

A Primer on a Domestic Catastrophic Disaster Response for the Joint Logistics Enterprise

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A handwritten signature in black ink, appearing to read 'E.D. McGrady'.

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Abstract

Responses to a U.S. catastrophic disaster involve a variety of organizations acting in complex environments. When the disaster occurs in the United States, responding agencies may include the local, state, and federal governments, nongovernmental organizations, international aid organizations, and the private sector. Responders' support involves and requires significant logistics, and their collective logistical components are referred to as the Joint Logistics Enterprise (JLEnt). While a cohesive effort by the JLEnt agencies is essential for an effective response, the diversity of agencies' roles, capabilities, and modes of operation complicates response efforts. This primer provides an overview of the roles of common response agencies in a continental U.S. catastrophic disaster response effort.

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Contents

Introduction	1
General Disaster Response Cycle	2
Catastrophic disaster response	3
National Response Framework and the Post-Katrina Emergency Management Reform Act.....	3
National Incident Management System	4
Emergency support functions	7
Primary agencies in a catastrophic disaster response	11
Local authorities	11
State authorities	11
National Guard.....	12
Federal authorities	12
Secretary of Homeland Security.....	12
FEMA Administrator	12
NGOs	13
Private sector.....	13
Tasking and mission assignments	14
Defense Support of Civil Authorities	15
DOD tasking	18
National Guard's role during a response	20
Communication and coordination	23
Social networking during response efforts.....	24

Appendix A: Recommended Reads28

Appendix B: Agency Summaries29

Appendix C: Southern California Catastrophic Earthquake Response36

References37

List of Figures

Figure 1.	The five preparedness mission areas	2
Figure 2.	ICS wire diagram	5
Figure 3.	Emergency response operations centers within the NIMS and NRF system	6
Figure 4.	Response sequence to a catastrophic incident as compared to a locally manageable emergency.	15
Figure 5.	Process for DOD tasking	17
Figure 6.	National Guard command structure under control of the state.....	21
Figure 7.	Incident response coordination under the DSC structure	22
Figure 8.	Diagram of a non-disaster-specific Joint Field Office	24
Figure 9.	Social network of response to Hurricane Sandy	26
Figure 10.	DOD Support to SCCER emergency management.....	36

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List of Tables

Table 1.	Chart of coordination and primary agencies by ESF	9
Table 2.	Chart of supporting, coordination, and primary agencies by ESF.....	10
Table 3.	DOD capabilities in support of the NRF.....	19

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Glossary

AOR	Area of Responsibility
ASPR	Assistant Secretary for Preparedness and Response
CCDR	Combatant Commander
CCMD	Combatant Command
CONUS	Continental United States
DCE	Defense Coordinating Element
DCO	Defense Coordinating Officer
DHS	Department of Homeland Security
DOD	Department of Defense
DSC	Dual Status Command
DSCA	Defense Support of Civil Authorities
EOC	Emergency Operation Center
EMAC	Emergency Management Assistance Compact
EMS	Emergency Medical Service
ESF	Emergency Support Functions
EXORD	Execution Order
FEMA	Federal Emergency Management Agency
FHO	Federal Health Official
ICS	Incident Command System
IRA	Immediate Response Authority
JFO	Joint Field Office
JLEnt	Joint Logistics Enterprise
JTF	Joint Task Force
JS	Joint Staff
LFA	Lead Federal Agency
LNO	Liaison Officer
MA	Mission Assignment
NIMS	National Incident Management System
NG	National Guard
NGO	Nongovernmental Organization
NJOIC	National Joint Operations and Intelligence Center
NLSA	National Logistics Staging Area
NPS	National Preparedness System
NRF	National Response Framework
NRCC	National Response Coordination Center

NRF-CIS	National Response Framework Catastrophic Incident Supplement
PKEMRA	Post-Katrina Emergency Management Reform Act
PSMA	Pre-scripted Mission Assignment
REC	Regional Emergency Coordinator
RFA	Request for Assistance
SCCER	Southern California Catastrophic Earthquake Response
SecDef	Secretary of Defense
SEOC	State Emergency Operation Center
USACE	U.S. Army Corp of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USNORTHCOM	U.S. Northern Command

Introduction

Natural disasters from flooding, tornados, wildfires, earthquakes, and hurricanes occur with relative frequency within the United States. In its most severe case, a catastrophic disaster, defined by the National Response Framework as “any natural or manmade incident...that results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, and/or government functions,” [1] can very quickly overwhelm the affected local and state response capabilities. Thus, other organizations join in to help, generating a need for significant and coordinated logistics between the local, state, and federal governments, the Department of Defense (DOD), nongovernmental organizations (NGOs), and the private sector.

The logistics components of the response organizations involved are collectively referred to as the Joint Logistics Enterprise (JLEnt) [2]. Participation in the JLEnt is fluid and depends on the situation, the area affected by the disaster, and the requirements of the response effort. While a cohesive JLEnt effort is ideal for an effective response, the nebulous nature of a catastrophic disaster response and the varied roles, authorities, capacities, modes of operation, and goals of the agencies involved challenge seamless collaboration [3].

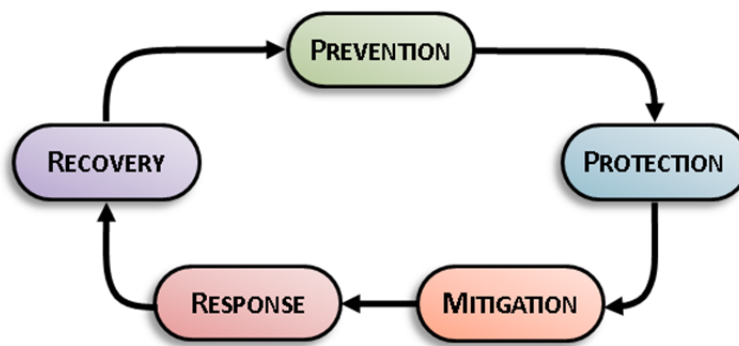
An appreciation and understanding of the different JLEnt agencies’ response mechanisms can help mitigate roadblocks to coordination. To that end, the intent of this document is to provide a brief, high-level overview of commonly deployed agencies and their response methods and capabilities in the context of a catastrophic disaster response effort inside the continental United States (CONUS).

This primer distills more comprehensive bodies of work on CONUS disaster response. For more detailed information, recommended documents are referenced in Appendix A.

General Disaster Response Cycle

The National Preparedness System (NPS), established by the Federal Emergency Management Agency (FEMA), outlines how the nation will achieve its goal of being a secure and resilient nation during a crisis [4-5]. The NPS describes the five mission areas—prevention, protection, mitigation, response, and recovery, shown in Figure 1—of any general disaster response. For each mission, there is a documented framework and federal interagency operational plan detailing themes, coordination structures, and key roles and responsibilities [5].

Figure 1. The five preparedness mission areas



Although the response cycle in Figure 1 applies to typical disaster responses as well as catastrophic disaster responses, in this document, we focus only catastrophic disaster responses as those require the most DOD support. Furthermore, of the five mission areas, we focus only on response, as this is where the majority of the JLEnt's efforts will occur.

Catastrophic disaster response

Responses to catastrophic disasters require such large efforts that for the purposes of this document, it will be assumed that there has already been a Presidential major disaster declaration and all efforts fall under the Robert T. Stafford Disaster Relief and Emergency Assistance Act [6], (hereafter referred to as the Stafford Act). This legislation enables the federal government to provide assistance to state and local governments in their efforts to alleviate the suffering and damage caused by natural or manmade disasters. We note that although this document focuses on national-level responses to local incidents, all disaster responses begin and end at the local level.

National Response Framework and the Post-Katrina Emergency Management Reform Act

As noted above, each of the five mission areas has its own framework. The National Response Framework (NRF) started as a way to establish roles and responsibilities for federal agencies during response situations. In recent years, the NRF has emphasized the integration of all levels of government, NGOs, and the private sector into a common incident command structure [7].

The NRF is built on the premise that the local government initiates the response and requests assistance from the state once its resources are overwhelmed. If the state's capabilities are saturated, the Governor will request federal assistance. The framework can be applied to a range of situations, from a localized small-scale natural disaster to a large multi-city terrorist attack. However, lessons learned from Hurricane Katrina showed that for catastrophic incidents, relying on the strictly pull method for assistance outlined in the NRF may not be sufficient for a timely and effective response.

