FDA	n/a		unavailable	5, 6, 8	Protection, Response, Recovery
	Pharmaceutical Storage and Stockpile	Point	FDA	n/a		unavailable	5, 6, 8	Protection, Response, Recovery
	Pharmacies	Point	TechniGraphics, Inc (TGS)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Pre-Planned Inoculation Sites	Point	DHHS (State/Local)	n/a		unavailable	5, 6, 8	Protection, Response, Recovery
	Renal Dialysis/Transplant Services	Point	DHHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Retail Pharmacies	Point	DHHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Senior Centers	Point	DHHS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	SNS Reception and Storage Sites	Point	DHHS/CDC	n/a		unavailable	5, 6, 8, 13	Protection, Response
	Strategic National Stockpile (SNS) Sites	Point	DHHS/CDC	n/a		unavailable	5, 6, 8	Protection, Response
	Tissue Banks	Point	DHHS	n/a		http://www.aatb.org/content.asp?contentid=458	5, 6, 8, 13	Protection, Response
Public Health Agencies	Centers for Disease Control	Point	DHHS/CDC	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 8, 13	Protection, Response
	Healthcare and Public Health Treatment Facilities, Agencies and Departments	Point	DHHS	n/a		unavailable	5, 6, 8, 13	Protection, Response
	Metropolitan Medical Response System (MMRS) Jurisdictions	Polygon	FEMA	n/a		http://www.fema.gov/metropolitan-medical-response-system-mmrs-program-archive	5, 6, 8, 13	Protection, Response
	Public Health State/Local Departments	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 8, 13	Protection, Response
	Veterans Health Administration	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 6, 8, 13	Protection, Response
Imagery								
High Resolution	Border Crossings	Raster	DHS/CBP	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	EPA ASPECT	Raster	EPA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FEMA LIDAR	Raster	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FEMA Radar	Raster	FEMA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	HSIP Urbanized Areas (Imagery 1-2-FT RES)	Raster	NGA (USGS)	n/a		http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	IKONOS/Quickbird/commercial airborne	Raster	USGS	n/a		http://www.satimagingcorp.com/gallery-ikonos.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NOAA Coastal Shoreline Aerial Photography	Raster	NOAA/NOS	n/a		http://shoreline.noaa.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NOAA Thermal	Raster	NOAA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Post-Event Video	Video	DHS, NASA, DoD, NGB, DOI	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Rail Photos	Raster	DOT/FRA (AAR)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	TSA - Imagery Request Areas	Raster	DHS/TSA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	US Airport Imagery	Raster	FAA (DOT)	n/a		http://www.faa.gov/airports/airport_safety/airportdata_5010/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USACE Blue-Roof Aerial Photography	Raster	DOD/USACE	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
High Resolution Oblique	Urban Areas	Raster	USGS (Pictometry Inc., Grenman-Pederson Inc., Multivision USA)	n/a		http://www.airborne1.com/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
International Charter	Landsat/SPOT/IRS/Radarsat/Envisat/ALOS/SAC-C/CBERS2/DMC	Raster	USGS	n/a		http://eros.usgs.gov/remote-sensing	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Low Resolution	CONUS Imagery - Aerial/Satellite	Raster	USGS (NGA)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Agricultural Imagery Program (NAIP) (1-2m res)	Raster	USDA	n/a		http://datagateway.nrcs.usda.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Orthoimagery Data set (1m res)	Raster	USGS	n/a		http://nationalmap.gov/viewer.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	POES/GOES/MODIS/AQUA	Raster	NOAA, NASA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	USGS DOQQ 1m	Raster	USGS	n/a		http://nationalmap.gov/viewer.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Mid Resolution	Landsat/ASTER/Hyperion/ALI/AWIFS/LISS	Raster	USGS/NASA/USDA	n/a		http://eros.usgs.gov/remote-sensing	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Levees								
Levees	Borehole Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Closure Structure Line	Polyline	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Cross Section Line	Polyline	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Encroachment Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Flood Fight Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Floodwall Line	Polyline	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Gravity Drain Line	Polyline	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Levee Center Line	Polyline	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Levee Crossing Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Levee Distress Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Levee Relief Well Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Levee Station Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Piezometer Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Leveed Area	Polygon	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Pump Station Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Rehabilitation Line	Polyline	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Sand Boil Point	Point	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
	Toe Drain Line	Polyline	NLD (USACE)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	3, 5	Mitigation, Response
Man-Made Hazards								
Biological	S&T Biowatch	Point	DHS	n/a		unavailable	5, 8, 13	Protection, Response
Chemical	EPA Air Sampling Stations	Point	EPA	n/a		unavailable	5, 8, 13	Protection, Response
Emergency Warning	Civil Danger Warning (CDW)	Point	FCC (State/Local)	n/a		unavailable	5, 8, 13	Protection, Response
	Civil Emergency Message (CEM)	Polygon	DHS (FCC)	n/a		unavailable	5, 8, 13	Protection, Response
	Evacuation Immediate (EVI)	Polygon	FCC (State/Local)	n/a		unavailable	5, 8, 13	Protection, Response
	Hazardous Materials Warning (HMW)	Polygon	FCC (State/Local)	n/a		unavailable	5, 8, 13	Protection, Response
	Law Enforcement Warning (LEW)	Polygon	FCC (State/Local)	n/a		unavailable	5, 8, 13	Protection, Response
	Local Area Emergency (LAE)	Point	FCC (State/Local)	n/a		unavailable	5, 8, 13	Protection, Response
	Nuclear Power Plant Warning (NUW)	Point	NRC (FCC)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 13	Protection, Response
	Shelter in Place Warning (SPW)	Polygon	FCC (State/Local)	n/a		unavailable	5, 8, 13	Protection, Response
Radiological	Radiation Detection Identifier Devices (RIID)	Point	DHS	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detection Monitors (RPM)	Point	DHS	n/a		unavailable	5, 8, 13	Protection, Response

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	Radiation Detectors (PRD)	Point	DHS	n/a		unavailable	5, 8, 13	Protection, Response
	Radiological Assistance Program (RAD) Regions	Polygon	DOE	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 8, 13	Protection, Response
	Radiation Detectors~BTS PRD (PERS RAD DETECTOR)	Point	DHS	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~CBP Commercial (PORTAL)	Point	DHS/CBP	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~CBP MAIL & ECCF (PORTAL)	Point	DHS/CBP	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~CBP Pagers	Point	DHS/CBP	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~CBP Personal Vehicles (PORTAL)	Point	DHS/CBP	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~DOE Pager-s (ORAU)	Point	DOE	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~EPA ERAMS - Air Particulate	Point	EPA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~EPA ERAMS - Drinking Water	Point	EPA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~EPA ERAMS - Milk	Point	EPA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~EPA ERAMS - Precipitation	Point	EPA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~FBI HRMS (Handheld RAD Monitor)	Point	FBI (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~FBI HRMS At Bomb Squads	Point	FBI (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~FBI Pager-s	Point	FBI (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~FBI RADPACK	Point	FBI (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~NNSA Backpack - G	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~NNSA Backpack - G/N	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~NNSA Backpack - N	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Radiation Detectors~NNSA Briefcase - G	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~NNSA Briefcase - N	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~NNSA Mobile System - G	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~NNSA Mobile System - G/N	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~NNSA Mobile System - N	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Detectors~NNSA Pagers	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Identifiers~All Identifiers	Point	DHS	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Identifiers~CBP RIID (LOW RES)	Point	DHS/CBP	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Identifiers~FBI Civil Defense (LOW RES)	Point	FBI (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Identifiers~FBI GR-130 (LOW RES)	Point	FBI (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Identifiers~FBI GR-135 (LOW RES)	Point	FBI (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Identifiers~NNSA Handheld ID (LOW RES)	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Identifiers~NNSA HPGE (HI RES)	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiation Identifiers~NNSA NAI (LOW RES)	Point	DOE/NNSA (DHS)	n/a		unavailable	5, 8, 13	Protection, Response
	Radiological Hazard Measurements (ACTUAL, NON-PREDICTIVE)	Point	DOE/FRMAC	n/a		unavailable	5, 8, 13	Protection, Response
X-Ray Capabilities	All X-Ray	Point	DHS	n/a		unavailable	5, 8	Response
National Monuments & Icons								
Archeological Sites	Archeological Sites	Point	DOI	n/a		http://www.uark.edu/misc/aras/map.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Business	Fortune 1000 Company Headquarters	Point	DOC	n/a		unavailable	5, 9, 13, 15	Protection, Response
Industry	Major Media Corporation Headquarters	Point	DHS	n/a		unavailable	5, 9, 13, 15	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Oil Company Corporate Headquarters	Point	DOE	n/a		unavailable	5, 9, 13, 15	Protection, Response
	Historic Sites	Point	Navteq (DOI)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 9, 13,	Protection, Response
National Monuments & Icons	National Monuments and Icons	Point	DOI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 9, 13, 15	Protection, Response
	National Symbols	Point	Navteq (DOI)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 9, 13,	Protection, Response
	Tourist Attractions	Point	DOI	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 9, 13,	Protection, Response
Natural Hazards								
Emergency Warning	Avalanche Warning (AVW)	Polygon	USGS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Avalanche Watch (AVA)	Point	USGS (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Blizzard Warning (BZW) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Coastal Flood Warning (CFW) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Coastal Flood Watch (CFA) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Dust Storm Warning (DSW) Area	Polygon	NOAA/NWS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Earthquake Warning (EQW)	Polygon	USGS (FCC)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fire Warning (FRW)	Polygon	FCC (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flash Flood Warning (FFW) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flash Flood Watch (FFA) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flood Warning (FLW)	Polygon	NOAA/NWS	n/a		http://www.noaawatch.gov/floods.php	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flood Watch (FLA) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	High Wind Warning (HWW) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	High Wind Watch (HWA) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Warning (HUW) Area	Polygon	NOAA/NWS	n/a		http://www.nhc.noaa.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Watch (HUA) Area	Polygon	NOAA/NWS	n/a		http://www.nhc.noaa.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Severe Thunderstorm Warning (SVR) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	Severe Thunderstorm Watch (SVA) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Special Marine Warning (SMW) Area	Polygon	NOAA/NWS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tornado Warning (TOR) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tornado Watch (TOA) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tropical Storm Warning (TRW) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tropical Storm Watch (TRA) Area	Polygon	NOAA/NWS	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tsunami Warning (TSW) Area	Polygon	NOAA/NWS	n/a		http://ptwc.weather.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tsunami Watch (TSA) Area	Polygon	NOAA/NWS	n/a		http://ptwc.weather.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Volcano Warning (VOW) Area	Polygon	USGS (FCC)	n/a		http://volcanoes.usgs.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Winter Storm Warning (WSW) Area	Polygon	NOAA/NWS	n/a		http://ptwc.weather.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Winter Storm Watch (WSA) Area	Polygon	NOAA/NWS	n/a		http://ptwc.weather.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
National Flood Hazard	Base Flood Elevation (BFE)	Polyline	FEMA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Coastal Barrier Resources System (CBRS)	Polygon	FEMA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flood Hazard Areas Part 1	Polygon	FEMA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flood Hazard Areas Part 2	Polygon	FEMA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Flood Hazard Areas Part 3	Polygon	FEMA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hydrualic Structures	Polyline	FEMA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 14	Mitigation, Response
	Cross Sections	Polyline	FEMA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 14	Mitigation, Response
Geologic	Earthquake Epicenters - Historic	Point	USGS/NEIC (USGS National Atlas)	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fault	Point	USGS National Atlas	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fault Lines	Polyline	USGS National Atlas	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Lahars - Historic	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Lahars - Prediction/Probability	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Landslide Susceptibility	Polygon	USGS	n/a		http://landslides.usgs.gov/learning/nationalmap/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Landslides - Historic	Polygon	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Plate Boundaries	Polyline	Unknown	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Quaternary Faults	Polygon	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Quaternary Faults	Polyline	USGS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Seismic Hazards - 2 Percent	Polygon	USGS (ESIC)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Seismic Hazards - 10 Percent	Polygon	USGS (ESIC)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Surficial Sediment Sinkhole Susceptibility	Polygon	USGS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tsunami Hazard Area	Polygon	NOAA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tsunami Events with Runups	Point	NOAA (NGDC)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tsunami Runups	Point	NOAA (NGDC)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tsunami Tide Gauges	Point	NOAA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tsunami Events	Point	NOAA (NGDC)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Significant Volcanic Eruptions	Point	Smithsonian Institution (NGDC)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Volcanoes	Point	USGS National Atlas	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Weather	DART Stations	Point	NOAA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Drought Monitoring	Polygon	USDA	n/a		http://droughtmonitor.unl.edu/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Floodplain - DFIRM	Polygon	FEMA	n/a		http://www.in.gov/dnr/water/3484.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Floodplain - Q3	Polygon	FEMA	n/a		https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Error	Polygon	NOAA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Hurricane Forecasted Locations - Historic	Polyline	NOAA	n/a		http://www.nhc.noaa.gov/data/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Forecasted Path - Historic	Polyline	NOAA	n/a		http://www.nhc.noaa.gov/data/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Track - Current	Polyline	NOAA/NHC	n/a		http://www.nhc.noaa.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Tracks - Historic	Polyline	NOAA/NHC	n/a		http://csc.noaa.gov/hurricanes/#	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Wind Speeds - Historic	Point	NOAA/NHC	n/a		http://csc.noaa.gov/hurricanes/#	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Hurricane Windswath - Current	Polygon	NOAA	n/a		http://www.aoml.noaa.gov/hrd/data_sub/wind.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Digital Forecast Database (NDFD)	Grid	NOAA/NWS	n/a		http://www.nws.noaa.gov/ndfd/technical.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	National Weather Service (NWS) Observation Stations	Point	NOAA/NWS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NEXRAD Radar Imagery (WSR-88D)	Raster	NOAA/NWS	n/a		http://www.roc.noaa.gov/WSR88D/Default.aspx	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Nexrad Radar Locations	Point	NOAA/NWS	n/a		http://www.wunderground.com/radar/map.asp	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NOAA Weather Radio All Hazards (NWR) Transmitters	Point	NOAA/NWS	n/a		http://www.nws.noaa.gov/nwr/nwrbro.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	NWS Upper Air Stations	Point	NOAA/NWS	n/a		http://www.ua.nws.noaa.gov/dataqc.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Rainfall - Daily	Point	NOAA	n/a		http://www.ncdc.noaa.gov/oa/climate/climatedata.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Red Flag Warning (Wildfire)	Polygon	NOAA/NWS	n/a		http://www.srh.noaa.gov/ridge2/fire/briefing.php	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Remote Automated Weather Stations (RAWS)	Point	BLM	n/a		http://www.raws.dri.edu/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	River Gage Levels	Point	USGS	n/a		http://waterdata.usgs.gov/nwis/rt	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Storm Cells	Polygon	NOAA/NWS	n/a		http://www.nws.noaa.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Weather	Storm Corridor	Polyline	NOAA/NWS	n/a		http://www.nws.noaa.gov/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Storm Surge	Polygon	NOAA/NHC	n/a		http://www.nhc.noaa.gov/prepare/hazards.php#surge	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Storm Surge Prediction (SLOSH)	Polygon	NOAA/NHC	n/a		http://www.nws.noaa.gov/mdl/psurge/download.php	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tornado Touchdown - Historic	Point	NOAA/NWS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Tornado Tracks	Polyline	NOAA/NWS Storm Prediction Center	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tropical Cyclone Wind Speed Probabilities	Polygon	NOAA/NHC	n/a		http://www.spc.noaa.gov/products/wwa/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tropical Storms - Historic	Polygon	NOAA	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	World Wide Weather Conditions	Polygon	NOAA	n/a		http://www.worldweather.org/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Wildfire	Active Fire Origins	Point	DOI/NIFC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Fire Detection	Point	USGS GeoMAC (MODIS or AVHRR)	n/a		unavailable	4, 5	Response, Recovery
	Fire Perimeters (2011)	Polygon	GeoMac	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	4, 5	Response, Recovery
	Fire Perimeters (2000-2010)	Polygon	GeoMac	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	4, 5	Response, Recovery
	Fire Perimeters - Historic	Polygon	DOI/NIFC (USGS GeoMAC)	n/a		http://www.geomac.gov/index.shtml	4, 5	Response, Recovery
	Fire Watch/Lookout	Point	NOAA/NWS	n/a		http://www.srh.noaa.gov/ridge2/fire/briefing.php	4, 5	Response, Recovery
	Fire Weather Watch	Polygon	NOAA/NWS	n/a		http://www.srh.noaa.gov/ridge2/fire/briefing.php	4, 5	Response, Recovery
	Red Flag Warnings	Polygon	NOAA/NWS	n/a		http://www.srh.noaa.gov/ridge2/fire/briefing.php	4, 5	Response, Recovery
Nuclear Facilities								
Deactivated Nuclear Facilities	Deactivated Nuclear Facilities	Point	NRC	n/a		unavailable	5, 10, 13	Protection, Response
Nuclear Fuel	Nuclear Fuel	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
Nuclear Fuel Cycle Facilities	Fuel Fabrication Facilities	Point	NRC	n/a		http://www.nrc.gov/info-finder/materials/	5, 10, 13	Protection, Response
	Uranium Mill Sites	Point	NRC	n/a		http://www.nrc.gov/info-finder/materials/uranium/	5, 10, 13	Protection, Response
	Uranium Milling Facilities	Point	NRC	n/a		http://www.nrc.gov/info-finder/materials/	5, 10, 13	Protection, Response
	Uranium Radium and Vandium Ores	Point	USGS	n/a		unavailable	5, 10, 13	Protection, Response
Nuclear Materials Transport	Proposed Nuclear Waste Highway Routes	Polyline	NRC	n/a		http://www.state.nv.us/nucwaste/states/states.htm	5, 10, 13	Protection, Response
	Proposed Nuclear Waste Railroad Routes	Polyline	NRC	n/a		http://www.state.nv.us/nucwaste/states/states.htm	5, 10, 13	Protection, Response

