



**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

THESIS

**HOMELAND SECURITY IS HOMETOWN SECURITY:
COMPARISON AND CASE STUDIES OF VERTICALLY
SYNCHRONIZED CATASTROPHE RESPONSE PLANS**

by

Paul J. Liquorie

September 2015

Thesis Co-Advisors:

Nadav Morag
John Rollins

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			<i>Form Approved OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE September 2015	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE HOMELAND SECURITY IS HOMETOWN SECURITY: COMPARISON AND CASE STUDIES OF VERTICALLY SYNCHRONIZED CATASTROPHE RESPONSE PLANS			5. FUNDING NUMBERS	
6. AUTHOR(S) Liguorie, Paul J.			8. PERFORMING ORGANIZATION REPORT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB protocol number ____N/A____.	
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE A	
13. ABSTRACT (maximum 200 words) National preparedness doctrine has constantly evolved to address the pressing hazards and threats the country faces. Although arguably centered on terrorism, the current status of national policy attempts to have an all-hazards focus. While the contemporary version provides all tiers of government more guidance and structure than ever before, it still remains largely disjointed and lacks an effective overall operational response framework. Various components of catastrophe response have been identified, including threat/hazard identification, interoperability models, and other broad planning concepts. Absent from the federal doctrine is a comprehensive plan for the synchronization of vertical intergovernmental response planning. However, there are international frameworks and domestic catastrophe response plans developed at the Federal Emergency Management Agency regional level that comprehensively close the gap between federal strategy and state/local operational necessities. These are presented as a comparison and in case studies that are evaluated against the leading catastrophe-response planning criteria from government, professional, and academic standards. The conclusion includes recommendations for adapting current federal task force models to focus on catastrophe planning, improving national emergency-response capacity, and restructuring federal homeland security grant funding.				
14. SUBJECT TERMS catastrophe response planning, emergency management, homeland security, National Response Framework, Emergency Management Assistance Compact (EMAC), catastrophic earthquake, improvised nuclear device (IND), Civil Defence Emergency Management (CDEM) group, mission ready package			15. NUMBER OF PAGES 177	
17. SECURITY CLASSIFICATION OF REPORT Unclassified			16. PRICE CODE	
18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified		19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU	

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

**HOMELAND SECURITY IS HOMETOWN SECURITY: COMPARISON AND
CASE STUDIES OF VERTICALLY SYNCHRONIZED CATASTROPHE
RESPONSE PLANS**

Paul J. Liquorie
Captain, Montgomery County, Maryland Department of Police
B.A., The American University, 1990

Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF ARTS IN SECURITY STUDIES
(HOMELAND SECURITY AND DEFENSE)**

from the

**NAVAL POSTGRADUATE SCHOOL
September 2015**

Author: Paul J. Liquorie

Approved by: Nadav Morag
Thesis Co-Advisor

John Rollins
Thesis Co-Advisor

Mohammed Hafez
Chair, Department of National Security Affairs

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

National preparedness doctrine has constantly evolved to address the pressing hazards and threats the country faces. Although arguably centered on terrorism, the current status of national policy attempts to have an all-hazards focus. While the contemporary version provides all tiers of government more guidance and structure than ever before, it still remains largely disjointed and lacks an effective overall operational response framework. Various components of catastrophe response have been identified, including threat/hazard identification, interoperability models, and other broad planning concepts. Absent from the federal doctrine is a comprehensive plan for the synchronization of vertical intergovernmental response planning. However, there are international frameworks and domestic catastrophe response plans developed at the Federal Emergency Management Agency regional level that comprehensively close the gap between federal strategy and state/local operational necessities. These are presented as a comparison and in case studies that are evaluated against the leading catastrophe-response planning criteria from government, professional, and academic standards. The conclusion includes recommendations for adapting current federal task force models to focus on catastrophe planning, improving national emergency-response capacity, and restructuring federal homeland security grant funding.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	BACKGROUND	1
B.	PROBLEM STATEMENT	1
	1. Catastrophe Preparedness at the Local Level.....	2
	2. Federal Preparedness	2
	3. Systemic Problems	3
C.	RESEARCH QUESTIONS	5
	1. Primary Questions	6
	2. Secondary Question	6
D.	METHODOLOGY	6
	1. Overview	6
	2. New Zealand Civil Defense and Emergency Management Framework	7
	3. Southern California Catastrophic Earthquake Response Plan.....	9
	4. Integrated Improvised Nuclear Device Plan: City of Chicago, County of Cook, State of Illinois, and FEMA Region V.....	10
II.	LITERATURE REVIEW	11
A.	OVERVIEW	11
	1. Sources that Identify Strategic Threats and Hazards	13
	2. Examples of Collaborative Catastrophe Response Plans.....	15
	3. Strategic Approaches to Catastrophe Planning	17
	4. Literature Regarding International Approaches.....	17
	5. Evaluative Criteria for Catastrophe Response Plans	18
	6. Case Studies.....	20
	7. Executive Branch Documents	21
	8. Other Federal Government Publications.....	21
	9. Literature from Academic Sources and Public Policy Groups	23
	10. Assessment of the Literature.....	23
III.	EVALUATION OF NATIONAL PREPAREDNESS STRATEGY.....	27
A.	ORIGINS OF NATIONAL PREPAREDNESS POLICY (WORLD WAR II–COLD WAR)	27
B.	POST–COLD WAR (DISASTER RESPONSE ERA)	28
C.	POST 9/11 – ALL-HAZARDS APPROACH	30
D.	SUMMARY	34
IV.	EVIDENCE OF A GAP.....	37
A.	CATASTROPHES—A LACK OF UNDERSTANDING.....	37
B.	GAPS BETWEEN FEDERAL DOCTRINE AND STATE/LOCAL OPERATIONAL RESPONSE PERSIST	41
C.	CONCLUSION	46

V.	COMPARISON MODEL FOR CATASTROPHE PREPAREDNESS—THE NEW ZEALAND MODEL	49
A.	INTRODUCTION.....	49
B.	NEW ZEALAND CIVIL DEFENSE AND EMERGENCY MANAGEMENT STRUCTURE.....	51
C.	FRAMEWORK ASSESSMENT	55
D.	CONCLUSION	57
VI.	CRITERIA FOR EVALUATING THE EFFECTIVENESS OF CATASTROPHE RESPONSE PLANS.....	59
A.	OVERVIEW	59
B.	NATIONAL RESPONSE FRAMEWORK AND COMPREHENSIVE PREPAREDNESS GUIDE 101.....	60
C.	COMPREHENSIVE PLANNING GUIDE 101	62
D.	NFPA-1600: STANDARD ON DISASTER PLANNING AND BUSINESS CONTINUITY PROGRAMS.....	65
E.	EMERGENCY MANAGEMENT ACCREDITATION PROGRAM STANDARD	68
F.	RESEARCH-BASED CRITERIA FOR EVALUATING DISASTER PLANNING AND MANAGING	69
VII.	COMPARISON AND ANALYSIS OF CRITERIA PRESENTED IN VARIOUS SOURCES	73
A.	OUTLINING THE CRITERIA.....	73
B.	CRITERIA ASSESSMENT	77
C.	CONCLUSION	78
VIII.	CASE STUDY: SOUTHERN CALIFORNIA CATASTROPHIC EARTHQUAKE PLAN.....	79
A.	OVERVIEW	79
B.	PLAN DETAILS	80
C.	ADEQUATELY PREPARING LOCAL EMERGENCY PROVIDERS FOR CATASTROPHIC EVENTS	83
D.	COLLABORATION OF STRATEGIC GOALS AND OPERATIONAL RESPONSE REQUIREMENTS.....	88
E.	SUMMARY	91
IX.	CRITERIA-BASED EVALUATION OF THE SOUTHERN CALIFORNIA CATASTROPHIC EARTHQUAKE PLAN.....	93
A.	OVERVIEW	93
B.	ACCEPTABILITY	93
C.	ADEQUACY	94
D.	COMPLETENESS.....	95
E.	CONSISTENCY	97
F.	FEASIBILITY.....	97
G.	FLEXIBILITY	99
H.	INTEROPERABILITY/COLLABORATION.....	101
I.	SUMMARY	101