The Post-Katrina Emergency Management Reform Act (PKEMRA) of 2006 amended the Stafford Act and updated the NRF to allow the federal government to mobilize resources without a request from the state. This moved the process from a strictly pull system to both push and pull. For example, the federal government may deploy specified packages in coordination with affected states, as outlined in the NRF Catastrophic Incident Supplement (NRF-CIS), to a National Logistics Staging Area

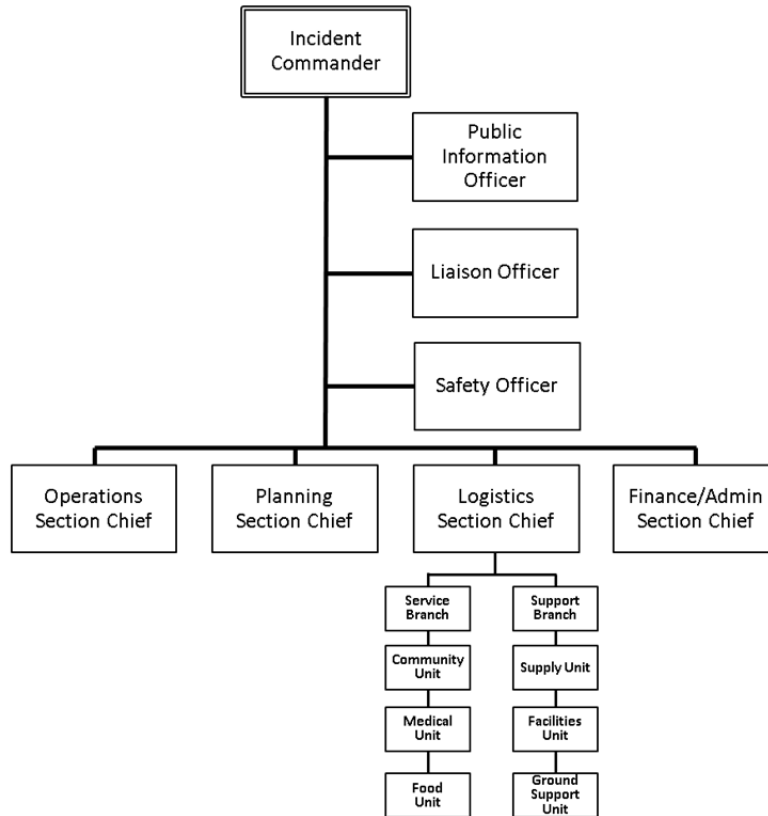
(NLSA) until either a formal state or local request is issued from incident command authorities or the Department of Homeland Security (DHS)/FEMA can coordinate a response [8]. This allows the federal government to be more proactive in a catastrophic disaster response in the event that the communication links between local and state response authorities are damaged, leaving them unable to make requests for assistance. We will discuss this issue in greater detail in the Mission Assignments section of this document.

National Incident Management System

The PKEMRA also established the National Incident Management System (NIMS), which is a comprehensive approach to incident management for all levels of government and all types of disasters [6-7, 9].

A basic building block of NIMS is the Incident Command System (ICS) (Figure 2), which is a command and control structure designed to eliminate duplication of effort, and promote coordination and communication across various agencies and echelons of government [4, 10].

Figure 2. ICS wire diagram



Source: From [10-11].

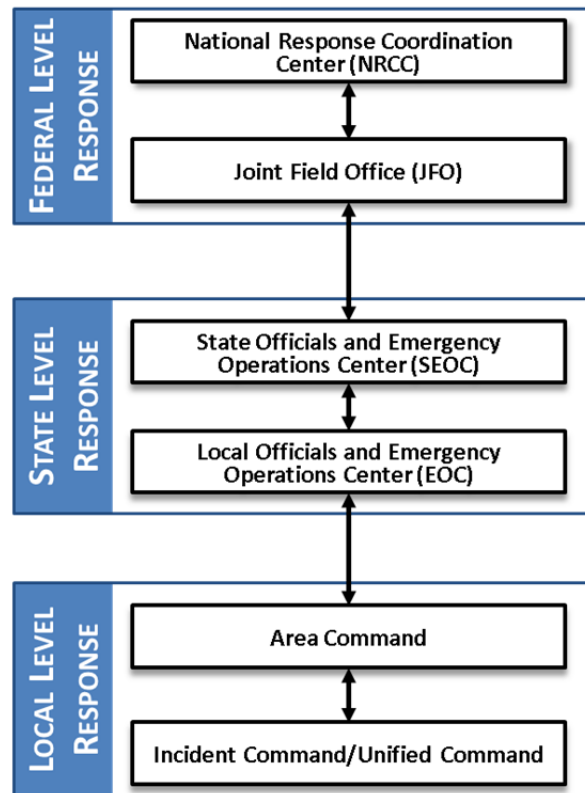
At the top of the organizational chart in Figure 2 is the incident commander [10], who, at the local level, is usually a fire or police chief, emergency medical service (EMS) coordinator, mayor, or county judge and is located at the incident [7]. The staff is divided into four main sections: Operations, Planning, Logistics, and Finance/Administration. For more details about the ICS and the various roles and responsibilities, see reference [10].

As the local area command becomes saturated with requests for resources, the state level of response is activated and a local Emergency Operations Center (EOC) is established. Once the local EOC is overwhelmed, the state will establish a state EOC (SEOC) populated with state and local officials. SEOCs can organize in various ways; the most common is using the ICS, but not all use this command structure.

The SEOC can request assistance from the federal government. When it does, the federal government will establish a local Joint Field Office (JFO) to act as its coordination team on the ground [12]. It coordinates local, state, and federal governments, NGOs, and private sector organizations, and is where the DOD will plug into the response. If possible, the JFO and the SEOC will be collocated to better facilitate the state’s requests for assistance (RFAs). We will discuss the JFO in more detail later this in this document.

In a catastrophic disaster response, a National Response Coordination Center (NRCC) will be established at FEMA headquarters in Washington, D.C., bringing together the federal, private, and NGO efforts. A diagram of the various echelons of emergency response operations centers is shown in Figure 3.

Figure 3. Emergency response operations centers within the NIMS and NRF system



Source: From [11].

These operations centers serve as central command points and should perform the following functions [11]:

- Communication and coordination
- Resource allocation and tracking
- Information collection, analysis, and dissemination

Often these centers will include representatives from FEMA, NGOs, and the private sector [12]. Each level of command is in communication with its higher-level and lower-level coordination offices (e.g., the FEMA Administrator in the NRCC will update the President about the federal response as well coordinate response efforts with the Regional Administrator) to ensure the necessary functions are performed. The double-sided arrows in Figure 3 represent this flow of information between the lead and subordinate commands. This structure helps ensure that RFAs from the local government are passed to the state authorities, who then make formal requests to the federal authorities. This process is detailed later in the Tasking and mission assignments section.

Emergency support functions

Response efforts under the NIMS and NRF are organized into emergency support functions (ESFs). The NRF identifies 14 active ESFs and the corresponding federal agency responsible for each.¹ The ESFs are:

- 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, Temporary Housing, and Human Services
- ESF #7: Logistics
- ESF #8: Public Health and Medical Services
- ESF #9: Search and Rescue
- ESF #10: Oil and Hazardous Materials Response
- ESF #11: Agriculture and Natural Resources

¹ ESF # 14 (Long-term Community Recovery) was suspended by the National Disaster Recovery Framework and is no longer an active emergency support function

- ESF #12: Energy
- ESF #13: Public Safety and Security
- ESF #14: Long-Term Community Recovery
- ESF #15: External Affairs

FEMA activates each ESF as needed to support the particular crisis response. The NRF details the scope, policies, concept of operations and responsible coordination agency to provide oversight for each ESF. The NRF also specifies a primary agency to provide the resources necessary in fulfilling the ESF response. Often, the coordination and primary agencies are the same [13]. The coordination and primary agencies for each ESF are displayed in Table 1. In addition to the identified lead agencies, federal agencies are also assigned to support each ESF (Table 2). For example, DOD is listed as the coordination agency for ESF #3 - Public Works and Engineering through the U.S. Army Corp of Engineers (USACE). The DOD is a primary agency for ESF #9 - Search and Rescue and a supporting agency to all other ESFs (see Table 2). For more information about the ESFs, reference Emergency Support Functions Annexes and the Support Annexes of the National Response Framework: Third Edition, as well as the Response Federal Interagency Operational Plan [7, 14-28].

Table 1. Chart of coordination and primary agencies by ESF

	#1 - Transportation	#2 - Communications	#3 - Public Works and Engineering	#4 - Firefighting	#5 - Information and Planning	#6 - Mass Care, Emergency Assistance, Temporary Housing, and Human Services	#7 - Logistics	#8 - Public Health and Medical Services	#9 - Search and Rescue	#10 - Oil and Hazardous Materials Response	#11 - Agriculture and Natural Resources	#12 - Energy	#13 - Public Safety and Security	#15 - External Affairs
Department of Agriculture (USDA)											C/P			
USDA/U.S. Forest Services				C/P										
Department of Defense									P					
DoD/U.S. Army Corps of Engineers			C/P											
Department of Energy												C/P		
Department of Health and Human Services								C/P						
Department of Homeland Security														C
DHS/FEMA		P	P		C/P	C/P	C/P	C/P						P
DHS/National Communication System		C/P												
DHS/US Coast Guard								P	P					
Department of Interior								P		P				
Department of Transportation	C/P													
Department of Justice													C/P	
Environmental Protection Agency										C/P				
General Services Administration							C/P							

Source: From [8].

a. "C" indicates coordination agency; "P" indicates primary agency.

Table 2. Chart of supporting, coordination, and primary agencies by ESF

	#1 - Transportation	#2 - Communications	#3 - Public Works and Engineering	#4 - Firefighting	#5 - Information and Planning	#6 - Mass Care, Emergency Assistance, Temporary Housing, and Human Services	#7 - Logistics	#8 - Public Health and Medical Services	#9 - Search and Rescue	#10 - Oil and Hazardous Materials Response	#11 - Agriculture and Natural Resources	#12 - Energy	#13 - Public Safety and Security	#15 - External Affairs
Department of Agriculture (USDA)			S		S	S	S	S		S	C/P/S	S		S
USDA/U.S. Forest Services	S	S	S	C/P		S	S	S	S	S			S	
Department of Defense	S	S	S	S	S	S	S	S	P	S	S	S	S	S
DoD/U.S. Army Corps of Engineers	S		C/P	S		S	S	S	S	S	S	S	S	
Department of Energy	S		S		S		S	S		S	S	C/P	S	S
Department of Health and Human Services			S		S	S	S	C/P	S	S	S			S
Department of Homeland Security	S	S	S		S	S	S	S	S	S	S	S	S	C
DHS/FEMA	S	P	P	S	C/P	C/P/S	C/P	S	C/P	S	S			P
DHS/National Communication System		C/P					S					S		
DHS/US Coast Guard	S		S	S				S	P	P			S	
Department of Interior	S	S	S	S	S	S	S	S	P	S	P/S	S	S	S
Department of Transportation	C/P		S		S	S	S	S		S	S	S		S
Department of Justice	S				S	S		S	S	S	S		C/P	S
Environmental Protection Agency			S	S	S			S		C/P	S	S	S	S
General Services Administration	S	S	S		S	S	C/P	S		S	S			S

Source: From [8].

a. "S" indicates supporting agency; "C" indicates coordinating agency; "P" indicates primary agency.