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	WIPP Transnuranic Waste Routes	Polyline	DOE	n/a		http://www.wipp.energy.gov/routes.htm	5, 10, 13	Protection, Response
Nuclear Power Plants	Nuclear Plants	Point	Ventyx	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	Nuclear Power Facilities - Commercial	Polygon	NRC	n/a		http://www.eia.gov/tools/faqs/faq.cfm?id=207&t=3	5, 10, 13	Protection, Response
	Nuclear Power Reactors - Commercial	Point	NRC	n/a		http://www.eia.doe.gov/cneaf/nuclear/page/nuc_reactors/reactsum.html	5, 10, 13	Protection, Response
Radioactive Waste Management	Nuclear Waste Sites	Point	NRC (DOE)	n/a		http://www.nrc.gov/waste.html	5, 10, 13	Protection, Response
	Spent Fuel Storage Facilities	Point	NRC (DOE)	n/a		http://www.nrc.gov/waste/spent-fuel-storage/locations.html	5, 10, 13	Protection, Response
	TRU Waste Sites	Point	DOE	n/a		unavailable	5, 10, 13	Protection, Response
Regulatory, Oversight and Industry	Emergency Operations Facilities (EOF)	Point	NRC	n/a		unavailable	5, 10, 13	Protection, Response
	Emergency Planning Zone (EPZ) Grids (2-, 5-,10-, 50-Mile)	Polygon	NRC	n/a		http://www.nrc.gov/about-nrc/emerg-preparedness/about-emerg-preparedness/planning-zones.html	5, 10, 13	Protection, Response
	Fuel Cycle Licensees	Point	NRC	n/a		http://www.nrc.gov/materials/fuel-cycle-fac/licensing.html	5, 10, 13	Protection, Response
	NRC Nuclear Material Licensees Locations (W/I Non-Agreement States)	Point	NRC	n/a		unavailable	5, 10, 13	Protection, Response
	NRC Offices	Point	NRC	n/a		http://www.nrc.gov/about-nrc/locations.html#usmap	5, 10, 13	Protection, Response
	NRC Regions	Polygon	NRC	n/a		http://www.nrc.gov/info-finder/region-state/	5, 10, 13	Protection, Response
	Nuclear Emergency Evacuation Routes	Polyline	NRC	n/a		unavailable	5, 10, 13	Protection, Response
	Nuclear Material License Agreement States (34)	Polygon	NRC	n/a		http://www.nrc.gov/info-finder/materials/#state-list	5, 10, 13	Protection, Response
	Nuclear Material Licensees	Point	NRC	n/a		http://www.nrc.gov/info-finder/materials/#state-list	5, 10, 13	Protection, Response
	Protective Action Sectors (PAS)	Polygon	NRC	n/a		unavailable	5, 10, 13	Protection, Response
Research, Training, and Test Reactors	Nuclear Research Facilities	Point	TechniGraphics, Inc (TGS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 10, 13	Protection, Response
	Nuclear Research, Training and Test Reactors	Point	NRC	n/a		http://www.nrc.gov/reactors/operating/project-managers.html#non-pwr	5, 10, 13	Protection, Response
Population/Demographics								
Census	CENSUS 2000	Polygon	US Census	n/a		http://www.census.gov/main/www/cen2000.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

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	CENSUS 2010 (Forecast)	Polygon	US Census	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Metropolitan Statistical Areas	Polygon	US Census	n/a		http://www.census.gov/population/metro/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Population by Census Tracts	Polygon	US Census	n/a		http://www.census.gov/geo/www/relate/rel_tract.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Population by City	Polygon	US Census	n/a		http://www.census.gov/popest/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Population by County	Polygon	US Census	n/a		http://www.census.gov/popest/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Crime	Arson Report	Point	DOJ	n/a		http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s	5, 13	Protection, Response
	Assault Report	Point	DOJ	n/a		http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s	5, 13	Protection, Response
	Burglary Report	Point	DOJ	n/a		http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s	5, 13	Protection, Response
	Larceny Report	Point	DOJ	n/a		http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s	5, 13	Protection, Response
	Motor Vehicle Theft Report	Point	DOJ	n/a		http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s	5, 13	Protection, Response
	Murder Report	Point	DOJ	n/a		http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s	5, 13	Protection, Response
	Rape Report	Point	DOJ	n/a		http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s	5, 13	Protection, Response
	Robbery Report	Point	DOJ	n/a		http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s	5, 13	Protection, Response
Labor, Income and Employment	Income and Employment	Polygon	DOC/BEA	n/a		http://www.bea.gov/iTable/iTable.cfm?ReqID=99&step=1#reqid=99&step=1&isuri=1	5, 6	Response
	Labor Statistics	Polygon	DOL/BLS	n/a		http://www.bls.gov/	5, 6	Response
	Poverty and Median Income	Polygon	DOC	n/a		http://www.census.gov/hhes/www/income/income.html	5, 6	Response
	Social Security Allocation	Point	SSA	n/a		http://www.usatrace.com/ssnchart.html	5, 6	Response
LandScan USA	LandScan USA - Raster Population	Raster	Oak Ridge National Laboratory (DHS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Postal/Shipping								
Courier	DHL Locations	Point	DHS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FedEx Locations	Point	DHS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Private Non-Retail Shipping	Point	TGI (USPS, DHS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	General Freight Trucking Terminals	Point	Dun & Bradstreeet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 9	Protection, Response
	UPS Locations	Point	DHS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	ZIP Code Boundary	Polygon	US Census (USPS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Mailing/ shipping	Air Shipping Mailing Centers	Point	Dun & Bradstreeet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Bulk Mail Centers	Point	Dun & Bradstreeet (D&B)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Response
Routing	Arms, Ammunition and Explosive Shipping Routes	Polyline	DoD/TRANSCOM	n/a		unavailable	1, 5, 13	Protection, Response
USPS	USPS Inspection Service Offices	Point	USPS	n/a		https://ribbs.usps.gov/locators/find-is.cfm	5, 13	Protection, Response
	USPS Mail Collection Boxes	Point	USPS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	USPS Support Facilities	Point	USPS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	USPS Administrative Offices	Point	USPGS	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	USPS Post Offices - Owned	Point	USPS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	USPS Processing Facilities	Point	USPS	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 13	Protection, Response
Specialized Response Teams								
DHHS	DHHS Incident Response Coordination Team (IRCT)	Point	DHHS	n/a		unavailable	1, 5, 13	Protection, Response
	DHHS Teams	Point	NDMS	n/a		unavailable	1, 5, 9,	Protection, Response
	Key Personnel Deployment	Point	DHHS/SOC	n/a		unavailable	1, 5, 9, 13	Protection, Response
DHS	CBP Search, Trauma, and Rescue (BORSTAR) Team Locations	Point	DHS/CBP	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Disaster Medical Assistance Team (DMAT) Locations	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Disaster Mortuary Operational Response Team (DMORT) Locations	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA Damage Assessment Teams	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	FEMA Emergency Response Team-Regional (ERT-A)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA Federal Incident Response Support Team (FIRST)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA Incident Management Assistance Team (IMAT)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA MERS/MATTS Home Bases	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA MERS/MATTS Locations (Deployed)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA NDMS Federal Coordinating Centers	Point	HIFLD	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 9, 13	Protection, Response
	FEMA US&R	Point	FEMA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 9,	Protection, Response
	FEMA US&R Canine Teams	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA US&R Incident Support Teams	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA US&R Team Home Bases	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FEMA US&R Teams (Deployed)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Incident Management Teams (IMTs) Federal Type 1 and Type 2	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Maritime Safety and Security Team (MSST) Bases	Point	DHS/USCG	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Maritime Safety and Security Team (MSST) Deployed Locations	Point	DHS/USCG	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Medical Emergency Radiological Response Team (MERRT)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	National Medical Response Teams (NMRTS)	Point	FEMA	n/a		http://www.phe.gov/Preparedness/respond ers/ndms/teams/Pages/default.aspx	1, 5, 9, 13	Protection, Response
	National Nurse Response Teams (NNRT)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	National Pharmacy Response Teams (NPRT)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	National Veterinary Response Team (NVRT) Locations	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Scientific and Technical Advisory and Response Teams (STARTS)	Point	FEMA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	USCG National Strike Force Bases	Point	DHS/USCG	n/a		unavailable	1, 5, 9, 13	Protection, Response
	USCG National Strike Force Deployed Locations	Point	DHS/USCG	n/a		unavailable	1, 5, 9, 13	Protection, Response
	USCG Strike Teams	Point	DHS/USCG	n/a		unavailable	1, 5, 9,	Protection, Response
DoD	NGB WMD Civil Support Teams	Point	NGB	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 9, 13	Protection, Response
	NGB WMD-Civil Support Team Deployed Locations	Point	NGB (JFHQ-STATE)	n/a		http://www.au.af.mil/au/c21/wmd-cst.htm	1, 5, 9, 13	Protection, Response
	USACE Planning & Response Teams (PRTS)	Point	DoD/USACE	n/a		unavailable	1, 5, 9, 13	Protection, Response
Other Federal Agency	Aviation Safety Teams	Point	DOT (DOI)	n/a		unavailable	1, 5, 9,	Protection, Response
	DOE Nuclear Incident Response Team (NIRT)	Point	DOE	n/a		http://www.nrc.gov/about-nrc/organization/nsirfuncdesc.html	1, 5, 9, 13	Protection, Response
	DOI Interagency Hotshot Crews	Point	DOI/NIFC	n/a		unavailable	1, 5, 9, 13	Protection, Response
	DOL/OSHA Specialized Response Teams	Point	DOL/OSHA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	EPA Counter Terrorism Response Teams (CTRT)	Point	EPA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	EPA Environmental Response Team (ERT)	Point	EPA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	EPA National Counter Terrorism Evidence Response Team (NCERT)	Point	EPA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	FBI Domestic Emergency Support Team (DEST)	Point	DOJ/FBI	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Infrastructure Assessment Response Team	Point	DOD/USACE	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Mine Rescue Teams	Point	MSHA/MEO	n/a		unavailable	1, 5, 9,	Protection, Response

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	Navigation Response Team	Point	NOAA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	NOAA Incident Meteorologists (IMET)	Point	NOAA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Oil Spill/HAZMAT Response Team	Point	NOAA	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Vaccination Teams	Point	VA	n/a		unavailable	1, 5, 9,	Protection, Response
State/Local	CBRNE Enhanced Response Force Package (CERF-P)	Point	NGB	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5, 9, 13	Protection, Response
	Donations Coordination Teams	Point	FEMA (State/Local)	n/a		unavailable	1, 5, 9, 13	Protection, Response
	Hazmat Emergency Response Units - Local	Point	FEMA (State/Local)	n/a		unavailable	1, 5, 9, 13	Protection, Response
	NGB WMD-Civil Support Team Bases	Point	NGB (JFHQ-STATE)	n/a		http://www.globalsecurity.org/military/agency/army/wmd-cst.htm	1, 5, 9, 13	Protection, Response
	Search and Rescue Units - Local	Point	FEMA (State/Local)	n/a		unavailable	1, 5, 9, 13	Protection, Response
Telecommunications								
Broadcasting	AM Antennas	Point	FCC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Antenna Structure Registrate	Point	FCC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Broadband - Co-Location Facilities	Point	FCC	n/a		unavailable	2, 5, 13	Protection, Response
	Cable Franchise Boundaries	Polygon	FCC	n/a		unavailable	2, 5, 13	Protection, Response
	FCC AM	Point	FCC	n/a		http://finder.geocommons.com/overlays/1482	2, 5, 13	Protection, Response
	FCC FM	Point	FCC	n/a		http://www.fcc.gov/encyclopedia/fm-query-broadcast-station-search	2, 5, 13	Protection, Response
	FCC TV	Point	FCC	n/a		http://www.fcc.gov/encyclopedia/tv-query-broadcast-station-search	2, 5, 13	Protection, Response
	FM Antennas	Point	FCC	No		https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FM Radio Contours	Polygon	FCC	n/a		http://www.fcc.gov/encyclopedia/fm-broadcast-station-classes-and-service-contours	2, 5, 13	Protection, Response
	FM Radio Towers	Point	FCC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Microwave Service Towers	Point	FCC (DHS/NCS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Television Contours	Polygon	FCC	n/a		unavailable	2, 5, 13	Protection, Response