X.	CASE STUDY: THE INTEGRATED IMPROVISED NUCLEAR DEVICE RESPONSE PLAN: CITY OF CHICAGO, COUNTY OF COOK, STATE OF ILLINOIS, AND FEMA REGION V	103
	A. OVERVIEW	103
	B. PLAN DETAILS	104
	C. BASE PLAN	105
	D. PRE-DESIGNATING.....	108
	E. EXECUTION CHECKLIST.....	109
	F. SUMMARY	110
XI.	CRITERIA-BASED EVALUATION OF THE INTEGRATED IMPROVISED NUCLEAR DEVICE RESPONSE PLAN: CITY OF CHICAGO, COUNTY OF COOK, STATE OF ILLINOIS AND FEMA REGION V	113
	A. OVERVIEW	113
	B. ACCEPTABILITY	113
	C. ADEQUACY	115
	D. COMPLETENESS.....	116
	E. CONSISTENCY.....	119
	F. FEASIBILITY.....	119
	G. SUMMARY	121
XII.	CONCLUSIONS BASED ON EVALUATION OF THE CASE STUDIES	123
	A. EVALUATION	123
	B. UNIVERSAL PLANNING APPLICATIONS	124
	C. RECOMMENDATIONS.....	127
	1. Enhance the Emergency Management Assistance Compact Processes	128
	2. Build National Capacity through a County Based System	131
	3. Restructuring Federal Grant Funding.....	132
	4. Joint Catastrophe Planning Teams	134
	D. CONCLUSION	135
	LIST OF REFERENCES	137
	INITIAL DISTRIBUTION LIST	143

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF FIGURES

Figure 1.	Basic Structure and Responsibilities of the Joint State/Federal Organization.....	82
Figure 2.	Phases of Earthquake Response.....	84
Figure 3.	Conceptual Illustration for Assessing Capability Requirements and Identifying Capability Gaps for National Preparedness	127
Figure 4.	Current EMAC Operation Levels	130

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1. Comparative Applicable Criteria Table74

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

AG	adjutant general
ARES	Amateur Radio Emergency Services
CalEMA	California Emergency Management Agency
CalOES	California Governor's Office of Emergency Services
CDEM	Civil Defence and Emergency Management
CEG	coordinating executive group
CBRNE	chemical, biological, radiological, nuclear, explosive
COG	continuity of government
CONOPS	concept of operations
COOP	continuity of operations
CPG 101	Comprehensive Planning Guide 101
CRS	Congressional Research Service
CSZ	Cascadia Subduction Zone
CST	civil support team
DHS	Department of Homeland Security
DMORT	Disaster Mortuary Operational Response Team
DNI	Director of National Intelligence
DOD	Department of Defense
DOT	Department of Transportation
DRC	Disaster Research Center
DRRS	Defense Readiness Reporting System
EMAC	Emergency Management Assistance Compact
EMAP	Emergency Management Accreditation Program
EMP	electromagnetic pulse
ESF	emergency support function
FAA	Federal Aviation Administration
FCO	federal coordinating officer
FEMA	Federal Emergency Management Agency
FOUO	for official use only
GAO	Government Accountability Office

GIS	geographical information system
GSA	Government Services Administration
HIDTA	high intensity drug trafficking area
HUD	Department of Housing and Urban Development
HSEEP	Homeland Security Exercise and Evaluation Program
HSPD-8	Homeland Security Presidential Directive-8
ICS	Incident Command System
IMAAC	Interagency Modeling and Atmospheric Assessment Center
IMT	incident management team
IND	improvised nuclear device
JCPT	joint catastrophe planning team
JTTF	joint terrorism task force
LEDT	law enforcement deployment team
MCDEM	Ministry of Civil Defence and Emergency Management (New Zealand)
MYTEP	multi-year training and exercise plan
MRP	mission ready package
NEMA	National Emergency Managers Association
NFPA	National Fire Protection Association
NFPA 1600	NFPA Standard on Disaster Emergency Management and Business Continuity Programs
NGO	non-government organization
NIMS	National Incident Management System
NMSZ	New Madrid seismic zone
NORAD	North American Aerospace Defense Command
NPG	National Preparedness Goal
NRF	National Response Framework
NRP	National Response Plan
NUEVAC	Nuclear Evacuation Analysis Code
NVOAD	National Voluntary Organizations Active in Disasters
OASIS	Operational Area Satellite Information System
PKEMRA	Post Katrina Emergency Management Reform Act