Primary agencies in a catastrophic disaster response

Local authorities

The response effort starts at the local level. The primary local authority during a response is the incident commander, who is usually a fire or police chief, EMS coordinator, mayor, or county judge. Additional local authorities can include county, city, parish, or township officials, emergency managers, local department and agency heads, and members of local chapters of NGOs, churches, and local charities [7].

State authorities²

If the local responders require assistance, state authorities can be requested to help. The Governor is responsible for the state's residents' well-being and, therefore, coordinates the state's resources and provides guidance for all incident responses [7]. The Governor will support local governments when needed and coordinate assistance with the federal government—and even other states—when necessary.

Each state is mandated to have an emergency management agency. The director of the state emergency management agency is responsible for ensuring that the state is prepared to handle emergencies and coordinating statewide responses to incidents [7].

State officials and their staffs train together during interagency exercises to develop the necessary capabilities to respond to various incidents. These staffs typically serve as members of the SEOC and incident command posts [7].

² Tribal, territorial, and insular governments are included in this level of authority. For more detail, see *The National Framework*, Third Edition, 2016.

National Guard

The National Guard (NG) can serve the state in two ways. First, the Governor can activate it into a State Active Duty role, where soldiers and airmen are under the command and control of the Governor through the Adjutant General (a state's NG commander) [7, 29]. Second, the NG can be activated under U.S. Code Title 32, with approval from the President and the Secretary of Defense (SecDef). Title 32 allows the Governor to employ NG units to conduct homeland defense activities while being funded by the federal government [29-30].

Federal authorities

If a disaster overwhelms local and state resources or occurs where the federal government has primary jurisdiction (e.g., in a national park or on a military base), the President will lead the national response effort to ensure necessary resources are provided quickly and efficiently [7]. DHS plays a key role, and is responsible for coordinating the federal response with state and local governments. As discussed above, other federal agencies lead coordination of the ESFs (Table 1).

Secretary of Homeland Security

The Secretary of Homeland Security is the principal federal officer for incident management within the United States and is responsible for coordinating preparedness and recovery activities among the federal agencies [6-7]. The Secretary takes a "unity of effort" approach, whereby cooperation and common interest are more important than command and supervisory roles [7].

FEMA Administrator

FEMA is a component of the DHS and its Administrator acts as an advisor to the President, the Secretary of the Homeland Security and the Homeland Security Council³ during a federal response effort [6-7]. The Administrator assists the President, through the Secretary of Homeland Security in carrying out the requirements of the Stafford Act, operating the NRCC, managing the DHS grant

³ The Homeland Security Council consists of the President, the Vice President, the Secretary of Homeland Security, the Attorney General, the Secretary of Defense, and other individuals as designated by the president.

program that funds core capabilities for national preparedness, and supporting all ESFs [6-7].

NGOs

NGOs include volunteer, faith-based, and nonprofit organizations that aid the local, state, and federal responses by providing shelter, emergency supplies, food, water, medical supplies, and other life-saving provisions through their own funding lines. The American Red Cross supports ESF #6 - Mass Care, and is one of the few NGOs designated as a primary/support agency during a national response [7]. Local, state, and federal agencies are encouraged to work with NGOs as a means to bolster the response.

Private sector

Private sector organizations include businesses, educational institutions, industry, and public/private partnerships. Often, the private sector plays a key role in disaster response because they own or maintain critical infrastructures (e.g., electric, telecommunications, hospitals, utilities) and are suppliers of key commodities (e.g., fuel, food and agriculture, communications) [7]. The NRF encourages local, state, and federal agencies to build relationships with private sector partners.

Tasking and mission assignments

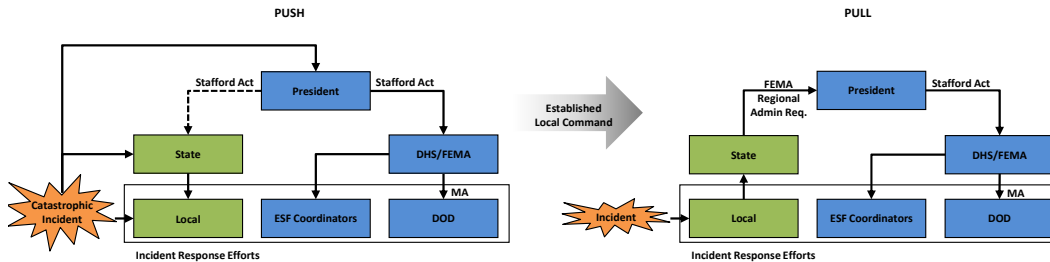
In this section, we describe how RFAs are made, and then how they are translated into a response effort.

In most incident responses, local authorities pull resources from the state and, if necessary, federal governments. Once federal support has been established, FEMA—or, in some cases, the designated coordination agency for the specific ESF—will issue mission assignments (MAs). However, in a catastrophic disaster response, there is an assumption that the magnitude of the disaster will overwhelm the local responders and, as a consequence, there is a preemptive push of resources by the federal government through pre-scripted mission assignments (PSMAs). PSMAs exist to help expedite a response during a catastrophic disaster.

FEMA maintains a catalog of more than 250 PSMAs for more than 30 agencies [31]. In a catastrophic disaster response, FEMA will coordinate response activities until local authorities reestablish their ICS, and then the more common pull system will be instated.

The left-hand side of Figure 4 captures the flow of response actions when an incident is considered to be catastrophic in nature. The 2006 PKEMRA amendment to the Stafford Act allows for the President to make a declaration of a major disaster without first obtaining a request from the affected state(s) [32]. In these cases, DHS/FEMA will establish a unified command structure and coordinate the response until state authorities are capable of establishing incident command [8]. Once local command is established, response activities will resume flowing as depicted in the right-hand side of Figure 4.

Figure 4. Response sequence to a catastrophic incident as compared to a locally manageable emergency.



Defense Support of Civil Authorities

How the DOD is tasked is independent of whether there is a push system of PSMAs or a pull system of MAs in place. When the coordination agency for a specific ESF receives a request for assistance that only the DOD can fulfill, Title 10 forces⁴ are activated through a Defense Support of Civil Authorities (DSCA) mission. The process is illustrated in Figure 5. During a DSCA mission, the civil authorities are in control and the military forces are there to support them. It is important to note that DOD is funded to support homeland security missions, but not DSCA missions. Therefore, it is imperative for the military services to follow the MA protocol, or DOD will not be reimbursed for its assistance.

First, an RFA is made for DOD to provide support at the local, state, or federal level. The RFA will come from FEMA (in most cases) or the federal department or agency that initially received the MA (in far fewer cases).⁵ The MA will be validated by the Defense Coordinating Officer (DCO) and his/her staff, known as the Defense Coordinating Element (DCE). A DCO will be deployed and located at the JFO. Other DCOs may also be at the NRCC and the SEOC. The validation is based on the follow criteria (this is sometimes referred to as the “CARRLL” process) [33]:

- Cost

⁴ Title 10 forces refer to any forces under the command and control of the President (Navy, Marine Corps, Air Force, and Army). The National Guard can also be federalized and pulled under the command of the President [29].

⁵ For example, the Department of Health and Human Services might request DOD support for a healthcare-related MA that it is in charge of executing.

- Appropriateness
- Risk
- Readiness
- Legality
- Lethality

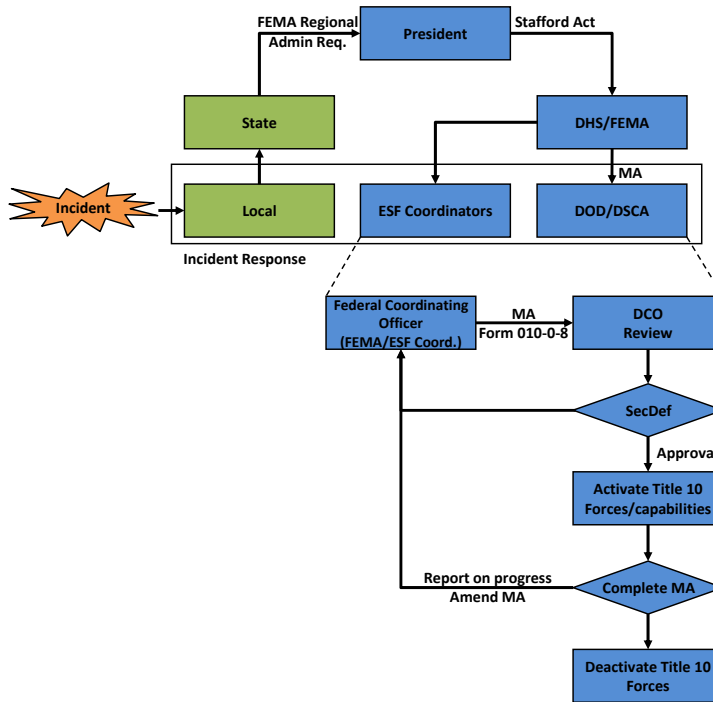
Once the RFA is validated by the DCO and the proper authorities at the state and federal levels, it becomes an MA. The MA is then passed from the DCO to either the U.S. Northern Command (USNORTHCOM) or the U.S. Pacific Command, depending on the location of the MA. At this point the question is asked whether the Combatant Commander (CCDR) has the resources to complete the MA. If so, the MA provides the execution order (EXORD) for the CCDR to request assistance from the military services.