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	Television Towers	Point	FCC	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	TV Digital Station Transmitters	Point	FCC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	TV NTSC Station Transmitters	Point	FCC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
Communications	Fiber Lit Buildings Locations	Point	Navteq (DHS/NCS, FCC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	Fiber Optic Lines	Polyline	NGA (FCC, NCS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	IT Locations / Portals	Point	DHS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	Land Mobile Broadcast Service	Point	FCC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	Land Mobile Commercial Service	Point	FCC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	Land Mobile Private Service	Point	FCC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	LATA Boundary	Polygon	Navteq (DHS/NCS, FCC)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	Metro Fiber USA	Polyline	Navteq (FCC, NANPA, DHS/NCS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	Rate Center Boundaries	Polygon	Navteq (FCC, NANPA, DHS/NCS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5	Response
	Wire Center Boundaries	Polygon	Navteq (FCC, NANPA, DHS/NCS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5	Response
DoD	Armed Forces Reserve Communications Units	Point	DoD (NGB)	n/a		http://www.fcc.gov/Bureaus/MB/Databases/tv_service_contour_data/readme.html	2, 5	Response
Internet	Cable Landings	Point	FCC	n/a		unavailable	2, 5	Response
	Cable Modem Coverage	Polygon	FCC	n/a		unavailable	2, 5	Response
	CLEC Fiber Lines	Polyline	FCC	n/a		unavailable	2, 5, 13	Protection, Response
	CLEC Hqs	Point	FCC	n/a		unavailable	2, 5	Response
	DSL - Enabled Wire Centers	Point	FCC	n/a		unavailable	2, 5, 13	Protection, Response
	High Speed Service Providers	Point	FCC	n/a		unavailable	2, 5, 13	Protection, Response
	Internet Access Points	Point	DHS	n/a		unavailable	2, 5, 13	Protection, Response
	Internet Exchange Points	Point	DHS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	Internet Hubs	Point	FCC	n/a		unavailable	2, 5, 13	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Internet Service Provider Areas	Polygon	DHS	n/a		unavailable	2, 5	Response
	Internet Service Providers	Point	DHS	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5	Response
Priority/ Emergency Assets	FEMA National Emergency Coordination NET Assets	Point	FEMA	n/a		unavailable	2, 5, 13	Protection, Response
	Government Emergency Telecommunications Service (GETS) Assets	Point	DHS/NCS	n/a		http://gets.ncs.gov/contact.html	2, 5	Response
	NCS Shared Resources (SHARES) High-Frequency Radio Program Assets	Point	DHS/NCS	n/a		unavailable	2, 5, 13	Protection, Response
	Telecommunications Service Priority (TSP) Program Assets	Point	DHS/NCS	n/a		unavailable	2, 5	Response
	Wireless Priority Service (WPS)	Point	DHS/NCS	n/a		unavailable	2, 5	Response
Satellite	Continuously Operating Reference Stations (CORS)	Point	National Geodetic Survey	n/a		http://www.ngs.noaa.gov/CORS/	2, 5, 13	Protection, Response
	Satellite Control Stations	Point	FCC	n/a		unavailable	2, 5, 13	Protection, Response
Transport Facilities	Microwave Facilities (Commercial)	Point	FCC	n/a		unavailable	2, 5, 13	Protection, Response
	Telecom Hotels	Point	FCC	n/a		unavailable	2, 5, 13	Protection, Response
Wired	Area Code	Polygon	FCC	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Border Gateways	Point	FCC (DHS/NCS)	n/a		unavailable	2, 5, 13	Protection, Response
	Central Offices/Switching Stations	Point	FCC (DHS/NCS)	n/a		unavailable	2, 5, 13	Protection, Response
	International Gateways	Point	FCC (DHS/NCS)	n/a		unavailable	2, 5, 13	Protection, Response
	Tandem Offices	Point	FCC (DHS/NCS)	n/a		unavailable	2, 5	Protection, Response
	Underwater Cable Facilities	Point	FCC (DHS/NCS)	n/a		unavailable	2, 5, 13	Protection, Response
	Wire Centers	Point	FCC (DHS/NCS)	n/a		unavailable	2, 5, 13	Protection, Response
Wireless	Cellular Market Area	Polygon	FCC	n/a		unavailable	2, 5	Protection, Response
	Cellular Towers	Point	FCC (DHS/NCS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response
	Mobile Communications Equipment Production	Point	FEMA (DoD/DLA)	n/a		unavailable	2, 5, 13	Protection, Response
	Mobile Communications Equipment Storage	Point	FEMA (DoD/DLA)	n/a		unavailable	2, 5, 13	Protection, Response
	Paging Service Transmitters	Point	FCC (DHS/NCS)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	2, 5, 13	Protection, Response

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	Regional Fiber Optics	Polyline	FCC (DHS/NCS)	n/a		unavailable	2, 5, 13	Protection, Response
Threat/Suspicious Activity								
Reports	Events of Interest	Point	DHHS/SOC (FEMA)	n/a		unavailable	5, 13	Protection, Response
	Location Based Threat Reporting	Point	DHS/NOC	n/a		unavailable	5, 13	Protection, Response
Surveillance	Surveillance or Suspicious Activity	Point	DHS/NOC	n/a		unavailable	5, 13	Protection, Response
Transportation								
Aviation	Aero Navaids	Point	FAA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 4, 5	Response
	Aero Obstructions	Point	FAA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 4, 5	Response
	Air Route Traffic Control Center (ARTCC)	Point	FAA (DOT)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 4, 5	Response
	Air Route Traffic Control Centers - Regions	Polygon	FAA (DOT)	n/a		http://www.faa.gov/about/office_org/headquarters_offices/ato/artcc/	1, 4, 5	Response
	Air Traffic - Flight Path Points	Point	FAA (DOT)	n/a		unavailable	1, 4, 5	Response
	Airport Districts	Polygon	FAA (DOT)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Airport/Airfield Boundaries	Polygon	FAA (DOT)	n/a		http://www.faa.gov/airports/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Airports - Private	Polygon	FAA (DOT)	n/a		http://airportguide.com/private_search_results.php	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Airports - Public Use	Polygon	NTAD 2011	n/a	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Airports Heliports	Point	DOT/NTAD	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Commercial Airport Facilities (Building Polygons)	Polygon	FAA (DOT)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	FAA Flight Feed	Point	FAA (DOT)	n/a		unavailable	1, 4, 5	Response
	FAA Flight Snapshot	Point	FAA (DOT)	n/a		unavailable	1, 4, 5	Response
	FAA Flight Standard District Office (FSDO)	Point	FAA (DOT)	n/a		http://www.faa.gov/about/office_org/field_offices/fsdo/	1, 4, 5	Response
	FAA Regions	Polygon	NGA (FAA, DOT)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 4, 5	Response
	FAA Schools	Point	FAA (DOT)	n/a		unavailable	1, 4, 5	Response
	FAA Terminal Radar Approach Control (TRACON) Facilities	Point	FAA (DOT)	n/a		http://www.faa.gov/about/office_org/headquarters_offices/ato/tracon/	1, 4, 5	Response

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	Flight Paths	Polygon	FAA (DOT)	n/a		http://weather.aero/tools/desktopapps/flightpathtool	1, 4, 5	Response
	Flight Restriction Zones	Polygon	FAA (DOT)	n/a		unavailable	1, 4, 5	Response
	FRMAC Aviation Assets	Point	DOE/FRMAC	n/a		unavailable	1, 4, 5	Response
	Government Aviation Asset/Bases	Polygon	FAA (DOT)	n/a		unavailable	1, 4, 5	Response
	Heliports - Private	Point	FAA (DOT)	n/a		http://airportguide.com/private_search_results.php	1, 4, 5	Response
	Heliports - Public	Point	FAA (DOT)	n/a		http://www.rotor.com/Operations/Heliports.aspx	1, 4, 5	Response
	Metropolitan Washington Airports Authority Lands	Polygon	MWAA	n/a		unavailable	1, 4, 5	Response
Aviation	Military Airfields and Air Bases	Polygon	DoD/DISDI GEOBASE	n/a		unavailable	1, 4, 5	Response
	Runways	Polygon	DOT/NTAD (FAA)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 4, 5	Response
	Sea Plane Bases	Point	FAA (DOT)	n/a		http://www.airnav.com/airports/us/AK?type=C	1, 4, 5	Response
	Short Take-off/Landing Ports	Point	FAA (DOT)	n/a		unavailable	1, 4, 5	Response
	Ultralight Ports	Point	FAA (DOT)	n/a		unavailable	1, 4, 5	Response
Intermodal	Intermodal Facilities	Point	DOT/NTAD	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 5	Response
	Intermodal Terminals	Point	DOT/BTS	n/a		http://www.loadmatch.com/directory/city.cfm?category=terminals	1, 5	Response
Maritime	Anchorage Areas	Polygon	DoD/USACE	n/a		unavailable	1, 3, 5	Response
	Anchorages	Point	DOD/USACE	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Boating Facilities	Point	DHS/USCG (DoD/USACE)	n/a		unavailable	1, 3, 5	Response
	Breakwater Lines	Polyline	NOAA, DoD/USACE	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Breakwater Points	Point	NOAA, DoD/USACE	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Canals	Polyline	DOT/BTS, DoD/USACE	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Channels	Polygon	DOT/BTS, DoD/USACE	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Commercial Ports	Point	DHS/USCG	n/a		unavailable	1, 3, 5	Response
	Danger Zones	Polygon	DoD/USACE	n/a		unavailable	1, 3, 5	Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Digital Nautical Charts	Raster	NGA	n/a		https://www1.nga.mil/ProductsServices/NauticalHydrographicBathymetricProduct/Pages/DigitalNauticalChart.aspx	1, 3, 5	Response
	Electronic Navigational Charts (ENC)	Point	NOAA/OCS	n/a		http://www.nauticalcharts.noaa.gov/mcd/enc/	1, 3, 5	Response
	Fairways	Polygon	DHS/USCG	n/a		https://www.sciencebase.gov/catalog/item/get/4f4e4a52e4b07f02db62aea3	1, 3, 5	Response
	Ferry Terminals	Point	DOT/BTS	n/a		http://marinas.com/browse/ferry/US/	1, 3, 5	Response
	Home Ports	Point	NDMS	n/a		unavailable	1, 3, 5	Response
	Inland Electronic Navigation Charts (IENC)	Point	DoD/USACE	n/a		http://www.agc.army.mil/Missions/Echarts/InlandElectronicNavigationalCharts.aspx	1, 3, 5	Response
	Locks	Point	TGI (DoD/USACE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Nautical NAVAIDS	Point	TGI (NOAA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Navigable Waterways	Polygon	TGI (DOT/BTS, USACE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Navigation Locks	Point	DoD/USACE	n/a		unavailable	1, 3, 5	Response
	Piers/Wharves/Quays	Point	TGI (DoD/USACE)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
	Port Cameras	Point	DHS/TSA	n/a		unavailable	1, 3, 5	Prevention, Protection, Response
	Port Facilities	Polygon	DHS/USCG	n/a		http://www.navigationdatacenter.us/data/datamile.htm	1, 3, 5	Response
	Port Water Boundaries	Polygon	DHS/USCG	n/a		unavailable	1, 3, 5	Response
	Ports	Polygon	DoD/USACE (DOT/NTAD)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
Maritime	Principal Ports	Point	DHS/USCG	n/a		http://www.navigationdatacenter.us/data/datamile.htm	1, 3, 5	Response
	Restricted Zones	Polygon	DoD/USACE	n/a		unavailable	1, 3, 5	Protection, Response
	River Mile Markers	Point	DoD/USACE	n/a		http://www.navigationdatacenter.us/data/datamile.htm	1, 3, 5	Response
	Safety & Security Zones	Polygon	DHS/USCG	n/a		unavailable	1, 3, 5	Response
	Shipping Fairways	Polygon	TGI (NOAA, DHS/USCG)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1, 3, 5	Response
Mass Transit	Amtrak Railroad Lines	Polyline	DOT/FRA	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Amtrak Stations	Point	DOT/NTAD (DOT/FRA)	No		https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Amtrak Stations (BUS)	Point	DOT/NTAD (DOT/FRA)	n/a		http://www.amtrak.com/find-train-bus-stations	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Bus Stations	Point	DOT (State/Local)	Yes		https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Bus Stops	Point	DOT (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Bus Terminals	Point	DOT (State/Local)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Commuter Rail Transit Passenger Stations	Point	DOT/BTS	n/a		http://www.transtats.bts.gov/Homepage.asp	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Commuter Rails	Polyline	DOT/BTS	n/a		http://www.transtats.bts.gov/Homepage.asp	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Ferries	Point	TGI (DOT/BTS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Ferry Routes	Polyline	TGI (DOT/BTS)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	HOV Lanes	Polyline	DOT/BTS	n/a		http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/north_american_transportation_atlas_data/index.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Light Rail	Polyline	DOT/BTS	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Railroad Stations	Point	TGI (DOT/BTS, Navteq)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Transit Line	Polyline	DOT/NTAD	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Transit Station	Point	DOT/NTAD	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Railroad	Interchanges	Point	DOT/NTAD	n/a		http://www.ctre.iastate.edu/research/bts_wb/cd-rom/spatial/ntad.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Rail Mile Markers	Point	DOT/FRA	n/a		http://www.navigationdatacenter.us/data/datamile.htm	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Rail Nodes	Point	Oak Ridge National Laboratory (DOT/FRA, DOT/NTAD)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Rail Ramps	Point	DOT/FRA (DOT/NTAD)	n/a		http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/north_american_transportation_atlas_data/index.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Railroad	Polyline	TGI (DOT/BTS, DOT/NTAD, US Census)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Railroad - 1:100K	Polyline	DOT/FRA	n/a		http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/north_american_transportation_atlas_data/index.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Railroad - 1:2M	Polyline	DOT/FRA	n/a		http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/north_american_transportation_atlas_data/index.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Railroad Bridges	Point	DOT/FRA (DOT/NTAD, AAR)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Railroad Dispatch/Control Centers	Point	DOT/FRA (AAR)	n/a		http://www.bts.gov/publications/north_american_transportation_atlas_data/	5	Response
	Railroad Interlockings/Interfaces	Polyline	DOT/FRA (AAR)	n/a		unavailable	5	Response
	Railroad Operation Centers	Point	DOT/FRA (DOT/NTAD)	n/a		http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/north_american_transportation_atlas_data/index.html	5	Response
	Railroad Repair Shops	Point	DOT/FRA (AAR)	n/a		unavailable	5	Response
	Railroad Tunnels	Point	DOT/FRA (DOT/NTAD, AAR)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Railroad Yards	Polygon	DOT/FRA (DOT/NTAD, AAR)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Strategic Rail Corridor Network (STRACNET)	Polyline	DoD/TRANSCOM	n/a		unavailable	5	Protection, Response
Regulatory, Oversight and Industry	State DOT Facilities	Point	DOT (State DOT)	n/a		unavailable	5	Protection, Response
	State DOT Hqs	Point	DOT (State DOT)	n/a		unavailable	5	Protection, Response
	TSA - Machinery	Point	DHS/TSA	n/a		unavailable	5	Protection, Response
	TSA - Screeners	Point	DHS/TSA	n/a		unavailable	5	Protection, Response
Road	Automatic Traffic Counters	Point	DOT/NTAD	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5	Protection, Response
	Bridges	Point	DOT/NTAD	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Critical Transportation Infrastructure	Point	DOT	n/a		unavailable	5, 13	Protection, Response
	Exits	Polyline	DOT/NTAD, US Census	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Highways	Polyline	DOT/NTAD, US Census	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Interstates	Polyline	DOT/NTAD, US Census	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Major Highways	Polyline	DOT/NTAD, US Census	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Major Roads	Polyline	DOT/NTAD, US Census	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Secondary Hwys	Polyline	DOT/NTAD, US Census	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Strategic Highway Network (STRAHNET)	Polyline	DoD (DOT)	n/a		http://www.fhwa.dot.gov/planning/national_highway_system/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Streets	Polyline	DOT/NTAD, US Census	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Traffic Cameras - Video Feed	Video	DoD/TRANSCOM	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Traffic Events	Point	DoD/TRANSCOM	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Traffic Flow Monitors	Point	DoD/TRANSCOM	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Tunnels	Polyline	DOT/NTAD	n/a		http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/north_american_transportation_atlas_data/index.html	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Routing	Army National Guard Convoy Routes	Polyline	ARNG	n/a		unavailable	1, 5, 13	Protection, Response
	Chlorine Shipment Routes	Polyline	DOT (AAR)	n/a		unavailable	1, 5, 13	Protection, Response
	Movement Restriction Areas/Closures	Polygon	DoD/TRANSCOM	n/a		unavailable	1, 5, 13	Protection, Response
	Route Cameras	Point	DoD/TRANSCOM	n/a		unavailable	1, 5, 13	Protection, Response
	Toxic Inhalation Hazard (TIH) Railroad Routes	Polyline	DOT (AAR)	n/a		unavailable	1, 5, 13	Protection, Response
	Transportation Choke Points	Point	DOT (AAR)	n/a		unavailable	1, 5, 13	Protection, Response
Water								
Raw Water Storage	Raw Water Storage	Point	EPA (USGS NHD)	n/a		unavailable	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
Raw Water Supply	Aqueducts	Polyline	USGS NHD (EPA)	n/a		http://viewer.nationalmap.gov/viewer/nhd.html?p=nhd	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Aquifers	Point	USGS National Atlas	No		https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Covered Reservoirs	Point	EPA (USGS NHD)	n/a		http://nhdgeo.usgs.gov/viewer.htm	4, 5, 13	Protection, Response
	Drinking Water Intake	Point	EPA (USGS NHD)	n/a		unavailable	5, 13	Protection, Response
	Ground Water	Point	USGS NHD	n/a		http://nhdgeo.usgs.gov/viewer.htm	4, 5, 13	Protection, Response
	Reservoirs	Polygon	USGS/GNIS (USGS NHD)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	4, 5, 13	Protection, Response