POD	point of distribution
PPD-8	Presidential Policy Directive-8
PRA	priority response area
RACES	Radio Amateur Civil Emergency Services
RAP	Radiological Assistance Program
SCO	state coordinating officer
SEMS	State Emergency Management System
UCG	Unified Coordination Group
USAR	urban search and rescue
USGS	United States Geographical Survey
USNORTHCOM	U.S. Northern Command
WMD	weapon of mass destruction

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

National preparedness doctrine has constantly evolved to address the pressing hazards and threats the country faces. Although arguably centered on terrorism, currently, national policy attempts to have an all-hazards focus. While the contemporary version provides all tiers of government more guidance and structure than ever before, it still remains largely disjointed and lacks an effective overall operational response framework. Various components of catastrophe response have been identified in the national preparedness doctrine, including threat/hazard identification, interoperability models, and other broad planning concepts, such as capabilities based planning.

However, many of these frameworks do not directly apply to national catastrophe planning because of the country's federalist form of government that emphasizes states' rights. As a result, emergency response personnel and resources are decentralized requiring interstate compacts and intrastate memorandums of agreement/understanding. This contributes to the persistent gap in catastrophe planning and response between state and local agencies and the federal government. Absent from the federal doctrine is a comprehensive plan for the vertical synchronization of intergovernmental response planning.

Thus, it is difficult to find a single source to guide the drafting of an all-inclusive catastrophe response plan. One argument for this is that there are so many possible catastrophe scenarios and configurations for emergency service agencies that vary from state to state and even vary at the municipal level. However, there are vertically synchronized catastrophe response plans that have been developed at the regional level that are exemplars of intergovernmental planning that can serve as templates for other areas of the country. At a minimum, planners should consider these plans as best practices in the emergency management community.

In addition to these domestic plans, a comparison of New Zealand's Ministry of Civil Defence and Emergency Management's (MCDEM) groups provide a framework that the United States can adapt to instill greater coordination across all tiers of government in catastrophe response planning. Once a framework is established to bring

all stakeholders together for planning purposes, the group that has been assembled can begin to draft a plan. To assist in doing this, there are governmental, industrial, non-profit, and academic standards that are specific to catastrophe response planning. From the primary standards of each of these fields, common criteria can be extracted and established. These can be utilized to create new plans or assess current ones. Within the thesis, these standards are used to evaluate case studies of current, domestic, catastrophe, response plans that were developed at the Federal Emergency Management Agency (FEMA) regional level in conjunction with hundreds of vested state and local participants.

The two plans selected are from different regions of the country and address divergent threats. The *Southern California Catastrophic Earthquake Plan* addresses an impending natural hazard and was produced by FEMA Region IX, the California Office of Emergency Services, and over 1500 other regional partners, including private sector infrastructure owners and volunteer organizations.¹ The other plan, the *Integrated Improvised Nuclear Device Plan: City of Chicago, County of Cook, State of Illinois and FEMA Region V* developed by these primary regional partners, and numerous private and non-governmental organizations was drafted to address a potential catastrophic terrorist attack in the form of a detonation of an improvised explosive device (IND).² An overview of the New Zealand framework for catastrophe response planning is presented first and provides guidance toward improving the United States' catastrophe response planning.³

When attempting to find comparative national models for catastrophe response planning from other countries, it is difficult to find ones that equate well against the

¹ Federal Emergency Management Agency [FEMA] Region IX, and the California Office of Emergency Services, *Southern California Catastrophic Earthquake Plan*, 2010, [http://www.caloes.ca.gov/PlanningPreparednessSite/Documents/SoCalCatastrophicConops\(Public\)2010.pdf](http://www.caloes.ca.gov/PlanningPreparednessSite/Documents/SoCalCatastrophicConops(Public)2010.pdf).

² Federal Emergency Response Agency [FEMA] Region V, *Integrated Improvised Nuclear Device Response Plan City of Chicago, County of Cook, State of Illinois and FEMA Region V* (Washington, DC Federal Emergency Response Agency Region V, 2012).

³ New Zealand Ministry of Civil Defence and Emergency Management [MCDEM], *National Civil Defence Emergency Management Strategy* (Wellington, New Zealand: New Zealand Department of Internal Affairs, 2008), <http://civildefence.govt.nz/assets/Uploads/publications/national-CDEM-strategy-2008.pdf>.