However, if the CCDR does not have the resources to fulfill the MA, it is sent to the Joint Staff⁶ (JS) for review. Upon review, the JS will staff the request with input from the CCDRs, legal staff, and defense agencies (e.g., Defense Logistics Agency). Once the JS has concurred on the MA, it is then approved by the Assistant Secretary of Defense for Homeland Defense and America's Security Affairs, and finally by SecDef. The MA is sent to the entity that can fulfill the mission and the EXORD is executed.

For a more thorough understanding of the DSCA process, access Joint Knowledge Office for DSCA courses, starting with course J3ST-US020, and the Defense Support of Civil Authorities: Quick Reference Guide for Naval Commanders [30, 33].

⁶ Specifically the Joint Staff Current Operations Officer (J33) [33].

Figure 5. Process for DOD tasking



The MA process can be time-consuming, especially if the CCDR does not have the appropriate resources. However, in special cases, DOD can respond without an MA. According to DOD 3025.18, the military services can respond using immediate response authority (IRA) to “save lives, prevent human suffering or mitigate great property damage within the United States.” IRA missions must be reported to the National Joint Operations and Intelligence Center (NJOIC), which is responsible for disseminating information about the situation to the relevant DOD components.

An IRA mission should end once the local community can sustain the response effort. The DOD official leading the IRA mission should assess when it should end, but after a period of 72 hours, the response is no longer considered immediate and the mission should cease [34] or get authorization to continue operations through a FEMA MA. It should be noted that an IRA can only be executed by a local commander within his or her local area. An IRA does not allow a commander to deploy forces to the area of the disaster.

DOD tasking

As outlined in DOD Manual 3025.01, Volume 1 - Defense Support of Civil Authorities [35], the DOD may be called upon to assist in the case of a domestic emergency or special event [35]. DSCA is but a subset of the of the civil support provided by the DOD under the NRF, as the DoD also assists in wildland firefighting, National Special Security Events, and other special events [8].

Because DOD participation during an emergency response can vary greatly due to the nature of the incident, and since the DOD is not assigned as coordinator for specific ESFs (aside from the USACE), the exact parameters of its supporting role in any given situation can prove difficult to predict.

Per the Stafford Act [6], most requests for DOD aid during a CONUS catastrophic disaster will be made through FEMA. The most common type of assistance desired of the DOD is in support of ESF #9 - Search and Rescue [35]; however, DOD can also provide security and other specialized capabilities in support of the NRF. A non-exhaustive summary is presented in Table 3.

Table 3. DOD capabilities in support of the NRF

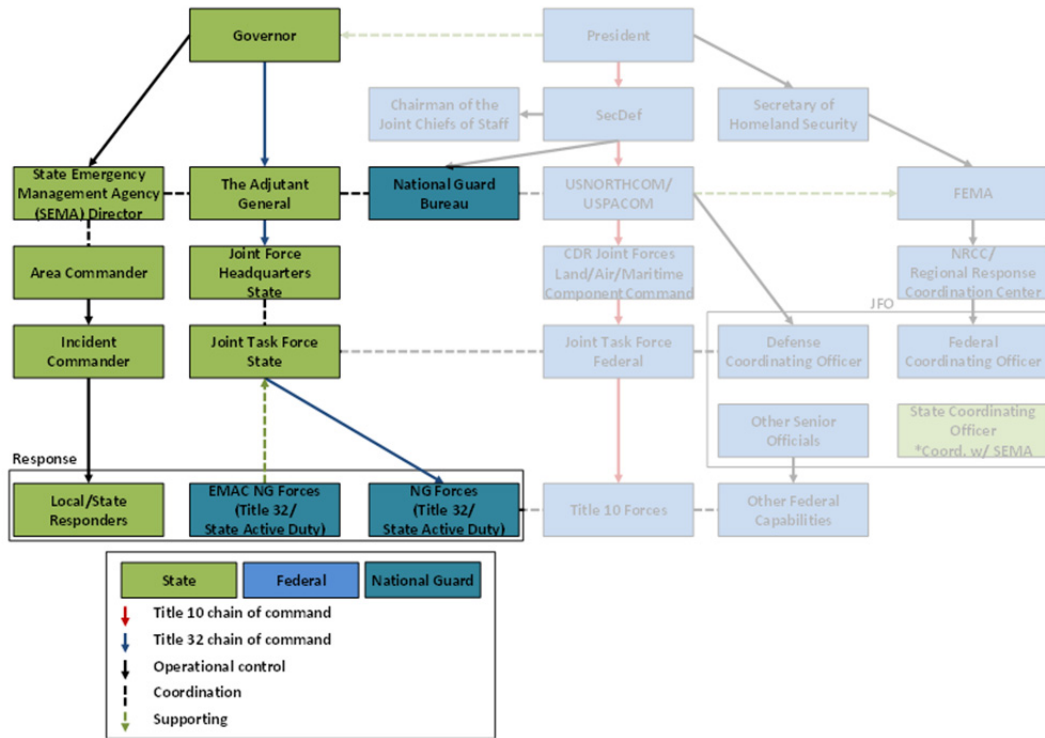
Situation monitoring	CBRN detection	Health and environmental surveillance	Epidemiology tracing	Bio-surveillance	Assessment of public health and medical needs	Damage assessment	Patrolling civil disturbances		
Communication support	Communications equipment	Incident communications	Public affairs	Liaison officers	Subject matter experts				
Coordination	Joint Regional Medical Plans	CBRN response structure	EOD coordinators	Contingency contracting	Interagency planning support	Continuity of operations and of government	Support of allies and partners and NGOs		
Logistics Personnel	Portable shelters	Tents	Generators	Fuel	Incident support bases: Cots, Blankets, Meals, Bottled Water, Health and comfort kits				
	Surge medical capability	Firefighting personnel	Flood fight efforts	Diving	Personnel and vehicles to support MCM-dispensing operations	EOD team	Assist USDA with animal disease diagnosis and public health	DoD Veterinary LNOs and support officers	
Medical assistance	Emergency medical assistance	Patient medical care and mental health assistance	Preventive medicine, environmental /occupational health	Medical supplies, pharmaceuticals, vaccines, blood, and blood products	Laboratory diagnostic capabilities	Confirmatory testing	DoD laboratory testing support of the CDC's LRN	Isolation and quarantine planning and assistance	Mass fatality assistance
Search and rescue	Locating distressed personnel	Rotary wing air mobility	Extrication and evacuation	Aviation evacuation	Technical SAR				
Transportation	Construction of temporary access roads	Setting up roadblocks	Patient movement through strategic airlift	Bulk transport of pharmaceuticals, vaccines, and commodities					
Protection	Dispersing unauthorized assemblages	Civil disturbance operations ordered by the President	Critical infrastructure protection	Cordoning off areas	Food and water safety				
Debris clearance and decontamination	Explosive ordnance disposal	Cleanup or disposal of HAZMAT	Recovery of oil	Debris clearance	Animal debris removal and disposal	Animal depopulation and disposal	CBRN decontamination	Patient decontamination	
Other technical assistance	Modeling assistance	Construction management and engineering	Regulatory permitting	Containment and Vector control	Telemedicine assistance and medical consultation	Services associated with housing migrants	Ship damage control and salvage	Emergency dredging	Vulnerability studies
Other equipment	Expedient flood fight products	Pumps	Skimmers	Booms	C-130 Aircraft Equipped with MAFFS	Rotary-Wing Aircraft	Construction material and equipment items		

Source: From [36].

National Guard's role during a response

When a disaster strikes, in coordination with the state emergency management agency (each state has one), the Governor may decide to elicit the help of the National Guard; to do so, he or she goes through the state Adjutant General. As long as the crisis is manageable within the state budget, and the President has not declared a state of emergency, efforts may stay at the state level. States do also have the potential to request assistance from neighboring states through the Emergency Management Assistance Compact (EMAC). The neighboring states' National Guards may then supplement the relief effort. When they are deployed, they fall under the operational command and control of the receiving state's emergency service authorities (and they are referred to as being under State Active Duty). Alternatively, as noted earlier, the National Guard may operate under Title 32 status if there is specific congressional or presidential authority for their deployment [37]. Even under Title 32 status, deployed National Guardsmen would report directly to state officials (specifically, the Adjutant General). The left half of Figure 6 depicts the chain of command if the entire response is run at the state level.