Sub Category	Theme	Type	POC	Restrictions	Source	URL	ESF#	PPD-8 Mission
	Spring	Point	USGS/GNIS (USGS NHD)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	4, 5, 13	Protection, Response
	Surface Water	Point	USGS NHD	n/a		http://nhdgeo.usgs.gov/viewer.htm	4, 5, 13	Protection, Response
	Uncovered Reservoirs	Polygon	EPA (USGS NHD)	n/a		http://nhdgeo.usgs.gov/viewer.htm or	4, 5, 13	Protection, Response
	Water Sources (intake)	Point	EPA	n/a		unavailable	4, 5, 13	Protection, Response
Regulatory, Oversight and Industry	Federal Water Agencies	Point	EPA	n/a		unavailable	4, 5, 13	Protection, Response
	State Utility Commissions - Water	Point	EPA (AWWA, ASDWA)	n/a		unavailable	4, 5, 13	Protection, Response
Treated Water Distribution Systems	Community Water System	Polygon	EPA	n/a		unavailable	4, 5, 13	Protection, Response
	Fire Hydrants	Point	EPA	n/a		http://www.cdph.ca.gov/certlic/occupations/pages/dwopcert.aspx	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Pumping Stations	Point	EPA	n/a		unavailable	4, 5, 13	Protection, Response
	Treated Water Monitoring Systems	Point	EPA	n/a		unavailable	5	Response
	Water Distribution Lines	Polyline	EPA	n/a		unavailable	5	Response
	Water Transmission/Distribution Mains	Polyline	EPA	n/a		http://www.cdph.ca.gov/certlic/occupations/pages/dwopcert.aspx	5	Response
Treated Water Storage	Water Towers	Point	EPA	n/a		unavailable	5, 13	Protection, Response
Wastewater Facilities	Drainage	Polyline	DoD/USACE	No		https://gii.dhs.gov/arcrest/services/	5	Response
	Manholes	Point	EPA	n/a		http://www.epa.gov/chp/markets/wastewater.html	5, 13	Protection, Response
	Sewage Lift Stations	Point	EPA	n/a		unavailable	5, 13	Protection, Response
	Sewage Mains	Polyline	EPA	n/a		unavailable	5	Response
	Sewage Treatment Facilities	Point	Dun & Bradstreet (EPA)	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery
	Treated Wastewater Monitoring Systems	Point	EPA	n/a		unavailable	5	Response
	Wastewater Control Centers	Point	EPA	n/a		unavailable	5, 13	Protection, Response
	Wastewater Discharge Systems	Point	EPA	n/a		unavailable	5, 13	Protection, Response
	Wastewater Facilities	Point	EPA	Yes	HSIP Gold	https://gii.dhs.gov/arcrest/services/	5, 13	Protection, Response
	Wastewater Raw Influent Storage	Point	EPA	n/a		unavailable	5, 13	Protection, Response
	Water Treatment Plants	Point	Dun & Bradstreet (D&B)	No	HSIP Gold	https://gii.dhs.gov/arcrest/services/	1 thru 15	Prevention, Protection, Mitigation, Response, Recovery

Appendix C: Civil Support

DoD protects the Continental United States (CONUS) through two distinct but interrelated missions: Homeland Defense (HD) and Civil Support (CS) missions. DoD serves as the federal department with lead responsibility for HD, which may be executed by DoD alone or include support provided by other agencies. While these missions are distinct, some department roles and responsibilities overlap, and operations require extensive coordination between lead and supporting agencies.

The actors interviewed for HD/CS support include USNORTHCOM/ USPACOM, NGA, and NGB (Title 10 and Title 32). The Civil Support Appendix will evolve in future phases of the GeoCONOPS project when the focus moves to catastrophic, intelligence, and law enforcement missions.

CS is defined as the application of DoD's rapid response and other technical capabilities to domestic emergencies or disasters in support of civil authorities. CS includes, but is not limited to, support to US civil authorities for natural and manmade domestic emergencies, civil disturbances, and authorized law enforcement activities. When this type of support is requested through a

formal request process, approved by the President or Secretary of Defense (SecDef), and executed under the guidance of the NRF, the support is characterized as Defense Support of Civil Authorities (DSCA). For the purposes of this GeoCONOPS, the umbrella term "Civil Support" is assumed to include the activities, roles, and responsibilities described by the following legacy terms: CS, DSCA, and Military Assistance for Civil Disturbance (MACD).

DoD is a full partner in the federal response to domestic incidents, and the DoD response is fully coordinated through the mechanisms outlined in the NRF. In providing CS, the SecDef will always retain command of DoD personnel, with the exception of National Guard forces under the command and control of the Governors (State Guard in Title 32 status: State Mission, Federally Funded). Nothing in the NRF impedes the SecDef's statutory authority pertaining to DoD personnel and resources.

Per Joint Publication 3-28 Civil Support, the authority over and control of DoD capabilities is maintained by the President, as Commander in Chief, through the SecDef and the chain of command as established by law. When emergency conditions dictate, and when time does not permit approval from higher HQ, local military commanders and responsible DoD component officials are authorized to respond to requests from local authorities and to initiate immediate response actions to save lives, prevent human suffering, or mitigate great property damage under imminently serious conditions.

Requests for DoD assistance may occur under Stafford Act or non-Stafford Act conditions. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288) (Title 42 US Code, Section 5121), authorizes the federal government to help state and local governments alleviate the suffering and damage caused by disasters. DoD support in a domestic disaster or a presidential declaration of emergency is in support of the primary or coordinating agency(ies). Military commanders and responsible DoD civilians may, under certain conditions, respond under immediate response authority to save lives, prevent suffering, and mitigate great property damage under imminently serious conditions. Without a disaster declaration, the President may also direct DoD to support the response to a disaster or emergency for a period not to exceed 10 days.[C1]

DoD has assigned 10 Defense Coordinating Officers (DCO), one to each FEMA region. If requested and approved, the DCO serves as DoD's single point of contact at the JFO for requesting assistance from DoD. With few exceptions, requests for CS originating at the JFO are coordinated with and processed through the DCO. The DCO may have a Defense Coordinating Element (DCE) consisting of a staff and military liaison officers to facilitate coordination and support to activated Emergency Support Functions (ESF). Specific responsibilities of the DCO (subject to modification based on the situation) include processing requirements for military support, forwarding MAs to the appropriate military organizations through DoD-designated channels, and assigning military liaisons, as appropriate, to activated ESFs.[C2]

As noncatastrophic events emerge, the DoD will initiate various tasking chains and mechanisms to support information requests, analysis, and coordination efforts for CS. Formal tasking requests for support and information will be processed by USNORTHCOM/USPACOM, NGA, Defense Program Office for Mission Assurance (DPO-MA), and other DoD agencies. As one of the foundational organizations supporting CS, USNORTHCOM's command structure of governance and reporting is typical of many DoD organizations. Reporting to USNORTHCOM are component commands for each of the services: US Army North (USARNORTH), US Air Force North (USAFNORTH), US Fleet Forces Command, etc. The USARNORTH commander has additional duties in charge of the Joint Land Forces Component Command (JFLCC). There are also specialized Joint Task Forces (JTF) with specific missions. Of the various JTFs, the main one charged with executing tasks related to CS is Joint Task Force-Civil Support (JTF-CS), headquartered in Norfolk, VA. During crisis events the JTF-CS commander reports directly to the ARNORTH commander, while DCOs at FEMA act in liaison roles directly with the ARNORTH commander as well.

All of these DoD organizations have unique mission requirements to support CS with unique and tailored geospatial products and analysis. In addition, each of these organizations approaches the geospatial non-critical event by leveraging infrastructure, imagery, CI assessments, time-sensitive event data, and complex geospatial analysis for data and product dissemination to state and local agencies. The USNORTHCOM Interagency Coordination Group (ICG), coordinates information sharing and deconfliction between the DoD agencies and provides clear and authoritative information for CS. These CS processes often consist of a complex network of geospatial information and analysis to provide comprehensive data products and services for federal, state, and local emergency responders. Through the years since the stand up of DHS, USNORTHCOM, NGA, DPO-MA, and USPACOM have supported hundreds of analysis and geospatial products for hurricane support, CI assessments, major wildfires, national significant security events and have provided intelligence and operational support resulting in a prevention of terrorists' attacks. The relationship and communication between the DoD and civil organizations need to continue to mature for support of emergency operations, catastrophic, and noncritical catastrophic events.

Another element of CS is the use of the National Guard, both state (Title 32) and federal (Title 10). The National Guard is a constitutionally unique element of the DoD, serving first as a state militia under direction

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C1 Joint Publication 3-28, Civil Support, September 14, 2007.

C2 DOD Support to Domestic Incidents, January 2008. Prepared by The Office of the Assistant Secretary of Defense/Homeland Defense and America's Security Affairs.

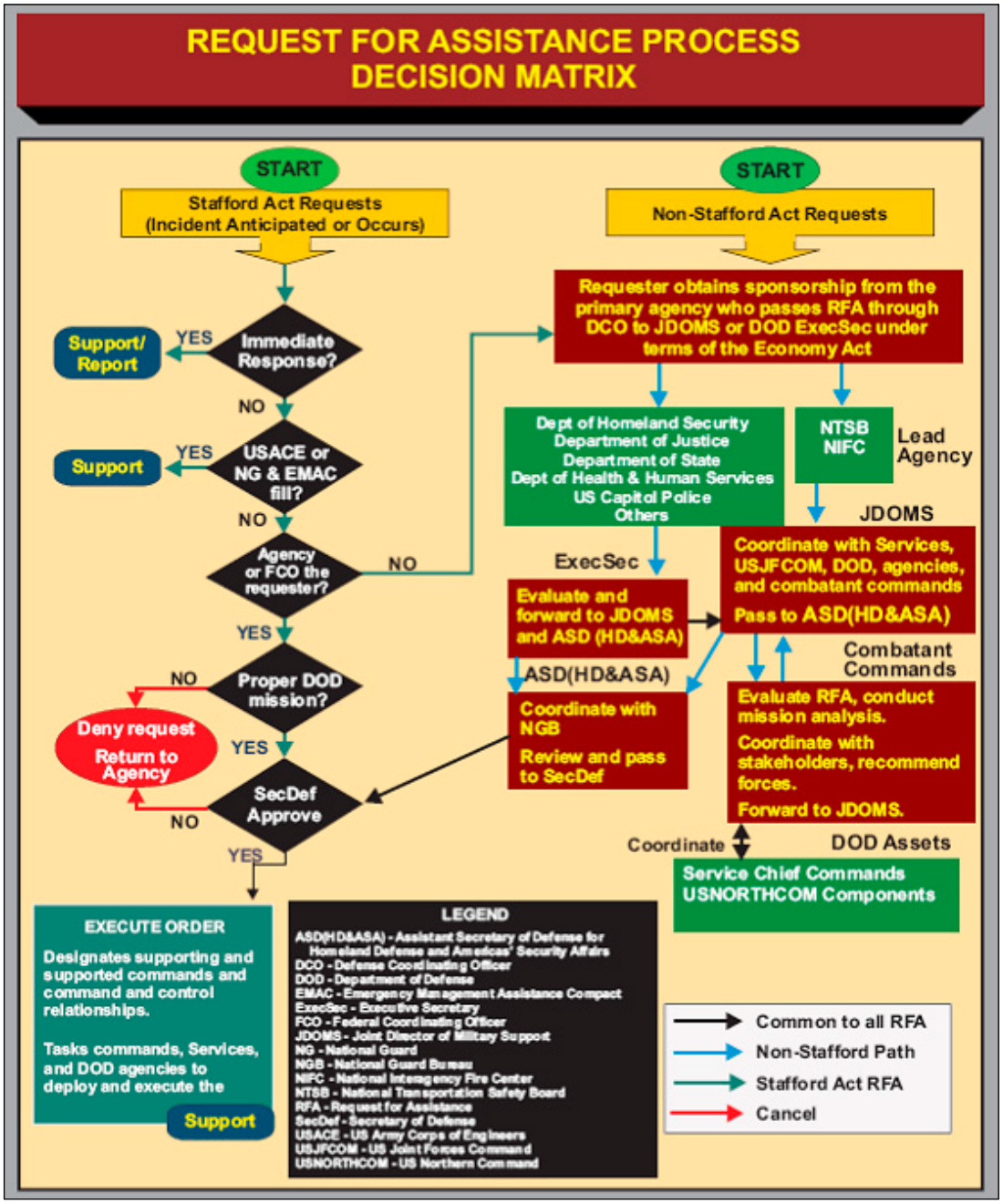

Figure C-1: Request For Assistance Process Decision Matrix

of the State Governor and State Adjutant General, but ultimately under the direction of the President of the United States. The Adjutant General serves as the State Director of Homeland Security in six states and the State Director of Emergency Management in three states. The State National Guard serves as a joint reserve entity, comprising two reserve services: Army and Air Force. The National Guard serves in three distinct operational statuses: Title 10 (federal active duty), Title 32 (federally funded state duty) and state active duty. The majority of CS operations performed by the National Guard are in Title 32 status. The NGB, a joint entity, administers the federal functions of the Army National Guard and Air National Guard.

The National Guard is typically the first military element to respond to an emergency within a state or local jurisdiction. The National Guard assists state and local emergency management and response personnel with a vast number of services, primarily as a force multiplier. Through this support, the National Guard has many unique geospatial information elements from fixed joint force HQ to staging areas and logistics support. The following geospatial information categories define the National Guard's support to state and local emergency management:

- Joint Task Force Joint Operations Center (JTF JOC)
- State National Guard receiving locations
- State National Guard logistics supply points
- State National Guard staging areas
- State National Guard unit locations

Federal agencies or state governors request DoD capabilities to support their emergency response efforts by using a formal RFA process. The decision process for approving Stafford RFAs is illustrated in ***Figure C-1***.[3]

3 *Joint Publication 3-28, Civil Support , September 14, 2007, pg II-5.*

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Appendix D: DHS Intelligence & Analysis – Interagency Remote Sensing Coordination Cell

Overview

The DHS I&A Collection and Requirements Division (CRD) is the Executive Secretariat (ExecSec) for the IRSCC. The IRSCC is an interagency body of remote sensing mission owners with capabilities that enable the primary federal responder to plan, coordinate, acquire, analyze, publish, and disseminate situational knowledge. The mission of the IRSCC through its charter is "to ensure oversight of the IRSCC and the working group and to provide IRSCC policy guidance, direction, and ensure operational effectiveness. The IRSCC assists the IRSCC Executive Committee (EXCOM) in providing recommendations to the remote sensing community in defining roles, responsibilities, and expectations for remote sensing. The IRSCC facilitates a more thorough understanding of the remote sensing environment collective knowledge of the federal remote sensing community and its capabilities.