Figure 6. National Guard command structure under control of the state

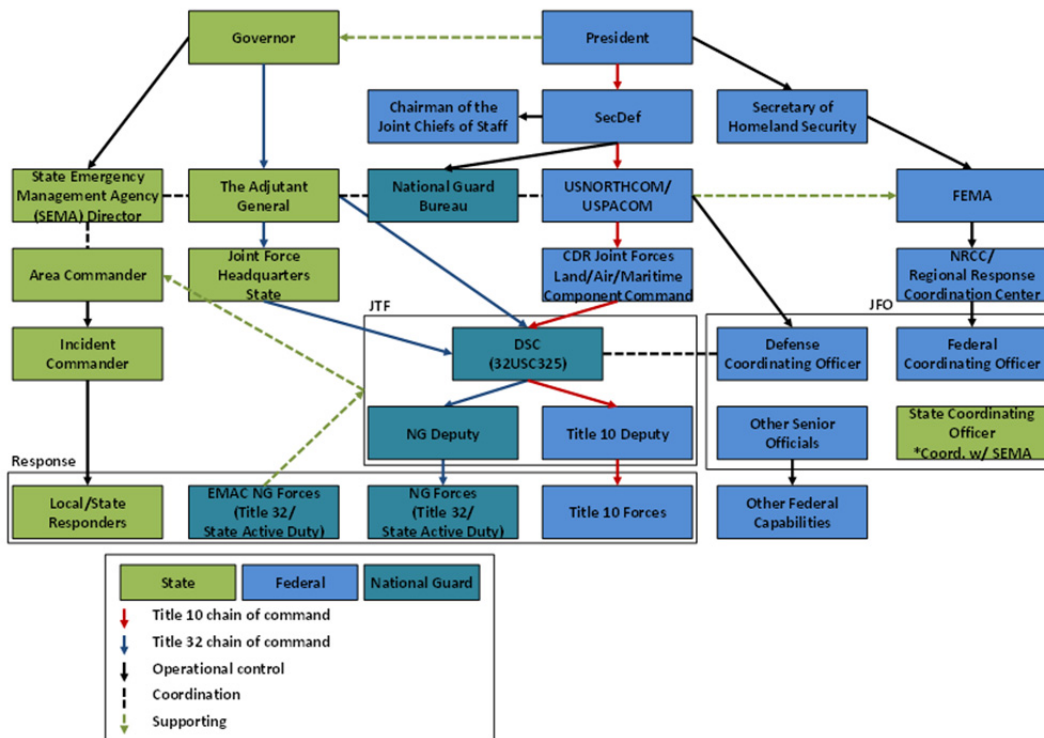


When the disaster is significant enough that the President decides to step in, he directs DOD relief efforts through the SecDef and the respective combatant command (U.S. Northern Command for most of the United States and its territories, aside from Hawaii and Guam, which fall under U.S. Pacific Command). While the Stafford Act [6] permits the President to call into service forces under Title 10 to assist in relief efforts in response to natural or man-made disasters, these forces cannot assist in law enforcement duty under the *Posse Comitatus* Act [38].

National Guard forces within a state remain under the executive control of the Governor. However, DOD forces (including National Guard forces deployed by the President under federal active duty—i.e. Title 10) can only be tasked through the federal chain of command. To solve this dilemma in a disaster response scenario, a new type of role was created not too long ago: the dual status commander (DSC). A DSC is empowered to relay orders on behalf of both chains of command to lead a coordinated military response. The National Defense Authorization Act formalized the DSC role in 2012 [39]. The Governor and the President must both agree to the establishment of a DSC, which can be terminated at any time by SecDef or the Governor. Presently, 51 states and territories have established memoranda of

agreement with SecDef for DSC appointments [40]. Figure 7 shows the coexisting chains of command and how the DSC coordinates unity of effort by standing at the crux of the state and federal commands.

Figure 7. Incident response coordination under the DSC structure



Certain documents are required to establish a DSC: nomination letters; certificate of qualification (signed by the Chief of the National Guard Bureau and the Commander of USNORTHCOM after completion of the required training); memoranda of agreement (to be quickly signed by the Governor and SecDef), and memoranda of state and DOD appointment (to be immediately signed by the Governor and SecDef). Under some circumstances, the establishment of a DSC does not apply (e.g., when the DOD is responding under “immediate response authority,” when there are standing agreements between communities and the military, or when DOD is responding to emergency situations involving weapons of mass destruction) [36].

Communication and coordination

Given the complex and evolving nature of disaster responses, clear communication and coordination between agencies is simultaneously imperative and challenging. At the federal level, the NRCC and JFO are the two coordinating bodies (see Figure 3).

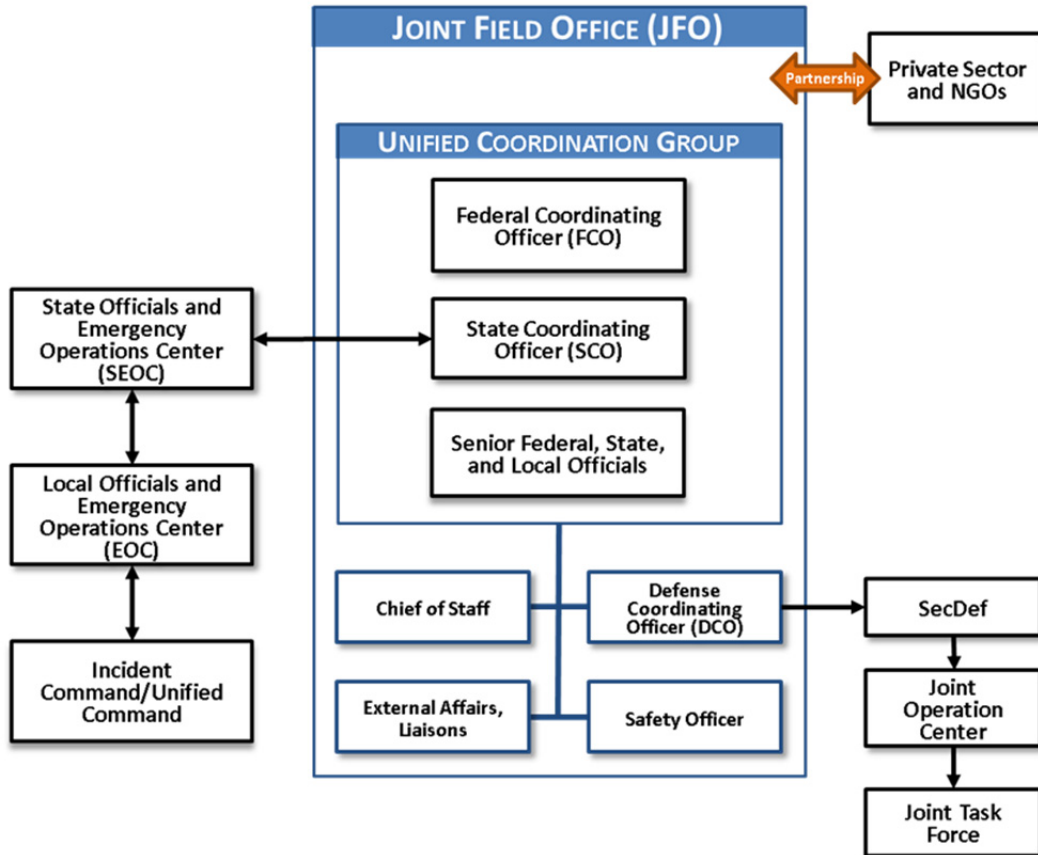
The JFO, which is the center of the federal response effort, is where the DOD plugs in. Figure 8 is a non-disaster-specific diagram of how the JFO could be organized and how it integrates with other elements of the response.

The core of the JFO is the Unified Coordination Group, which includes the Federal Coordinating Officer, the State Coordinating Officer, and other officials from the local, state, and federal levels. Under these officials are the Chief of Staff, Safety Officer, Liaison Officers, and most importantly for DOD, the DCO. The DCO is DOD's link to the response effort. The DCO and his or her staff process requests for DOD assistance from FEMA, as discussed previously in the Defense Support of Civil Authorities section.

FEMA leads ESF #5 - Information and Planning and within that ESF lies staffing the JFO. The JFO is the local coordination hub for the federal response. It uses the ICS structure, with the Unified Coordination Group acting as the IC, followed by the staff and then four sections: operations, logistics, financial/administration, and planning. The JFO does not provide on-scene operational guidance; instead, it supports on-site effort through its ability to coordinate resources.

If DOD involvement is significant, a Joint Task Force (JTF) may be established to command all Title 10 forces. These forces will also be under control of the President through the appropriate chain of the command, and would not fall under any sort of ICS structure. The JTF commander will have his or her control element co-located with the JFO to ensure coordination. The control element does not replace the DCO, and the DCO remains the DOD's connection to the JFO. For an example of a disaster-specific JFO, see Appendix C.

Figure 8. Diagram of a non-disaster-specific Joint Field Office



Source: From [41].

Social networking during response efforts

One of the major challenges in disaster response is communication among the various responding organizations. The previous section explained how different responders coordinate their efforts. While coordination is a key factor in an efficient and effective response effort, it is not always clear who to contact for the most pertinent information. To better illustrate communication during a response, we conducted a small case study to examine communication flow during the 2012 Hurricane Sandy response, using social networking principles. It is often unclear how information flows through a complex system comprised of multiple organizations, both governmental and nongovernmental. Social networks aim to capture both

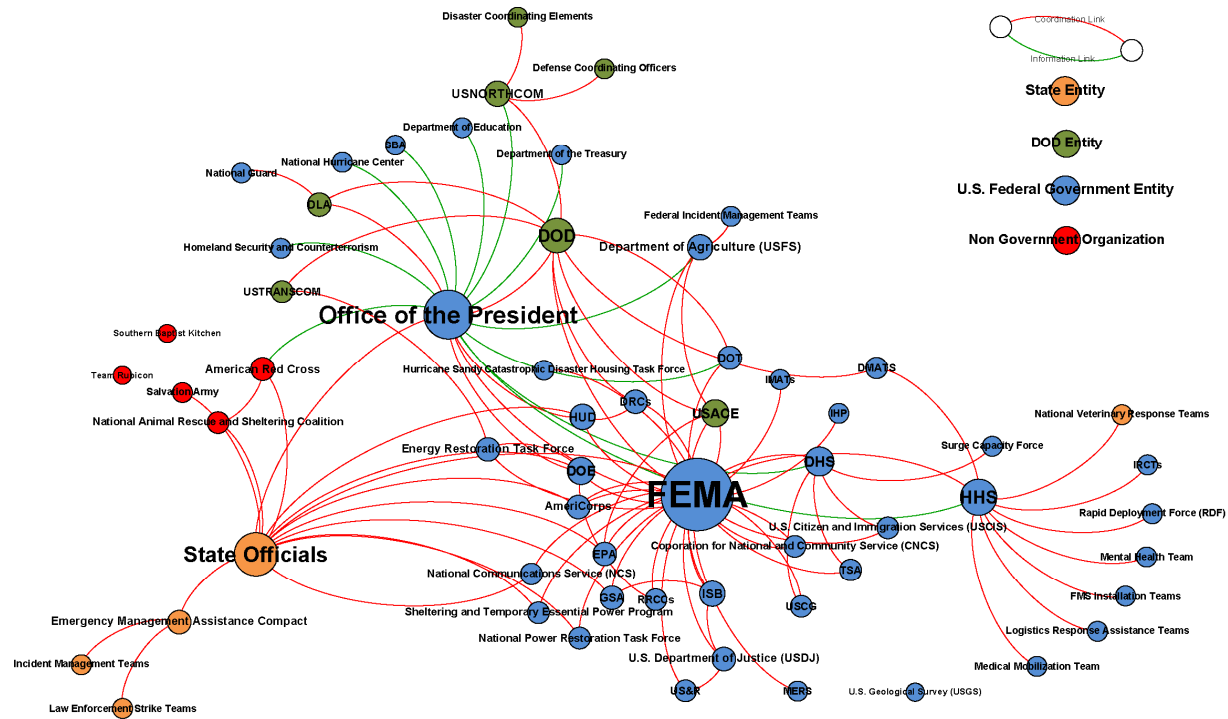
formal and informal information flow, and coordination between organizations and/or individuals [3].

We used a social networking construct to identify major communication paths and interactions during the response in Figure 9. It is important to remember that an organization's or individual's level of effort in the response is not captured using a social network—only the communication flow. CNA used data from after-action reports and mission assignments to construct the 2012 Hurricane Sandy response social network in Figure 9 [42]. This social network was based on limited data and, although accurate, is not all-inclusive

We identified two primary types of network connections: information-sharing and direct coordination. The network connections are represented by lines between individuals or organizations. Lines representing information-sharing are green and lines representing direct coordination are red.

Some organizations' primary role in the response to Hurricane Sandy was data acquisition and information sharing with other individuals and/or organizations. The National Hurricane Center and U.S. Geological Survey (USGS) were two such organizations [43]. The Office of the President was also a key communication node. This is captured in Figure 9 by the many green lines from the Office of the President to various departments and agencies.

Figure 9. Social network of response to Hurricane Sandy



Source: From FEMA MA data and [43].

The primary node in the social network for the Hurricane Sandy response was FEMA. As seen earlier in Figure 5, emergency response requirements go from the state to FEMA through a Federal Coordinating Officer, and FEMA tasks various agencies with MAs. FEMA is, therefore, a primary coordination node communicating at both the State and Federal level. This is illustrated in Figure 9 by the many red lines linking FEMA to many federal agencies and departments.

We observed that the DOD was involved in many different ESFs providing much of the necessary rotary lift and airlifting power restoration equipment[43]. The DOD response was primarily driven by MAs tasked through FEMA; therefore, despite a relatively large involvement, we observed relatively few communication links between the DOD and outside organizations.

Appendix A: Recommended Reads

This document is meant to be a brief primer on how the JLEnt players fit into the NRF, with a specific focus on the DOD. Below we provide a list of reading material and courses that we recommend for those interested in more information.

For more information on DSCA:

- J3ST-US020: Defense Support of Civil Authorities (DSCA) Overview Course (Requires Common Access Card)
- Disaster Response Staff Officer's Handbook
- Defense Support of Civil Authorities: Quick Reference Guide for Naval Commanders
- JP 3-28 Defense Support of Civil Authorities

For more information about the federal response process and RFAs:

- National Response Framework: Third Edition
- FEMA National Incident Support Manual
- FEMA Emergency Management Institute courses
 - Course IS-800.B - National Response Framework, An Introduction
 - Course IS-293 - Mission Assignment Overview
- ICS Review Material
- NIMS Frequently Asked Questions

Appendix B: Agency Summaries

The following one-pagers summarize the contributions of the U.S. Army Corps of Engineers, the DOD, the NG, FEMA, the U.S. Department of Health and Human Services, and the American Red Cross during catastrophic disaster responses. The information compiled in these one-pagers were gathered from numerous sources, namely this report's citations and organization's webpages.

U.S. Army Corps of Engineers (USACE)

- Provides public works and engineering
- Experts in flood mitigation and recovery
- Constructs temporary housing and provides power, utilities, water, and ice
- Primary agency for ESF #3 (Public works and Engineering)

Roles and Responsibilities

USACE is the leading U.S. federal agency for public engineering, with about 37,000 civilians and soldiers who are trained to deliver engineering services. It typically responds to flood or storm-related emergencies and is equipped to assist with fighting floods, removing debris, building temporary housing, and providing packaged ice and bottled water.

USACE is the primary agency for ESF #3 (Public Works and Engineering). Its typical roles and responsibilities include: needs assessments, temporary power, temporary roofing, temporary housing, debris management, emergency infrastructure assessments (bridge, ports, airfields, etc.), critical public facility restoration, demolition/structural stabilization, and technical assistance.

USACE is also a supporting agency for ESF #9 (Search and Rescue). In this role, USACE maintains a crew of volunteer structures specialists who can be used to support the FEMA Urban Search and Rescue response when given a MA.

Emergency Support Functions															
ESF #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coordinator			X												
Primary			X												
Support	X			X		X	X	X	X	X	X	X	X		

Response Resources

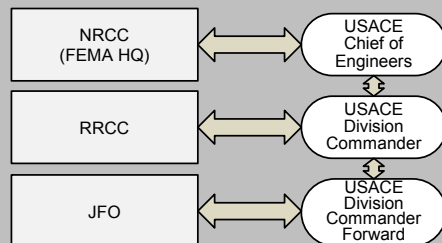
Personnel and Services

Emergency power planning and response teams
Structural safety assessment planning and response teams
Technical assistance structural engineers
Logistics support teams
Commodity distribution
Lifeline restoration
Structure specialists
Pre-awarded contracts for temporary roofing, power and debris management

Equipment and Supplies

Flood control materials (sandbags, pumps, etc.)
Generators
Engineering and construction materials (for tunnels, homes, commercial buildings, bridges, etc.)
Temporary roofing and housing structures
Temporary emergency power
Personal demand items (water and ice)
Deployable tactical operation center
Satellite communications

Response Structure



Activation Process

USACE has authority (under PL87-99) to conduct emergency management activities in areas affected or damaged by flooding or a coastal storm. It also has the authority to provide emergency water due to draught or contaminated sources.

If the President declares a disaster, FEMA will also activate USACE according to its ESF designation.

Department of Defense (DOD)

- Provides the necessary military force to deter war and protect the United States
- Primary agency for ESF #9 (Search and Rescue)
- Supporting agency for all NRF ESFs

Roles and Responsibilities

The DOD is United States' largest employer with more than 742,000 civilians and 1.3 million active service men and women. When responding to domestic disasters, the DOD is one of only two departments identified as having a supporting role for all ESFs, the Department of Interior (DOI) being the other.

DOD is the primary agency for ESF #9 (Search and Rescue), leading land-based search and rescue operations with the DOI National Park Services. The DOD brings expertise in coordinating operations, locating distressed personnel, extrication, and evacuation. It also offers rotary-wing air mobility, medical assistance, and communication and technical imagery analysis through the National Geospatial-Intelligence Agency.

DSCA is provided to requesting federal agencies with SecDef approval through validated MAs. For responsibilities this tasking can range from coordinating transport (evacuation, delivery, etc.), to providing transportation and medical assets, to monitoring and securing critical assets during a response.

Emergency Support Functions															
ESF #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coordinator															
Primary									X						
Support	X	X	X	X	X	X	X	X		X	X	X	X		X

Response Resources

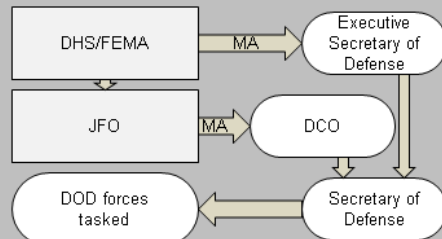
Personnel and Services

Locating distressed personnel
Extrication and evacuation
Technical search and rescue
Public affairs/liaison officers
Critical infrastructure protection
Patrolling civil disturbances
Surge medical capability
Isolation and quarantine planning
Mass fatality assistance
Flood fight efforts
Debris clearance
Explosive ordnance disposal

Equipment and Supplies

Rotary-wing aircraft
Communications equipment
Portable shelters
Generators
Cots, blankets, meals, bottled water
Medical equipment
Pharmaceuticals

Response Structure



Activation Process

When ESF #9 is activated in response to a federally declared emergency, DOD is tasked directly by FEMA in accordance with DODI 3003.01. Requests for other DOD support of civil authorities will be handled through MAs issued by a Federal Coordinating Officer through the DCO for SecDef approval with promise to reimburse as outlined by the Stafford Act (42 U.S.C. 5147) and Economy Act (31 U.S.C. 1535).