When activated, the IRSCC provides visibility of the remote sensing missions that are the statutory responsibility of the member organizations. This

Table D–1: IRSCC Member Agencies and Organizations

Department	Agency/Office
Department of Homeland Security	Federal Emergency Management Agency (FEMA)
	Office of Operations Coordination and Planning (OPS)
	Office of Intelligence and Analysis (I&A)
	US Coast Guard (USCG)
	Customs and Border Protection (CBP)
	Geospatial Management Office (GMO)
	National Protection & Programs Directorate (NPPD)
Department of Commerce	National Oceanic and Atmospheric Administration (NOAA)
Department of Agriculture (USDA)	
Department of Defense	US Northern Command (USNORTHCOM)
	National Geospatial-Intelligence Agency (NGA)
	National Guard Bureau (NGB)
	US Army Corps of Engineers (USACE)
	Civil Air Patrol (CAP)
	National Reconnaissance Office (NRO)
Department of the Interior	US Geological Survey (USGS)
Environmental Protection Agency (EPA)	
National Aeronautics and Space Administration (NASA)	

provides the community (federal, state, local, and tribal governments) information about ongoing remote sensing missions before, during, and after a Stafford Act declaration.

Operational Support

The IRSCC supports the emergency management community in response to an event with awareness of remote sensing activities and capabilities. The IRSCC does not task organizations to collect data but assists the remote sensing community with planning and coordination activities in support of federally declared disaster events.

IRSCC activities include daily remote sensing reports and imagery collection and requirements coordination support. These activities take place prior to, during, and after events have taken place. In response to a request for assistance following a natural or man-made disaster, the IRSCC compiles details on available imagery in support of requested areas of interest and priority targets (e.g., affected infrastructure). Member organizations listed in *Table D–1* provide information on available imagery products to the remote sensing community.

Production and Products

The IRSCC assists with the discovery of remotely collected data on an as-needed basis during natural and man-made disasters. The most common product produced by the IRSCC on a regular basis is the Federal Remote Sensing Situation Report, which is disseminated to IRSCC members and any other interested agencies and departments.

The IRSCC directs requestors to member organizations for access to remote sensing collections and deliverables. IRSCC members report the status of their respective missions, providing the customer with frequent updates in the form of emails or phone calls, if the requirement is ongoing. Requests for information include localization data, specifics such as requests for specific imagery, acceptable media of dissemination (imagery, imagery-derived products, etc.), and desired classification for accessible end-user implementation.

Appendix E: DHS OneView

The DHS GII is the governing body of geospatial data and application services built to meet common requirements across the DHS mission space. DHS OneView is a lightweight internet application providing geographic visualization and analysis to individual users through interactions with the GII services. OneView is implemented within the GII by the GMO, and is available to all DHS and affiliated Homeland Security partners via HSIN. Any individual with a valid HSIN account may access OneView at *https://gii.dhs.gov/oneview*.

DHS OneView ***(Figure E-1 on page 198)*** is a web-based mapping application delivering visualization capabilities for the spatial data holdings of the GII. OneView is built on the Microsoft SilverLight platform, providing for lightweight, rich internet application design and user interaction. By leveraging the SilverLight application programing interface (API), OneView add-on or widgets can be easily developed across the Department's components allowing for streamlined and efficient application development and code reuse, drastically cutting down on the time of development. OneView does

not replace current component web mapping applications, rather it provides a mechanism for users that do not have current capabilities in-house.

OneView provides access to over 400 infrastructure data layers delivered as web services via the GII, as well as population data and real-time situational awareness data for infrastructure impact analysis. Users may also use their own data for added context and utility. The foundational data set in OneView is provided by HSIP Gold, which includes data layers representing the 18 CI and key resources sectors, national hazards, and base map layers. Additionally, users can select data from numerous other sources including the Geospatial Multi-Agency Coordination Group (GeoMAC) for information regarding wildfires, NOAA NexRad to view hurricane and other severe weather information, and LANDSCAN, a worldwide population database. The OneView application currently provides the following functionality:

- Bing Map: Aerial imagery (including BirdsEye and StreetView)
- Viewing capability of the HSIP Gold Program data
- Mapping Tools: routing, address/location look up and geocoding, spatial query
- OGC services: ingest user defined WMS, KML and GeoRSS.

OneView is accessible 24/7 to all federal, state, and local homeland security partners with a HSIN username and password, regardless of the specific HSIN COI(s) they belong to. Non-government users, including contractors, must have a government sponsor in order to gain access. OneView requires users to have Microsoft Internet Explorer 7 or later (or Firefox 3 or later) and the Microsoft Silverlight 4 installed. Systems users are authenticated through their HSIN credentials for any community of interest. The OneView application is designed for expanding capabilities:

- SilverLight is a key element of Microsoft SharePoint 2010, allowing for future expansion of GII access and services through embedded SilverLight applications within SharePoint 2010
- This programming interface allows for non-geospatial application developers to leverage OneView through .NET/SilverLight
- OneView is designed for the Department's user base that does not have extensive geospatial capabilities or technologies.

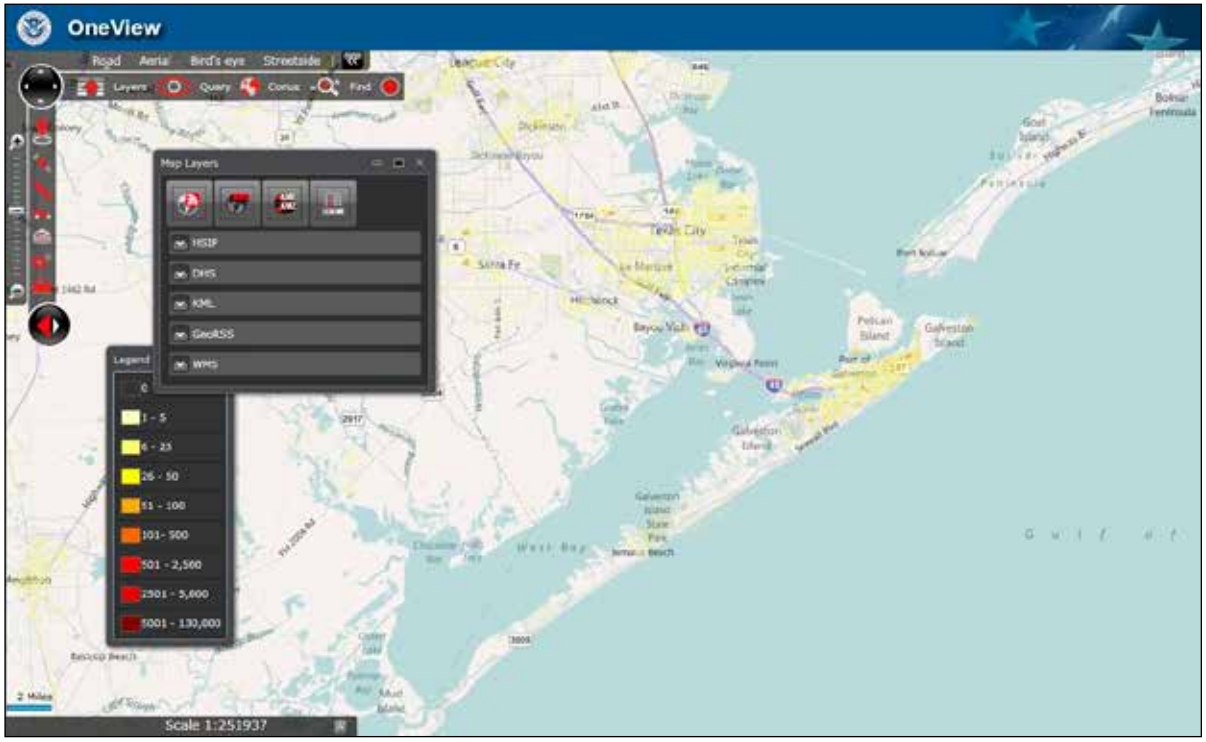


Figure E-1: DHS OneView

Appendix F: HIFLD

- HILFD established in 2002
- Supports Domestic Infrastructure Data Gathering, Sharing and Protection, Visualization, and Spatial Knowledge Management for Homeland Defense, Homeland Security and Emergency Preparedness, Response and Recovery Communities
- Co-sponsored by the DHS GMO, NGA, U.S. USGS, (OASD (HD&ASA))
- 5,000 mission partners representing the 14 executive departments, 94 agencies, 50 states (and two territories), and more than 700 private sector organizations
- Meets quarterly
- To get involved visit: https://www.hifldwg.org/

Overview

The Homeland Infrastructure Foundation-Level Data (HIFLD) Working Group was established in February 2002 to address desired improvements in collection, processing, sharing, and protection of homeland infrastructure geospatial information across multiple levels of government, and to develop a common foundation of homeland infrastructure data to be used for visualization and analysis on all classification domains. It has become a best practice within the government and remains a key driving force for building government partnerships that facilitate geospatial data sharing. The HILFD partnership has lead more than 5,000 mission partners representing the 14 executive departments, 94 agencies, 50 states (and two territories), and more than 700 private sector organizations

In 2014, HIFLD officially transitioned into a subcommittee under the auspices of the Federal Geographic Data Committee (FGDC). The HIFLD Subcommittee is responsible for developing, promoting, and executing a coordinated strategy for acquisition or development of homeland infrastructure geospatial information for Federal agencies while creating and utilizing partnerships with State, local, tribal, territorial, and private organizations. The HIFLD Subcommittee is accountable to the FGDC Steering Committee and provides recommendations to the FGDC Coordination Group. These are the policy and operational authorities, respectively, responsible for providing leadership and direction in the use and development of geospatial data and information across Federal geospatial programs, in conjunction with public, academic and private sector partners/ stakeholders.

The HIFLD Subcommittee ***(See Figure F-1)*** is administered by a core Program Management Group composed of the following organizations:

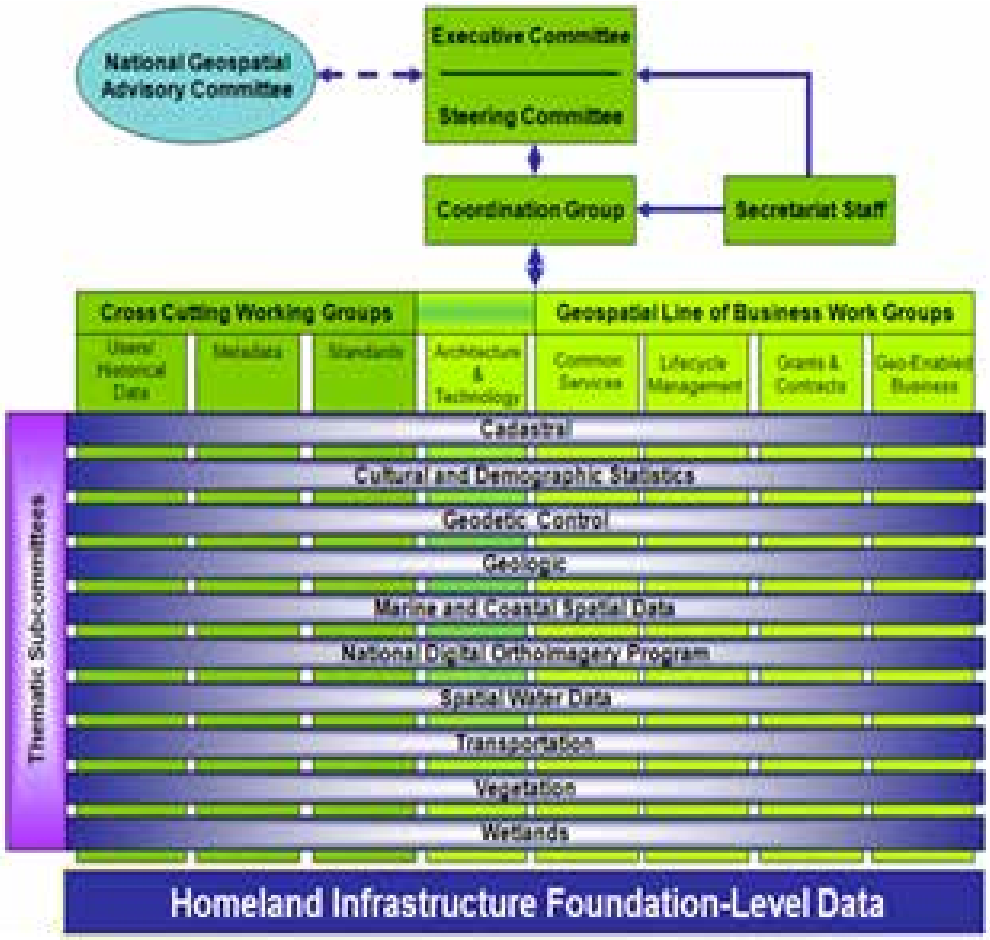


Figure F-1: HIFLD Subcommittee

DHS Geospatial Management Office, Office of Infrastructure Protection, Federal Emergency Management Agency; DOD Assistant Secretary of Defense for Homeland Defense and Americas' Security Affairs; DOI Office of the Geospatial Information Officer; NGA Office of the Asia-America. Additional HIFLD Subcommittee representatives may request membership to the

HIFLD Program Management Group, subject to approval by the HIFLD Subcommittee. The Program Management Group is responsible for developing the HIFLD Subcommittee annual work plan submission to the FDGC Coordination Group, and for reporting the annual accomplishments of the HIFLD Subcommittee.

During the past 10 years, HIFLD has held over 50 infrastructure sector-themed meetings nationwide to share information and best practices about geospatial analysis. Thousands of federal, state, and local geospatial professionals have attended these Working Group meetings (HIFLD WG). The HIFLD WG leveraged these meetings and available federal data sets to create the HSIP Gold and Freedom datasets, described later in this appendix. HSIP data currently serves as the foundational layer for multiple government supported geospatial viewers, applications, analytic tools, and other visualization capabilities. HIFLD meetings are held on a quarterly basis. The meetings focus primarily on different national-level and defense CI sectors on a rotating schedule. Issues addressed by HIFLD include the identification of authoritative homeland infrastructure geospatial data sources, acquisition of this authoritative data for common use by the HD/ HLS Community, and a variety of other structural/ governance themes related to geospatial information. These include, but are not limited to, data standards, symbology, enterprise architecture schemes, information exchange and protection, and the production of recommendations on other policy-related issues. The HIFLD WG leveraged these meetings and available federal data sets to create the HSIP Gold

dataset, which is a compilation of the best available geospatially enabled baseline infrastructure data sets for all 18 CI Key Resource Sectors, assembled from federal, state, local government, and private sector mission partners. HSIP Gold and Freedom have become the most used, useful, and usable common operational infrastructure data sets by over 270,000 authorized users. This model of good government has spurred additional requests for a regional HIFLD to focus on state and local priorities and on issues to strengthen federal, state, local, and private sector partnerships across the Homeland Security, Homeland Defense, and Emergency Preparedness Response and Recovery (EPR&R) communities.

HIFLD Working Group sessions and communications are kept, to the greatest extent possible, at the Unclassified level in order to encourage active participation by state and local entities with significant HLS/HD interests. Parallel sessions and communications at SECRET or higher levels are conducted as necessary.

Community Model

Similar to what was accomplished for the HLS GeoCONOPS, the HIFLD WG used the ME process to examine the information and relationships to better understand the infrastructure information community supporting HIFLD.

The Infrastructure Information Community Model ***(see Figure F–2)*** provides a graphical representation of the community's core objectives, Mission Areas, primary data and production capabilities in preparation for and in response to specific event types that compromise the stability of the national infrastructure. The Infrastructure Information Community, and its several thousand contributing partners, promote the collection, processing, and sharing of geospatial infrastructure information. The graphic represents the organizational segments and their general relationships within the community of official members, mission partners, data consumers, and providers.

The Infrastructure Information Community Model consists of three major sections, which identify, integrate, and communicate the core objective of national infrastructure protection, Mission Areas, data and production capabilities, official members, mission partners, data consumers and providers, data and production capabilities, and representative geospatial event types.

Figure F-2: Infrastructure Information CM

Homeland Security Infrastructure Program (HSIP) Gold, Freedom, and NAVTEQ State Release

The HSIP provides geospatial data for improved collaboration and situational awareness by leveraging the geospatial data collection efforts and resources of each partner agency in support of acquiring, standardizing, and sharing infrastructure geospatial information.