National Guard (NG)

- State militia under executive control of the Governor through the Adjutant General
- Federal reserve military force that can be called to active duty under Title 10

Roles and Responsibilities

The NG is at the disposition of both the Federal government and State governors and is poised to serve national and local efforts alike. It is an essential resource for responding to domestic incidents as its members provide expertise in emergency medical response, communications, logistics, search and rescue, and chemical, biological, radiological and nuclear response and decontamination.

The NG is one of the nation's reserve forces and may be called into service by the President for federal active duty (Title 10 status), by the Governor for State Active Duty, or under Title 32 status. It may also be deployed in support of state-to-state requests for assistance through the EMAC.

The NRF ESF Annexes specifically mention NG support for Firefighting (ESF #4) resources; Public Health and Medical Services (ESF #8), where the DOD may rely on NG and Reserve medical units in assisting with casualty staging and medical evacuation; Search and Rescue (ESF #9); and Public Safety and Security (ESF #13) in supporting law enforcement efforts. The EMAC suggests the NG may assist in all ESFs.

Emergency Support Functions															
ESF #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coordinator															
Primary															
Support	X	X	X	X	X	X	X	X	X	X	X	X	X		X

Response Resources

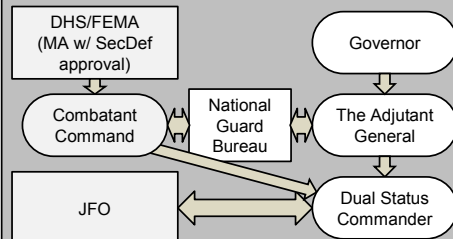
Personnel and Services

Public affairs/liaison teams
Traffic enforcement
Crowd control
Convoy security
Debris clearance
Transportation
Search and rescue
Casualty staging
Medical evacuation
Firefighting

Equipment and Supplies

Medical response packages
Rotary-wing aircraft
Fixed-wing aircraft
Firefighting equipment
Trucks
Ambulances
Generators
Communications equipment

Response Structure



Activation Process

The state Governor can call the NG to respond to emergencies (according to NGR 500-1) and request assistance from other states through EMAC. When state military response efforts are supplemented by DOD through FEMA tasking, a DSC will be appointed to head NG forces and maintain unity of effort (JP 3-28). The DSC (or JTF Commander if federal- or state-only response) coordinates relief efforts with the DCO at the JFO.

Department of Health and Human Services (HHS)

- Ensures safety of food supply and medicines
- Combats the spread of disease and prevents outbreak
- Coordinating agency for ESF #8 (Public Health and Medical Services)

Roles and Responsibilities

HHS consists of 11 divisions whose overall duty is to protect the health and well-being of U.S. citizens. Through its various agencies, HHS conducts biomedical research, develops vaccines, and monitors food and drug safety. HHS is one of four partner federal agencies with memoranda of agreement with the National Disaster Medical System (NDMS), which can deploy staff to the site of an incident, as well as coordinate medical assistance at nearby facilities.

HHS is the coordinating agency for ESF #8 (Public Health and Medical Services). It maintains the Strategic National Stockpile for rapid deployment of emergency medical supplies. It also runs the regional Incident Response Coordination Team – Advance (IRCT-A) to assess emergency situations and provide initial support. HHS disseminates information in a format suitable for individuals with limited English proficiency, provides for the behavioral health of disaster victims, and supports ESF #6 (Mass Care, Emergency Assistance, Temporary Housing, and Human Services).

Emergency Support Functions															
ESF #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coordinator								X							
Primary								X							
Support			X		X	X	X		X	X	X				X

Response Resources

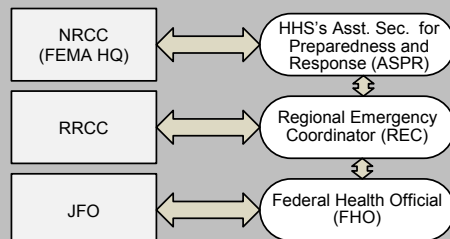
Personnel and Services

Health and medical needs assessment
 Medical care personnel
 Patient evacuation
 Behavioral health care
 Health monitoring
 Accessible health and safety information dissemination
 Food and water safety and security
 Agriculture safety and security
 Vector control
 Decontamination
 Fatality management
 Veterinary medical support for working animals

Equipment and Supplies

Medical caches
 Pharmaceuticals
 Medical equipment
 Personal protective equipment
 Blood and blood products
 Nerve agent antidotes
 Mortuary caches

Response Structure



Activation Process

ESF #8 is activated by DHS/FEMA following a Presidential declaration of emergency, or a request for assistance and the declaration of a major disaster (Stafford Act [42 U.S.C. 5147]). HHS, through ASPR, deploys the IRCT to assess needs, coordinating with local responders and reporting to the JFO and RRCC through the FHO (if assigned) or REC. Specific tasking is issued by FEMA through MAs to the ASPR.

Federal Emergency Management Agency (FEMA)

- Responsible for disaster preparedness, protection, response, mitigation, and recovery
- “Coordinates federal response during a disaster”

Roles and Responsibilities

FEMA’s mission is “to support our citizens and first responders to ensure that as a nation we work together to build, sustain and improve our capability to prepare for, protect against, respond to, recover from and mitigate all hazards.” In 2003 FEMA was incorporated into the Department of Homeland Security and its role was expanded to cover natural and man-made disasters, including terrorist acts.

In addition to FEMA’s headquarters in Washington, D.C., there are 10 regional offices that work with state and local officials in preparation for disasters. During a disaster, FEMA coordinates the federal government response. The NRCC will be located at FEMA headquarters and a local JFO will be stood up to coordinate the response on the ground. FEMA will also work with state and local operations centers.

FEMA is involved with most ESFs as either the primary or supporting actor with the exceptions of Energy (#12) and Public Safety and Security (#13). FEMA will issue MAs to other federal agencies when needed, including the DOD. As part of disaster preparedness, FEMA maintains 250+ pre-scripted MAs for more than 30 agencies.

Emergency Support Functions															
ESF #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coordinator					X	X	X		X						
Primary		X	X		X	X	X		X						X
Support	X			X		X		X		X	X				

Response Resources

Personnel and Services

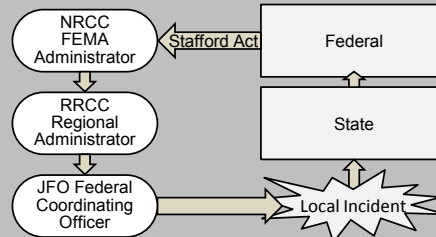
Coordination teams
Incident management assistance teams
Disaster emergency communications
Disaster recovery (grants, assistance, community planning)
Urban search and rescue
Logistics

Equipment and Supplies

The Logistics Management Directorate within FEMA maintains eight distribution centers with the commodities. In addition, they have public and private sector contracts to provide additional commodities on demand.

- Water
- Medical supplies
- Temporary housing
- Meals
- Blankets, cots, tarps, plastic sheeting

Response Structure



Activation Process

During most disasters, there is a pull of resources from local, to state, to federal as needed and requested. Thus FEMA only becomes involved when requested by the state.

The PKEMRA allows for a pre-emptive activation of FEMA during a catastrophic disaster under the assumption that the disaster will overwhelm the state’s ability to respond.

American Red Cross (ARC)

- Only NGO listed in the NRF with specific ESF roles
- Primary organization, along with DHS/FEMA, for ESF #6 (Mass Care, Emergency Assistance, Temporary Housing, and Human Services)

Roles and Responsibilities

Despite being a non-governmental agency, ARC has a Congressional Charter to provide relief (36 U.S.C. 3001). ARC is a co-primary agency with FEMA for ESF #6 (Mass Care, Emergency Assistance, Temporary Housing, and Human Services), where it is the lead for the Mass Care portion. In addition, it supports ESF #8 (Public Health and Medical Services). In these roles, ARC coordinates federal mass care assistance, independently provides its own mass care, and coordinates with many other federal agencies such as HHS, Department of Housing and Urban Development, U.S. Department of Agriculture, Veterans affairs, USACE, and FEMA.

ARC manages approximately half of the nation's blood supply through its Biomedical Services Operations Center in Washington, D.C. It can distribute prepositioned supplies through its logistics support network and has agreements with other organizations to provide additional supplies when necessary. Critical response teams are trained and ready to deploy rapidly. ARC is also a gateway to additional assistance from the International Federation of the Red Cross and International Committee of the Red Cross.

ARC is not a monolithic agency. In addition to the national organization there are over 120 local chapters. In a disaster these local chapters will likely be the first to arrive on the scene.