The HSIP Gold database is assembled by NGA in partnership with the HIFLD WG for use by the HD and HLS communities. HSIP Gold is a compilation of 568 of the best available geospatially enabled baseline infrastructure data sets for all 18 CI Key Resource Sectors assembled from federal, state, local government, and private sector mission partners.

HSIP Freedom is a license-free subset of HSIP Gold. HSIP Freedom is available to federal, state, local, tribal, and private sector contractors supporting HD, HLS and NP – PPMR&R missions.

The HSIP - NAVTEQ State Release Database is disseminated as part of the HSIP Program in support of State Fusion Centers, EOCs, State GIS Coordinators, and State Emergency Management Coordination. Its use is therefore restricted to the licensing and use terms set forth by NAVTEQ.

These datasets assist HLS, HD, and NP – PPMR&R mission partners with planning, situational awareness, threat and impact analysis (natural or man-made), modeling emergencies, protection of borders, and decision making during response and recovery operations.

DISSEMINATION

HSIP Gold can be disseminated to all federal government members (validated supporting contractors and consultants), National Guard Forces (WMD-CSTs, Critical Infrastructure Protection-Mission Assurance Assessment Teams and Joint Force HQ – State) and States with approved Presidential Disaster or Emergency Declarations to support the HD, HLS, and NP – PPMR&R missions. States are also authorized to view HSIP Gold when served from a federal server with password protection. As such, access to HSIP Gold can be obtained by two methods: via DVD or secure geospatial web services. If requesting DVD discs log on to www.hifldwg.org, click on the HSIP Gold tab, and complete the HSIP Gold request form. If consuming via secure geospatial web services, please contact the DHS GMO via gmo@hq.dhs.gov to obtain a secure token. HSIP Freedom is a compilation of approximately 350 of the HSIP Gold layers available for download through the DHS GII.

To gain access to GII, users must have a HSIN account. To request a HSIN account, an email request must be sent to HSIN.helpdesk@dhs.gov that includes:

- Name
- Official Email Address
- Organization
- Phone Number
- Government Sponsor Name (federal, state, or local)
- Community of Interest you would like to join (e.g., GIS,)

Additional information about HSIN can be found at www.dhs.gov/HSIN.

The following matrix can assist users in identifying the right data source and how and where to acquire HSIP Data. ***(see Figure F–3)***.

Data	What is it?	Who can access it?
HSIP Gold	A compilation of Common Operational Geospatially Enabled Base-Line Data to support to Homeland Security, Homeland Defense and National Preparedness – Prevention, Protection, Mitigation, Response and Recovery mission communities. Data is U//FOUO.	**Federal Government** Agencies *(to include National Guard Bureau – JFHQ State)* **State and Local** Government Agencies **sponsored by FEMA** with a **Presidential Disaster or Emergency Declaration.** **All Federal, State, Local, Tribal and Territorial** Government Agencies and **Industry Partners can view when served by a password protected Federal System.**
HSIP Freedom https://hsin.dhs.gov	Subset of HSIP Gold data that is license-free and does not include the commodity data. Data is U//FOUO.	**Federal, State, Local, Tribal and Territorial** Government Agencies and **Private Industry Partners.**
HSIP NAVTEQ State Release	The HSIP-NAVTEQ data uplifted by NGA is also a subset of HSIP Gold and includes street data, points of interest data, and route analysis. Data is U//FOUO.	State **Fusion Centers**, State Emergency Operation Centers (**EOC**), State **GIS Coordinators**, and State **Emergency Management** Coordinators.

Figure F-3: HSIP Data Description

Appendix G: US National Grid

This information has been replicated from the document "Implementation Guide to the USNG" prepared by the National Alliance for Public Safety GIS (NAPSG) Foundation for informational purposes only. This is not an official HLS GeoCONOPS document. While every reasonable precaution has been taken in the preparation of this document, NAPSG assumes no responsibility for errors or omissions, or for damages resulting from the use of the information contained herein.

The information contained in this Appendix is believed to be accurate. However, no guarantee is provided. Use this information at your own risk. Do not use this document as a legal citation to authority.

Introduction

Delayed responses, misrouting of emergency resources, and miscommunication due to location language complexities represent the frustrations of emergency responders across the whole community. However, there is a solution that can successfully minimize or even eliminate these location issues

altogether. It's called the United States National Grid or simply "USNG."

The USNG is a point and area reference system that can describe a position or area of operations when and where conventional location references like landmarks or street signs are not in place, such as after a hurricane, flood, or tornado (as shown at below). The USNG supports mission tasking during and after an incident and serves as an efficient and effective preparedness tool. It can be used to support planning efforts, including mutual aid and resource allocation planning, for clearly defined areas prior to an incident. The USNG creates a nationally consistent language of location by providing a grid reference system that is seamless across jurisdictional boundaries and interoperable with traditional location services.

The United States National Grid can support, among other things:

- A search team that needs to direct resources into an unfamiliar area or an area that has no street signs.
- An Incident Commander needing to break a large incident perimeter into manageable parts so that operational areas can be clearly defined and communicated easily across multiple disciplines and jurisdictions.
- Pre-incident planning to determine potential resource needs and to facilitate mutual aid coordination and deployment.
- A consistent, measurable means to support operational progress and standardized situation reporting.
- Dispatch functionality and interoperability during response, particularly when emergency responders are either unfamiliar with local streets or when road signs have been destroyed

The USNG puts the entire community on the same page, from emergency responders to the general public, by creating a simple, unambiguous method for describing a location. The USNG is easy to learn, easy to teach, and easy to use.

How to Use This Guide

This guide is designed to provide information about the USNG and to help the reader understand the value of and steps necessary to implement the USNG for the whole community. The audience for the document includes:

- Executive Level Decision Makers
  - City/County Managers, Elected Officials, Executive Directors, State Officials
- Public Safety Leaders and Executives
  - Emergency Managers, Police Chiefs, Fire Chiefs, Incident Commanders
- Emergency Responders
  - Search and Rescue Personnel, Firefighters, Law Enforcement, Mass Care Personnel
- GIS Practitioners and Technicians
  - GIS Analysts, Field Data Entry Technicians, GIS Supervisors
- Citizens interested in learning about the USNG

The guide is divided into the following key areas:

- United States National Grid Overview - Provides a description, brief background, and status of the USNG.
- USNG Basics - Explains the basic components, the terminology, and how to read and understand a USNG coordinate.

Implementation Guidance - Provides steps to be taken to ensure successful implementation, from governance documents supporting USNG adoption to training in the correct use of the USNG. This section discusses considerations in five key areas when implementing the grid.

- Reference Links - Provides readers with links to reference material supporting implementation of the USNG. The materials reference includes examples of best practices along with documents from agencies around the country who have implemented the USNG.

United States National Grid Overview

The United States National Grid is a standard area and point grid reference system that quickly enables multi-discipline and multi-jurisdictional emergency service agencies to precisely locate incidents and universally communicate locations using paper maps and/or electronic applications. It is recognized nationally and is used throughout many communities. The USNG is often safer to use than other systems, such as Latitude/Longitude (Lat/Lon). Lat/Lon can be communicated in multiple formats that can lead to misunderstandings. The USNG has one format that reduces the possibility for error.

To ensure maximum operational readiness when time is of the essence, the U.S. Department of Homeland Security (DHS) has designated that the USNG be used to increase the interoperability of location services by providing a nationally consistent grid reference system.

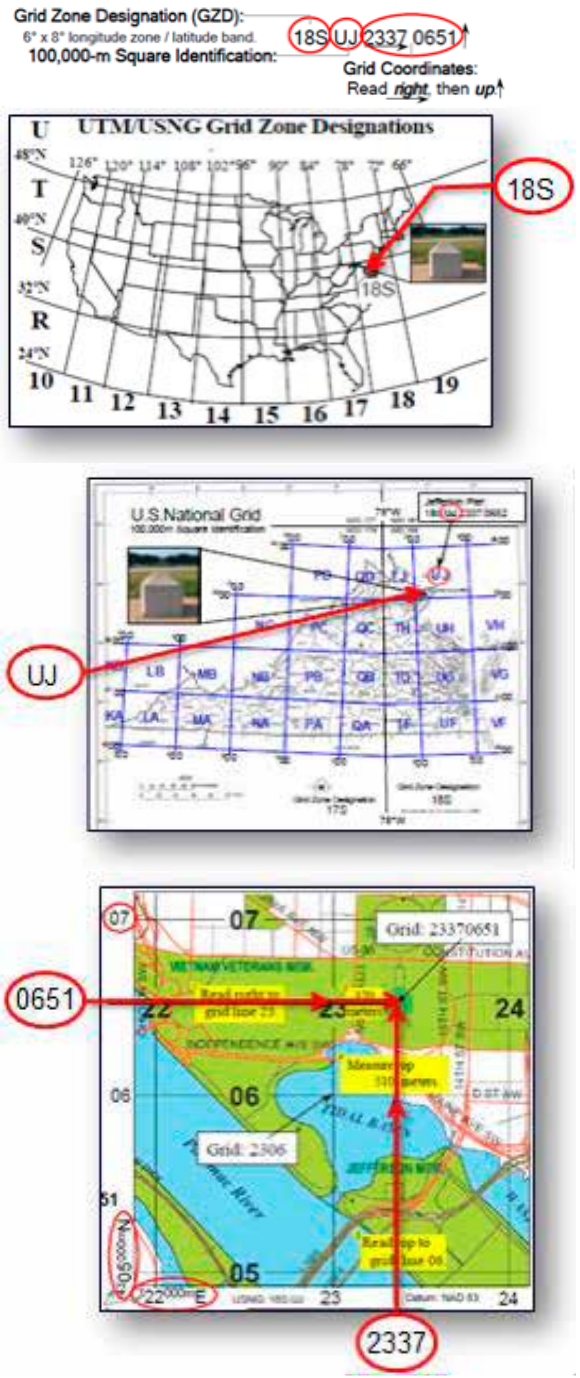
Based on the widely used Universal Transverse Mercator (UTM) Coordinate system developed in the 1940s and the Military Grid Reference System (MGRS) used by all NATO forces and the National Guard, the USNG became the national standard for civilian purposes in 2001 and is the only nationally recognized coordinate system in the United States.

The Federal Emergency Management Agency (FEMA) has made agency-wide implementation of the USNG a priority. The National Search and Rescue Committee (NSARC), representing multiple federal agencies, designated the grid as the primary system for conducting land-based search and rescue.

The United States Geological Survey (USGS) produced a new map series called the US-Topo, which incorporates the USNG as the primary reference system. Additionally, the National Geospatial-Intelligence Agency (NGA), which supports DHS, will only produce USNG-based products for United States disaster events.

USNG Basics

The USNG uses a string of up to 15 characters to describe a precise location. A USNG coordinate is divided into three components and is read like this: the first three characters are a combination of two numbers and a letter representing a Grid Zone Designation (GZD); the next two alphabetical characters represent a 100,000 meter (100 kilometers or 100K) square; the remaining portion is entirely numeric and will always have an even number of digits. This portion is based on standard X and Y (Easting and Northing) coordinates of the UTM coordinate system, which is in meters. The number of characters used can be adjusted to meet specific precision requirements of a situation or to simplify communicating location in smaller areas that do not cross GZDs or 100,000 meter squares.



In the following examples, the last eight digits identify a point with a precision of 10 square meters approximated within a 1,000 meter grid.

In most localized situations, once the Grid Zone and 100K meter square are well known by everyone involved and completely contain the area of operation, they can be dropped to eliminate redundancy. This flexibility then leaves only the grid coordinates and makes location references much simpler. Coordinate digits can also be truncated, in pairs from both the X and Y elements, to represent the precision of the location being described. Truncated locations identify the southwest corner of a grid square of a size representing its precision.

- 18S UJ = 100,000 meter square (or 100 Kilometers or 100Km – about 62 square miles)
- 18S UJ 2 0 = 10,000 meter square (or 10 Kilometers or 10Km – about 6.2 square miles)
- 18S UJ 23 06 = 1,000 meter square (or 1 Kilometer or 1Km – about .62 square miles)
- 18S UJ 233 065 = 100 meter square
- 18S UJ 2337 0651 = 10 meter square

Benefits:

- Provides a universal location reference system.
- Not dependent on landmarks, street signs, or knowledge of the community.
- Provides unambiguous context for location.
- Simple, standardized, easy to learn and use.
- Scalable to meet the needs of small local areas and regions, as well as large-scale national events and disasters.
- Uses only the level of refinement necessary to adequately describe a location when used as an area reference system:
  - 1m = an individual person

- 10m = a team, a large vehicle, a small home
- 100m = a city lot, large building, a football field
- 1,000m = a city block, a neighborhood
- 10,000m = a city

- Improves interoperability and military support to civil authorities.
- Universally defines geographic coordinates or areas of operation.

Implementation Guidance

Standardized mapping coordinates and map products based on the USNG, coupled with training to develop basic map reading and land navigation skills, create a low-cost and easily distributed common operation environment. A successful implementation of the USNG within an organization or organizational structure requires a strategic alignment of governance, training and education, integration in operational procedures, technology, and routine use (as with any public safety tool).

Governance

For the USNG to be effective for your agency or jurisdiction, appropriate policies and guidance that establish it as your location-referencing standard, are required.

The following initial steps should be taken when introducing USNG into your agency or jurisdiction:

- Provide clear direction to your organization on the need to use USNG.
- Update organization policy manuals and standard operating procedures (SOPs) to reflect USNG policy.
- Incorporate USNG into the organization publications (e.g., email signatures, address directory, letterheads, and business cards).
- Provide visibility of policy to industry, partners and citizens.
- Incorporate USNG into existing and new mutual aid agreements, MOUs and MOAs with partnering agencies or neighboring jurisdictions.

Standard Operating Procedures

Adopting the USNG into standard operating procedures promotes consistent application and supports public safety mission objectives. In order to do so, organizations should:

- Incorporate USNG in administrative and emergency operations.
- Include USNG attributes into data collection and base data.
- Develop map books with USNG as one of the base elements.
- Integrate USNG as the map standard for planning and incident map products as well as other non-map products used by decision makers (such as preplans, briefing documents, situation reports, etc.).
- Add USNG to incident dispatches, in addition to street addresses.
- Change agency map books to show properly labeled USNG grid lines.
- Eliminate all use of alternate or proprietary grids.

Training and Education

A training program must be developed and implemented that explains the benefits of the USNG and how to use it.

Public safety and emergency management training should include teaching basic map reading skills, including distance measurement, and describing locations using USNG terminology. Training should also include instruction on the use of the grid with location technologies such as GPS (Global Positioning System) receivers, web tools, and smart phones. Agencies should look to expand their training audience to include personnel who may become involved in disaster situations, (e.g., public works, businesses, volunteer organizations, and the general public.)

Training and education objectives should incorporate:

- Support at the organization level.
- Inclusion of USNG in all exercises.
- Utilization of free or low cost tools such as:

- USGS - National Map Viewer (http://viewer.nationalmap.gov/viewer)
- Florida Division of Emergency Management - Incident Mapper (http://map.floridadisaster.org/mapper)
- USNG on a Google Map (http://dhost.info/usngweb)

- Ensuring that technical staffs are properly trained to support USNG.
- Inclusion of supporting agencies, including non-governmental.

Training Opportunities and Considerations

- Incorporate the USNG into all training, including National Incident Management System (NIMS), Incident Command System (ICS), and all operational exercises:
  - Require that locations be recorded and communicated in USNG terms to supplement existing terms such as street address, intersections, and latitude and longitude
  - Include USNG on all maps used
  - Incorporate use of USNG into Planning Section maps/GIS responsibilities
  - Require USNG coordinates and grid lines in operational and division briefing maps
- Train volunteer organizations, where appropriate
- Integrate USNG into school curricula (e.g., Geoscience courses - ensure that numerous practical applications are included in the curriculum)
- Provide web-based training (e.g., target first responders and general public)
- Utilize university centers for information and user support

Maps

Maps are a key component of USNG implementation. Recommendations for implementing the USNG into your mapping operations are presented below:

- Include USNG grid lines on all maps
  - Park maps
  - Trail maps
  - County/state highway maps
  - City street maps
  - Specialty maps (snowmobile, bike, hiking)
- Incorporate USNG into parks and trails
  - Add locations to park and trail signage
  - Use USNG locations to identify features and facilities in guidebooks and pamphlets
- Create GeoPDF maps for added interactive functionality
  - USNG location display
  - Measuring
  - Selective layering and annotation
- Encourage incorporation of USNG into commercial maps, map products, and websites
- Develop USNG map atlases so they are available to be issued to incoming mutual aid
- Include USNG map atlases in public safety and utility company vehicles
- Encourage each jurisdiction´s GIS department to create maps and map atlases with USNG
- Establish and document USNG locations for significant addresses and Points of Interest (POI) including critical infrastructure, key resources, and vulnerable populations

Technology

- Computer Aided Dispatch (CAD) systems, Mobile Data Computers (MDCs), Automatic Vehicle Location (AVL), GPS, GIS, Firefighter/Law Enforcement Personnel Tracking/Accountability Systems, and smart phones are all examples of computing technology that provide maps and locations. The USNG should be a consideration in all of these to create interoperability among them. Many of these systems have configuration options for supporting the USNG or its military equivalent (the Military Grid Reference System). Others will be supporting it in the near future.

System suppliers and integrators may also be able to configure their systems with USNG. To enable systems configuration: Begin using free USNG web tools as training aids and start referring to positions routinely with USNG coordinates.

- Integrate USNG with street address and E911 databases.
- Specify full USNG functionality in any/all mapping and dispatch software purchases.
- Supplement latitude and longitude with USNG to avoid problems with lack of interoperability and conversion error.
- Include USNG capability when purchasing new GPS devices. If your current GPS devices do not have USNG, check for Military Grid Reference System as an option on the device.
- Integrate the USNG into Automatic Vehicle

Location and Computer Aided Dispatch.

  - Set systems to provide automatic display of USNG location of assets.
  - Provide tools to determine locations in USNG terms.

Reference Links

This area of the guide provides links to reference material supporting the various steps needed to implement the USNG. It is divided into three sections for different audiences to ensure the successful implementation of the USNG. The material referenced includes best practice examples from agencies around the country that have implemented the USNG.

Executive Level Decision Makers

The role of the executive level decision makers is to provide clear guidance and direction to incorporate USNG into policies and procedures to aid in the utilization of USNG.

Example agencies implementing the USNG and how it affects their operations:

- Executive summary
  - Federal Geographic Data Committee (FGDC):
    - FGDC—Executive Summary USNG Supporting Public Safety, Commerce, and the General Public. (http://www.fgdc.gov/usng/USNGInfoSheetsCv5_4pages.pdf)
- State standards
  - Minnesota:
    - Minnesota IT Policies and Standards Services—USNG. (http://mn.gov/oet/policies-and-standards/geospatial/gis-pages/us-national-grid.jsp)
  - North Carolina:
    - North Carolina Geographic Information Coordination Council—USNG Standard. (http://www.ncgicc.org/Portals/3/documents/US_National_Grid_TACRecommendation.pdf)
  - Florida:
    - Florida Adopts USNG as Standard. (http://www.floridadisaster.org/gis/usng/)
  - Missouri:
    - Missouri Department of Public Safety—State Emergency Management Agency—USNG. (http://sema.dps.mo.gov/maps_and_disasters/gis.asp)

Public Safety Personnel and Emergency Responders

The role of public safety personnel and emergency responders is to assist with implementation of the USNG into daily operations.

Standard Operating Guidelines and Use Cases:

- Skagit County, WA—USNG Educational Poster. (https://www.fgdc.gov/usng/educational-resources/Skagit%20County%20USNG%20Poster_r.pdf)
- Florida Division of Emergency Management (includes links to counties in Florida with USNG maps). (http://www.floridadisaster.org/gis/usng/)
- Florida Field Operations Guide: Florida's Approach to All Hazards Incident Management. (http://www.floridadisaster.org/FOG/FLFOG.pdf)
- FloridaDisaster.org: Using the United States National Grid - Educational poster. (http://www.floridadisaster.org/gis/usng/Documents/USNGPoster.pdf)
- United States National Grid: A Geospatial Tool for the Toolbox. (http://www.fireapparatusmagazine.com/articles/print/volume-18/issue-1/features/united-states-national-grid-a-geospatial-tool-for-the-toolbox.html)
- Florida Fire Service Magazine: Configuring Hardware for the United States National Grid. (https://docs.google.com/file/d/1zyALH-9X3JjQB-eLBAXiYi_okBsS4-

uqpzpN2xzHP29mcYoHiyvVMUpn9bbg/edit?pli=1)

- Florida Fire Service Magazine—USNG: It's Time to Stop Adopting and Start Implementing. (https://docs.google.com/file/d/0B3YvFeOt6bs5U1RkcU0yb1YtdFE/edit?pli=1)
- USFA—FEMA: Coffee Break Training—United States National Grid. (http://www.usfa.fema.gov/downloads/pdf/coffee-break/cc/cc_2012_1.pdf)
- Statter911.com: Fire Service: Start Using the USNG. (http://statter911.com/files/2010/01/Start_using_US-National-Grid1.pdf)

Reference Links:

- FGDC: Index Map for Continental United States. (http://www.fgdc.gov/usng/educational-resources/Map_USA_USNG_20081231.pdf)
- FGDC: How to read a United States National Grid (USNG) Spatial Address. (http://www.fgdc.gov/usng/how-to-read-usng/index_html)
- GIS Practitioners and Technicians
- The role of GIS practitioners and technicians is to incorporate USNG in all mapping products.
- Training Aids
  - Grids and Coordinates. (http://www.globalsecurity.org/military/library/policy/army/fm/3-25-26/ch4.htm)
  - American Surveyor—A Guide to Using the USNG. (http://www.amerisurv.com/PDF/TheAmericanSurveyor_USNationalGrid-Cavell_June2005.pdf)
- Mapping, Grid, and Data Tools
  - U.S. National Grid Tools for ArcGIS: ArcGIS Extensions— USNG. (http://www.esri.com/software/arcgis/extensions/usng)
  - U.S. National Grid map service on ArcGIS Online: ArcGIS Online NGA USNG. (http://maps1.arcgisonline.com/ArcGIS/rest/services/NGA_US_National_Grid/MapServer)
  - Emergency Management Maps: ArcGIS.com—Emergency Management Maps. (http://resources.arcgis.com/en/help/localgovernment/10.1/index.html#/What_is_Emergency_Management_Maps/028s00000037000000/)
  - Fire Station Wall Map: ArcGIS.com—Fire Station Wall Map. (http://resources.arcgis.com/en/help/localgovernment/10.1/index.html#/What_is_Fire_Station_Wall_Map/028s00000082000000/)
  - Fire Run Book: ArcGIS.com—Fire Run Book. (http://resources.arcgis.com/en/help/localgovernment/10.1/index.html#/What_is_Fire_Run_Book/028s000000nv000000/)
  - USNG Map Books: Dakota County Minnesota—Fire Map Books. (http://gis.co.dakota.mn.us/content/dakco/usng/1kfireortho/maps.htm)
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    - How to Read the USNG. (http://www.fgdc.gov/usng/how-to-read-usng/index_html)
    - FGDC—Educational Resources. (http://www.fgdc.gov/usng/educational-resources)
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Appendix H: National Exercise and Simulation Center

The NESC is a congressionally mandated center within FEMA that provides users with access to preparedness services and tools through a central access point. In addition to providing integrated M&S capabilities for the emergency management community, the NESC provides customized services to support a range of planning, training, education, exercise, operations, and evaluation needs. The NESC supports key preparedness policies and systems—including Presidential Policy Directive 8 (PPD-8): National Preparedness, the National Preparedness Goal, the National Preparedness System, the National Training and Education System (NTES), and the NEP—by providing services and tools that support the Whole Community[H1] and enable the next generation of preparedness.

H1 The Whole Community includes individuals, families, communities, the private and nonprofit sectors, faith-based organizations, and federal, state, local, tribal, and territorial governments.

The NESC fulfills the requirements of DHS Appropriations Act, HR5441, and the PKEMRA of 2006 to establish a National Exercise [and] Simulation Center. It also enacts the recommendation of the Federal Response to Hurricane Katrina: Lessons Learned, which suggested that DHS develop a National Exercise [and] Simulation Center to simulate the federal role in emergency response and work with state and local exercises.

Mission

Enhance preparedness across the Whole Community by providing access to state-of-the-art modeling and simulation and by promoting effective and efficient planning, training, education, exercise, operations, and evaluation services for all mission areas.

NESC Concept

The NESC is designed to serve as a "hub" for distributed planning, training, education, exercise, operations, and evaluation capabilities, giving users access to a variety of services and tools through a central access point. The NESC functions as a center for bringing together diverse capabilities of FEMA staff, contracted subject matter expertise, and partners throughout the government, academia, and the private sector, to provide tailored support services and tools to users. The NESC integrates these capabilities into a one-stop-shop—users can access a consolidated service catalogue that provides information about all available services and tools, and request NESC services through one website. The user base for the NESC includes stakeholders from all levels of government, spanning all mission areas—prevention, protection, mitigation, response, and recovery. By providing these users with a variety of centralized training, education, and exercise resources, the NESC increases their access to key services and tools while decreasing their administrative burdens, and, ultimately, enables more efficient and effective planning, training, education, exercises, operations, and evaluation.

As the executive agent for the NESC, FEMA's National Training, Education, and Exercises Division (NTEED) is responsible for managing the implementation of NESC services and tools. NTEED's vision is to professionalize training, education, and exercises at FEMA by establishing various products, services, and offerings incorporated within a comprehensive and integrated National Training, Education, and Exercise System.

Services

NESC services provide users with tailored support and subject matter expertise, delivered through a combination of federal, state, and local stakeholders; academia; and contractor support. These SME resources can be applied to a variety of disciplines, including planning, training, education, exercises, operations, and evaluation.

Coordination

The NESC provides coordination support to ensure the seamless integration of modular services into tailored support packages for users.

Administration and Logistics

The NESC provides administration and logistics support to assist users in meeting coordination and support and in securing needed facilities and resources.

Exercise Design and Control

The NESC provides a full suite of HSEEP-based exercise design and conduct services, including planning, design, development, exercise-related training, and exercise control.

Modeling and Simulation

The NESC provides users with access to both computer- and human-based M&S. NESC integrated

Success Story: *NLE 2012*

M&S capabilities were an integral element of National Level Exercise 2012, both in the development of the scenario and in conduct of the exercise. For example, in modeling the effects of a cyber-attack on a regional water system, exercise planners could develop data-driven assessments of potential impacts, making for a more realistic and effective exercise.

M&S services include live, virtual, and constructive[2] modeling and simulation capabilities distributed throughout the country. Computer-based M&S services include specialty modeling, simulation, and data services; planning support; and simulated environments. The NESC draws on expertise within FEMA and throughout the interagency to provide human-based SME simulation services, including the simulation of federal HQ-level interactions in training or exercises; exercise simulation cell capabilities; mock media; advanced gaming and red teaming; and SME databases.

Subject Matter Experts

The NESC provides users with access to a wide range of SMEs in a variety of disciples. SMEs support user needs including the instruction of training or education courses, facilitation of meetings or exercises, input into technical plans or scenarios, and other functions, as requested.

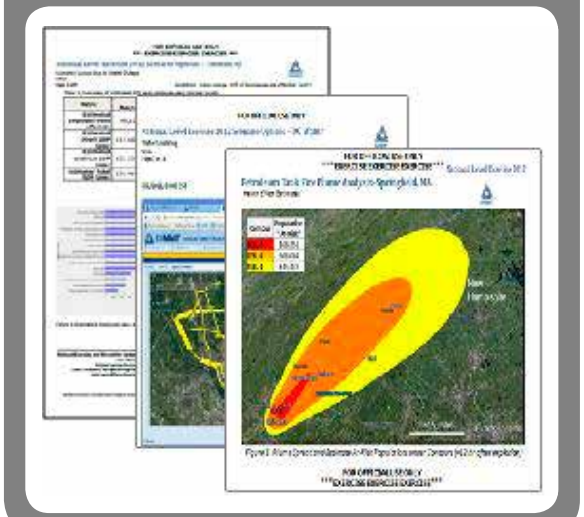
Evaluation

The NESC provides evaluation services and supports improvement planning. Evaluation and improvement planning services include evaluation planning,

2 ***Live simulations*** *involve real people operating real systems.* ***Virtual simulations*** *involve real people operating simulated systems.* ***Constructive models or simulations*** *involve simulated people operating simulated systems.*

Success Story: *Fusion X*

NED provided evaluation support for the 2012 DHS I&A's Fusion Center Readiness Initiative exercise. For the Fusion X exercise, NED provided lead and support evaluators, ensuring that the evaluation was conducted according to HSEEP principles while accurately evaluating I&A's objectives.



exercise evaluation, real-world event evaluation, and improvement planning.

Training and Education

In support of the NTES, the NESC provides access to a range of homeland security training and education resources. In particular, the NESC supports the establishment and delivery of several common practices and supporting services established through the NTES. These services include the National Online Course Catalog, Faculty and Instructor Registry, and Single Record Service, which will be accessible through the enterprise platform. The NTES is also designed to promote the sharing of new and innovative models that advance individual learning, and the NESC serves as an access point for stakeholders from across the country to discover these best practices and learning models for use in their own organization and programs. Lastly, the NESC supports the provision of training and education technical assistance to assist organizations in the development of new courses or to modify existing courses to meet evolving training and education requirements. Through its role in enabling several critical NTES supporting services, the NESC serves a key function in promoting a more coordinated approach to the provision of homeland security training and education that leverages best practices and innovative approaches from across the country.

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Appendix I: Referenced Documents

National Incident Management System (NIMS), December 2008, provides a systematic, proactive approach to guide departments and agencies at all levels of government, NGOs, and the private sector to work seamlessly to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, to reduce the loss of life and property and harm to the environment.

National Infrastructure Protection Plan (NIPP), January 2009, establishes a risk management framework for the nation's unified national approach to critical infrastructure and key resources (CI) protection.

National Response Framework (NRF), January 2008, is a guide to how the nation conducts all-hazards response. It describes specific authorities and best practices for managing incidents that range from the serious but purely local, to large-scale terrorist attacks or catastrophic natural disasters.

Defense Production Act (P.L. 81-774) is the primary authority to ensure the timely availability of resources for national defense and civil emergency preparedness and response.

Homeland Security Act of 2002 (P.L. 107-296, 116 Stat. 2135 (2002) (codified predominantly at 6 United States Code [U.S.C.] § 101-557), as amended, with respect to the organization and mission FEMA in the DHS Appropriations Act of 2007, P.L. 109-295, 120 Stat. 1355 (2006), established DHS as an executive department of the United States. The Homeland Security Act consolidated component agencies, including FEMA, into DHS.

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended (42 U.S.C. § 5121 et seq.) describes the programs and processes by which the federal government provides disaster and emergency assistance to state and local governments, tribal nations, eligible private nonprofit organizations, and individuals affected by a declared major disaster or emergency. The Stafford Act covers all-hazards, including natural disasters and terrorist events.

HSPD-5, Management of Domestic Incidents, February 28, 2003, establishes a single, comprehensive national incident management system. It also designates the Secretary of Homeland Security as the principal federal official for domestic incident management and recognizes the statutory authorities of the Attorney General, Secretary of Defense, and Secretary of State. It directs the heads of all federal departments and agencies to provide their full and prompt cooperation, resources, and support, as appropriate and consistent with their own responsibilities for protecting national security, to the Secretary of Homeland Security, Attorney General, Secretary of Defense, and Secretary of State in the exercise of leadership responsibilities and missions assigned.