Emergency Support Functions

ESF #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Coordinator															
Primary						X									
Support			X		X	X		X			X				

Response Resources

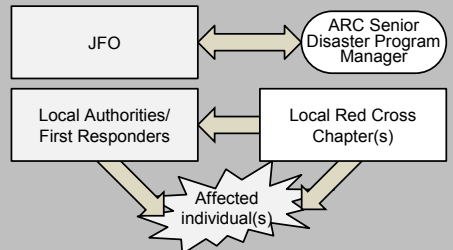
Personnel and Services

Local chapters
Critical response teams to rapidly deploy
Logistics support network (prepositioned supplies)
Disaster operations center (direct national movement of people, material, equipment)
Biomedical Services Operations Center (manages blood supply)
Overnight shelter
"Safe and Well" reporting website
Emotional and mental health support

Equipment and Supplies

Fleet of 300+ emergency response Vehicles to distribute supplies
Emergency communications equipment
Mobile kitchens
Food and water
Cots, blankets, clothing
First Aid kits

Response Structure



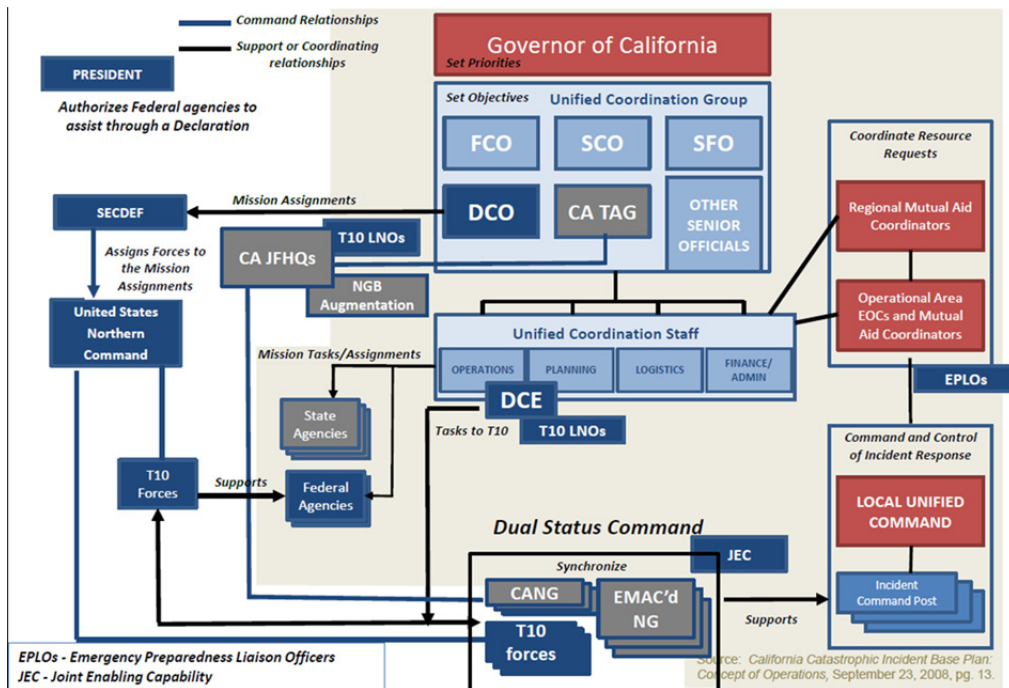
Activation Process

Empowered by Congressional Charter (36 U.S.C. 3001) to respond to disasters, ARC does not have a formal activation process. It responds to more than 65,000 disasters yearly; most are home fires. ARC is compelled by its charter to provide relief to the community and in support of first responders. Victims of a disasters may contact their local chapter for assistance (e.g., in the aftermath of a house fire).

Appendix C: Southern California Catastrophic Earthquake Response

USNORTHCOM has developed a playbook for a Southern California catastrophic earthquake response (SCCER). The responders and their roles change depending on the location and magnitude of disasters, but this provides some insight into what a response could look like.

Figure 10. DOD Support to SCCER emergency management



a. USNORTHCOM Playbook: Southern California Catastrophic Earthquake Response, Version 1.0 as of 02 June 2014.

b. California Catastrophic Incident Base Plan: Concept of Operations, September 23, 2008, pg. 13.

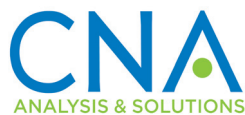
References

- [1] 2008. *National Response Framework - Catastrophic Incident Annex*.
- [2] 2012. *Operation of the Logistics Enterprise in Complex Emergencies*.
http://www.dtic.mil/doctrine/concepts/joint_concepts/hdbk_oplog_emerg.pdf.
- [3] Humplik, Tom, B. Smedley Sarah, A. Collins Elizabeth, Erin Sullivan, and K. Ma Christopher. (U) Social Networks in Crisis Response: Trust is Vital.
- [4] Lindsay, Bruce R. 2012. *Federal Emergency Management: A Brief Introduction* Congressional Research Service
- [5] 2016. *Overview of the National Planning Frameworks*. Department of Homeand Security
- [6] *Robert T. Stafford Disaster Relief and Emergency Assistance Act, As Amended*.
https://www.fema.gov/media-library-data/1383153669955-21f970b19e8eaa67087b7da9f4af706e/stafford_act_booklet_042213_508e.pdf.
- [7] 2016. *National Response Framework: Third Edition* Department of Homeland Security
- [8] 2008. "National Response Framework-Catastrophic Incident Annex." *Department of Homeland Security*.
https://www.fema.gov/pdf/emergency/nrf/nrf_CatastrophicIncidentAnnex.pdf.
- [9] 2008. *National Response Framework - Catastrophic Incident Annex*.
https://www.fema.gov/media-library-data/20130726-1825-25045-3106/catastrophic_incident_annex_2008.pdf.
- [10] 2008. *ICS Review Material* FEMA.
<https://training.fema.gov/emiweb/is/icsresource/assets/reviewmaterials.pdf>.
- [11] FEMA. Course: IS-800.B- National Response Framework, An Introduction.
- [12] 2011. *FEMA National Incident Support Manual*. Federal Emergency Management Agency
- [13] 2008. *EMERGENCY SUPPORT FUNCTION ANNEXES: INTRODUCTION* Department of Homeland Security
- [14] 2016. *Emergency Support Function #1: Transportation Annex* FEMA.

- [15] 2016. *Emergency Support Function #2: Communications Annex* FEMA.
- [16] 2016. *Emergency Support Function #3: Public Works and Engineering Annex*. FEMA.
- [17] 2016. *Emergency Support Function #4: Firefighting Annex* FEMA.
- [18] 2016. *Emergency Support Function #5: Information and Planning Annex*. FEMA.
- [19] 2016. *Emergency Support Function #6: Mass Care, Emergency Assistance, Temporary Housing, and Human Services Annex*. FEMA.
- [20] 2016. *Emergency Support Function #7 - Logistics Annex*. FEMA.
- [21] 2016. *Emergency Support Function #8 - Public Health and Medical Services Annex*. FEMA.
- [22] 2016. *Emergency Support Function #9 - Search and Rescue Annex*. FEMA.
- [23] 2016. *Emergency Support Function #10 - Oil and Hazardous Materials Response Annex*. FEMA.
- [24] 2016. *Emergency Support Function #11 - Agriculture and Natural Resources Annex*. FEMA.
- [25] 2016. *Emergency Support Function #12 - Energy Annex*. FEMA.
- [26] 2016. *Emergency Support Function #13 - Public Safety and Security Annex*. FEMA.
- [27] 2016. *Emergency Support Function #15 - External Affairs Annex*. FEMA.
- [28] 2014. *Response Federal Interagency Operational Plan*. Department of Homeland Security
- [29] *NGAUS Fact Sheet: Understanding the Guard's Duty Status*. National Guard Association of the United States.
- [30] 2013. *Defense Support of Civil Authorities: Quick Reference Guide for Naval Commanders*. Naval Warfare Development Command
- [31] 2013. "Implementation of Select Provisions of the Post-Katrina Act." *Government Accountability Office* (GAO-14-99R). <http://www.gao.gov/assets/660/659242.pdf>.
- [32] *Post-Katrina Emergency Management Reform Act*. August 3. <https://www.congress.gov/bill/109th-congress/senate-bill/3721>.
- [33] *J3ST-US020: Defense Support of Civil Authorities (DSCA) Overview Course* Joint Knowledge Online
- [34] 2010. *Department of Defense Directive* Department of Defense DoDD 3025.18.
- [35] *Defense Support of Civil Authorities: Overview*. http://www.dtic.mil/whs/directives/corres/pdf/302501_vol01.pdf.

- [36] 2013. "Defense Support of Civil Authorities." *Joint Publication 3-28*.
- [37] *Granting the consent of Congress to the Emergency Management Assistance Compact*. October 19. <https://www.congress.gov/104/plaws/publ321/PLAW-104publ321.pdf>.
- [38] Stuhltrager, James. 2006. *Send in the Guard: The National Guard Response to Natural Disasters*. National Resources and Environment.
- [39] Joint Forces Command. 2012. *Capstone Concept for Joint Operations: Joint Force 2020*. UNCLASSIFIED/FOUO.
- [40] 2014. "Dual Status Commander Fact Sheet." *National Guard* (October). http://www.nationalguard.mil/Portals/31/Features/Resources/Fact%20Sheets/new/Domestic_mission/dual_status.pdf.
- [41] 2006. *Joint Field Office Activation and Operations: Interagency Integrated Standard Operating Procedures*. https://www.fema.gov/pdf/emergency/nims/jfo_sop.pdf.
- [42] Team, Federal Interagency Sandy After-Action Review. 2013. *The Federal Response to Hurricane Sandy After-Action Report*. FOUO.
- [43] FEMA. 2013. *Hurricane Sandy FEMA After-Action Report*.

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