HSPD-7, Critical Infrastructure Identification, Prioritization, and Protection, December 17, 2003, establishes a national policy for federal departments and agencies to identify and prioritize United States CI and to protect them.

HSPD-8, National Preparedness, December 17, 2003, establishes policies to strengthen the preparedness of the United States to prevent and respond to threatened or actual domestic terrorist attacks, major disasters, and other emergencies by requiring a **national domestic all-hazards preparedness goal,** establishing mechanisms for improved delivery of federal preparedness assistance to state, local, and tribal governments, and outlining actions to strengthen preparedness capabilities of federal, state, local, and tribal entities. Annex 1, National Planning, published on December 3, 2007, establishes a standard and comprehensive approach to national planning.

HSPD-20/National Security Presidential Directive-51 National Continuity Policy, May 9, 2007, establishes a comprehensive national policy on the continuity of federal government structures and operations and a single National Continuity Coordinator responsible for coordinating the development and implementation of federal continuity policies.

Civil Support, Joint Publication 3-28, September 14, 2007, sets forth joint doctrine to govern the activities and performance of the Armed Forces of the United States in civil support operations and provides the doctrinal basis for interagency coordination during domestic civil support operations. It also provides overarching guidelines and principles to assist commanders and their staffs in planning and conducting joint civil support operations.

Homeland Defense, Joint Publication 3-27, July 12, 2007, provides doctrine for the defense of the US homeland across the range of military operations. It provides information on command and control, interagency and multinational coordination, and operations required to defeat external threats to, and aggression against, the homeland.

Department of Defense (DoD) Support to Domestic Incidents, January 2008, was developed by The Office of the Assistant Secretary of Defense/ Homeland Defense and America's Security Affairs. It outlines the DSCA support provided by U.S. military forces (federal military, Reserve, and National Guard), DoD civilians, DoD contract personnel, DoD agency, and DoD component assets in the federal response to domestic incidents, coordinated through the mechanisms outlined in the NRF.

PPD-8, National Preparedness, March 30, 2011, strengthens the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the nation, including acts of terrorism, cyber-attacks, pandemics, and catastrophic natural disasters. National preparedness is the shared responsibility of all levels of government, the private and nonprofit sectors, and individual citizens. Everyone can contribute to safeguarding the nation from harm. As such, while this directive is intended to galvanize action by the federal government, it is also aimed at facilitating an integrated, all-of-Nation, capabilities-based approach to preparedness.

Appendix J: Related CONOPS/SOPs

		National Response Framework											
		ESF 1	ESF 2	ESF 3	ESF 4	ESF 5	ESF 6	ESF 7	ESF 8	ESF 9	ESF 10	ESF 11	ESF 12
AFNORTH	Air Force Northern Air Support Handbook												
ARC	Disaster Assessment Toolkit						x						
	Information Management Services Disaster Assessment Program Guide						x						
DHS	IRSCC GEOINT CONOPS												
	IRSCC Natural Event Playbook					x							
	RFI Process					x							
	NICC CONOPS					x							
	IICD GA SOP					x							
	NICC RFI Process					x							
	NOC GA SOP					x							
	OIP IMC SOP					x							
DOE	VMWG Virtual Team Playbook												x
DOI	Directive: Designation Management and Enforcement of Authoritative Data Sources				x								

		National Response Framework											
		ESF 1	ESF 2	ESF 3	ESF 4	ESF 5	ESF 6	ESF 7	ESF 8	ESF 9	ESF 10	ESF 11	ESF 12
EPA	EM GIS Plan										x		
	EM GIS Data Plan										x		
	EPA Central Data Exchange Short Term Emergency Response Geospatial Operations										x		
	EPA Central Data Exchange Emergency Response Geospatial Operations										x		
	EPA Headquarters Incident Management Plan										x		

		National Response Framework											
		ESF 1	ESF 2	ESF 3	ESF 4	ESF 5	ESF 6	ESF 7	ESF 8	ESF 9	ESF 10	ESF 11	ESF 12
FEMA	Emergency Response Program CONOPS												
	Essential Elements of Information Standard List					x							
	ESF 5 SOP					x							
	ESF-14 Field Response Guide												
	FEMA Geospatial Process for Damage Assessment Housing Recovery					x							
	FEMA Geospatial Solutions Branch On Call GIS Support SOP					x							
	FEMA Hurricane CONPLAN Annex B Situational Awareness					x							
	FEMA IMAT Geospatial Intelligence Unit Operations					x							
	FEMA IMAT GIS Request Form					x							
	FEMA MAC GIU Operations Support					x							
	FEMA Mapping and Analysis Center Map Request Form					x							
	Geospatial Process for Damage Assessment					x							
	FEMA Mapping and Analysis Center SOP for Obtaining GIS Support					x							
	FEMA N-IMAT Planning Org Chart					x							
	Geospatial HAZUS Modeling for Disaster Response and Preparedness CONOPS					x							
	Global Earth Observation Integrated Data Environment CONOPS												
	ICP-Chemical Hazardous Materials Information Collection Plan					x							
	ICP-Earthquake Information Collection Plan					x							
	ICP-Epidemic/Pandemic Information Collection Plan					x							

		National Response Framework											
		ESF 1	ESF 2	ESF 3	ESF 4	ESF 5	ESF 6	ESF 7	ESF 8	ESF 9	ESF 10	ESF 11	ESF 12
FEMA	ICP-Flood Information Collection Plan					x							
	ICP-Generic Information Collection Plan					x							
	ICP-Hazardous Material Information Collection Plan					x							
	ICP-Hurricane Information Collection Plan					x							
	ICP-Major Oil Spill Information Collection Plan					x							
	ICP-Nuclear Power Plan Information Collection Plan					x							
	ICP-Nuclear Weapons Incident Information Collection Plan					x							
	ICP-Olympics Information Collection Plan					x							
	ICP-Power Failure Information Collection Plan					x							
	ICP-Space Entry or Re-entry Information Collection Plan					x							
	ICP-Terrorist Information Collection Plan					x							
	ICP-Tornado Information Collection Plan					x							
	ICP-Tsunami Information Collection Plan					x							
	ICP-Volcano Information Collection Plan					x							
	ICP-Winter Storm Information Collection Plan					x							
	Joint Field Office Activation and Operations Interagency Integrated SOP					x							
	Mapping and Analysis Center SOP for NRCC Support					x							
	MT Directorate Disaster Ops SOP					x							

		National Response Framework											
		ESF 1	ESF 2	ESF 3	ESF 4	ESF 5	ESF 6	ESF 7	ESF 8	ESF 9	ESF 10	ESF 11	ESF 12
FEMA	National IMAT West Minimum Suggested Staffing Needs for Disaster Deployments					x							
	NRCC EGS Emergency Response and After Hours Support					x							
	NRCC SOP					x							
	Remote Sensing SOP					x							
	Situation Status Branch Drought Information Collection Plan					x							
HHS	ESF-8 Hurricane Response Playbook								x				
NGA	Damage Classification System and Color Scheme					x							
	Damage Classification System and Color Scheme for Fires					x							
NGB	Standard Operational Information Sharing Plan of Action												
NOAA	Storm Mapping Tutorial v2												
NORTHCOM	Joint Warfighter Interoperable Geospatial Intelligence CONOPS												
USACE	SOP/Field Guide			x									
	EM GIS SOP			x									
USFS	National Wildfire Coordinating Group GIS SOP on Incidents				x	x							
	Wildfire Information Collection Plan				x								

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Appendix K: Acronyms

ABFE	Advisory Base Flood Elevations
AFO	Area Field Office
AIXM	Aeronautical Information Exchange Model
ARC	American Red Cross
CAP	Common Alert Protocol
CAT	Crisis Action Team
CBP	Customs and Border Protection
CBRN	Chemical Biological, Radiological, and Nuclear
CDC	Centers for Disease Control and Prevention
CI	Critical Infrastructure
CIO	Chief Information Officer
CIR	Critical Information Requirement
CISAR	Catastrophic Incident Search and Rescue

CM	Community Model
CMHIS	Contract Management and Housing Inspection Services
COI	Communities of Interest
CONPLAN	Concept Plan
CONUS	Continental United States
COP	Common Operating Picture
COOP	Continuity of Operations
CPIMD	Contingency Planning and Incident Management Division
CRS	Community Rating System
CSEPP	Chemical Stockpile Emergency Preparedness Program
COD	Common Operating Data
CS	Civil Support
CSW	Catalog Service for the Web
CST	National Guard Civil Support Team
DASC	Disaster Assistance Support Center
DCE	Defense Coordinating Element
DCO	Defense Coordinating Officers
DE	Distribution Element
DEGS	Deployable Emergency Geospatial Information System (GIS) Suite
DHHS	Department of Health and Human Services
DHS	Department of Homeland Security
DMAT	Disaster Medical Assistance Team
DMORT	Disaster Mortuary Team
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
DPO-MA	Defense Program Office for Mission Assurance
DRG	Domestic Readiness Group
DRTS	Debris Removal Tracking System
DSCA	Defense Support of Civil Authority
DTRA	Defense Threat Reduction Agency
EAS	Emergency Alert System
EDXL	Emergency Data Exchange Language
EEI	Essential Elements of information
EM	Emergency Management
EMG	Emergency Management Group
EMS	Emergency Medical Services
ENS	Emergency Notification System
ENVAS	Environmental Assessment tool
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
EPR&R	Emergency Preparedness Response and Recovery
EROS	Earth Resources Observation and Science
ESF	Emergency Support Function
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FCC	Federal Communications Commission
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee
FIRM	Flood Insurance Rate Maps
FPS	Feature Portrayal Service
FOUO	For Official Use Only
FTP	File Transfer Protocol
GA	Geospatial Analyst
GARS	Global Area Reference System
GeoCONOPS	Geospatial Concept of Operations
GDM	Geospatial Data Model
GII	Geospatial Information Infrastructure
GIS	Geospatial Information System
GIU	Geospatial Intelligence Unit
GMO	Geospatial Management Office
GPR	Geospatial Production Request
GSA	General Services Administration
HSA	Homeland Security Advisor
HAVE	Hospital Availability Exchange
HAZUS	Hazards U.S. Multi-hazards
HD	Homeland Defense
HIFLD WG	Homeland Infrastructure Foundation-Level Data Working Group

HM	Hazard and Mitigation
HQ	Headquarters
HSIN	Homeland Security Information Network
HSIN-I	Homeland Security Information Network- Intelligence
HSIP	Homeland Security Infrastructure Program
HSPD	Homeland Security Presidential Directive
HTTR	HIFLD to the Regions
HUD	Department of Housing and Urban Development
HURREVAC	Hurricane Evacuation
I&A	Intelligence & Analysis
IA	Individual Assistance
IASD	Infrastructure Analysis and Strategy Division
iCAV	Integrated Common Analytical Viewer
ICG	Interagency Coordination Group
ICP	Information Collection Plan
ICS	Incident Command System
IDP	Imagery Derived Products
IEB	Information Exchange Brokers
IICD	Infrastructure Information Collection Division
IMAAC	Interagency Modeling and Atmospheric Assessment Center
IMAT	Incident Management Assistance Teams
IMC	Incident Management Cell
IMT	Incident Management Team
IOC	Infrastructure of Concern
IOF	Interim Operating Facility
IP	Office of Infrastructure Protection
IRSCC	Interagency Remote Sensing Coordination Cell
ISS	International Situation Summary
IST	Incident Support Team
ITT	Information Transaction Inventory
JFO	Joint Field Office
JFLCC	Joint Land Forces Component Command
JIC	Joint Information Center
JOC	Joint Operations Center
JTF	Joint Task Forces
KML	Keyhole Markup Language
KMO	Knowledge Management Officer
LANL	Los Alamos National Laboratory
LE	Law Enforcement
LEX-PD	Logical Entity eXchange Specifications - Publication & Discovery
LIDAR	Light Detection and Ranging
LVB	Large Vehicle Bomb
LZ	Landing Zones
MA	Mission Assignment
MAC	Mapping and Analysis Center
MACC	Multiagency Coordination Center
MACD	Military Assistance for Civil Disturbance
MAT	Mitigation Assessment Team
ME	Mission Engineering
MERS	Mobile Emergency Response Support
MIGS	Mobile Integrated Geospatial Intelligence System
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MWCL	Master Watch Control Log
NAD	North American Datum
NAPSG	National Alliance for Public Safety Geospatial Information System
NASA	National Aeronautics and Space Administration
NCS	National Communications System
NDMS	National Disaster Medical System
NEF	National Essential Function
NEHRP	National Earthquake Hazards Reduction Program
NEP	National Exercise Program
NESC	National Exercise and Simulation Center
NFIP	National Flood Insurance Program
NGA	National Geospatial-Intelligence Agency
NGB	National Guard Bureau
NGO	Nongovernmental Organizations

NGP	National Geospatial Program
NHC	National Hurricane Center
NICC	National Infrastructure Coordinating Center
NIEM	National Information Exchange Model
NIEM-M	National Information Exchange Model-Maritime
NIMS	National Incident Management System
NIPP	National Infrastructure Protection Plan
NISAC	National Infrastructure Simulation and Analysis Center
NIST	National Institute of Standards and Technology
NMSZ	New Madrid Seismic Zone
NOA	Notice of Arrival
NOAA	National Oceanic and Atmospheric Administration
NOC	National Operations Center
NP – PPMR&R	National Preparedness – Prevention, Protection, Mitigation, Response, and Recovery
NPPD	National Protection and Programs Directorate
NPS	National Park Service
NRC	Nuclear Regulatory Commission
NRCC	National Response Coordination Center
NRF	National Response Framework
NSF	National Science Foundation
NSI	National Suspicious Activity Report Initiative
NSS	National Shelter System
NSSE	National Special Security Events
NST	NGA Support Team
NTEED	National Training, Education, and Exercise Division
NTES	National Training and Education System
NWS	National Weather Service
OASD	Office of the Assistant Secretary of Defense
OCIO	Office of the Chief Information Officer
OCONUS	Outside the Continental United States
OGC	Open Geospatial Consortium
OIP	Office of Infrastructure Protection
OPA	Office of Public Affairs
OPS	Office of Operations Coordination and Planning
ORNL	Oakridge National Laboratory
OSHA	Occupational Safety and Health Administration
PA	Public Assistance
PDA	Preliminary Damage Assessment
PFO	Principal Federal Official
PKEMRA	Post-Katrina Emergency Management Reform Act
PODs	Points of Distribution
PPDR	Private Property Debris Removal
PSA	Protective Security Advisor
PSMA	Pre-Scripted Mission Assignment
RDA	Rapid Damage Assessment
REPP	Radiological Emergency Preparedness Program
RFA	Request for Assistance
RFI	Request for Information
RMIS	Resource Information Management System
RRCC	Regional Response Coordination Center
RS	Remote Sensing
SAA	Special Activity Airspace
SAR	Search and Rescue
SBA	Small Business Administration
SCO	State Coordinating Officer
SLOSH	Sea, Land, Overland, Surge From Hurricanes
SME	Subject Matter Expert
SNL	Sandia National Laboratories
SNS	Strategic National Stockpile
SOP	Standard Operating Procedures
SOC	Secretary's Operations Center
SWO	Senior Watch Officer
TAC	Technical Assistance Contractors
TCPED	Tasking, Collection, Processing, Exploitation, and Dissemination
TSA	Transportation Security Administration
USACE	United States Army Corps of Engineers

USAF	United States Air Force
USAID	United States Agency for International Development
U.S.C.	United States Code
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey
USNG	United States National Grid
USNORTHCOM	United States Northern Command
USPACOM	United States Pacific Command
US&R	Urban Search and Rescue
VA-NPSC	Virginia National Processing Support Center
VMWG	Visualization and Modeling Working Group
VOLAG	Voluntary Agency
WFS	Web Feature Services
WGS	World Geodetic System
WMD	Weapons of Mass Destruction
WMS	Web Map Services
WWHGD WG	World-Wide Human Geography Data Working Group

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