United States' federalist system of government. Though New Zealand has a centrist form of government, its Ministry of Civil Defence and Emergency Management's groups present a model that provides potential for American planning efforts. The MCDEM uses a "ground up" organization to solicit input not only from local and regional level government agencies but citizens as well. Forums are held to set community risk tolerances, emergency response, and resource priorities. The feedback from community members is then forwarded to regional Civil Defence and Emergency Management (CDEM) groups that are composed of representatives from the emergency services and regional, local and national governments. Although the participants are legislatively required to be members of these groups, the plans they produce are representative of all parties' perspectives. Once completed, the regional plans are forwarded to the MCDEM for inclusion into the comprehensive national CDEM plan.

New Zealand would have to test this model during the 2011, magnitude 6.3, Christchurch earthquake. After action evaluations of the MCDEM plan's effectiveness were overall very positive. This proven model demonstrates the importance of synchronizing catastrophe response planning across all tiers of government. Although the CDEM group approach cannot be directly replicated in the United States, it can be adapted for use in national catastrophe response planning. In order to do so, criteria must first be established to develop and evaluate plans.

There are several standards for catastrophe response planning across government, professional, and academic resources. The most prominent of these include the Department of Homeland Security's *2008 National Response Framework* (NRF) and FEMA's *Developing and Maintaining Emergency Operations Plans: Comprehensive Preparedness Guide 101* (CPG 101).⁴ Non-governmental publications include the *National Fire Protection Association (NFPA) 1600 Standard on Disaster/Emergency Management and Business Continuity* and the *Emergency Management Accreditation*

⁴ U.S. Department of Homeland Security, *National Response Framework* (Washington, DC: Department of Homeland Security, 2008); Federal Emergency Management Agency, *Developing and Maintaining Emergency Operations Plans: Comprehensive Preparedness Guide 101* (Washington, DC: Federal Emergency Management Agency, 2010).

*Program (EMAP) Emergency Management Standard.*⁵ From academia, Dr. Enrico L. Quarantelli's scholarly work, *Researched Based Criteria for Evaluating Disaster Planning and Managing* builds upon his extensive research at the University of Delaware's Disaster Research Center.⁶

An analysis of these standards reveals a number of criteria that are universal to each of them. These criteria can then be used to develop or evaluate response plans. In short, using the NRF as the base to evaluate the other standards, the following core criteria were established:

- **Acceptability**—a plan meets potential scenarios, applicable laws, costs, and timeframe requirements
- **Adequacy**—planning is valid and relevant and addresses critical tasks
- **Completeness**—a plan includes timelines and a concept of operations (CONOPS); it addresses major actions, objectives, tasks and timelines and all stakeholders, resources and personnel requirements are addressed
- **Consistency and Standardization**—a plan applies with other policies, standards, and procedures
- **Feasibility**—a plan is realistic and achievable with on-hand and/or obtainable resources
- **Flexibility**—a plan is adaptable and decision making is decentralized and allows for delegation
- **Interoperability and Collaboration**—a plan has integrated and complementary objectives

The two domestic case studies chosen that meet all these criteria are the *Southern California Catastrophic Earthquake Plan* and the *Integrated Improvised Nuclear Device Plan: City of Chicago, County of Cook, State of Illinois and FEMA Region V plan*. Each plan differs in regards to the hazard or threat it addresses as well as the format and

⁵ National Fire Protection Association, *1600 Standard on Disaster/Emergency Management and Business Continuity*, 2013, <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=1600>; Emergency Management Accreditation Program, *The Emergency Management Standard* (Lexington, KY: The Emergency Management Accreditation Program, 2013), <http://www.emaponline.org/>.

⁶ Enrico L. Quarantelli, *Researched Based Criteria for Evaluating Disaster Planning and Managing*, Newark, DE: University of Delaware, 1997), http://www.nifv.nl/upload/179144_668_1168610952796-quarantelli-1998.pdf.

methodology used in planning for the response to the anticipated or potential scenarios. Yet, each is an exemplar of vertically synchronized catastrophe response planning.

The first plan is the *Southern California Catastrophic Earthquake Plan*. This plan relies heavily on empirical, data-based analysis and geographic information systems (GIS). As a result, the plan has established a baseline of the pre-event or steady state emergency response and support resources. The plan then accounts for the anticipated operational losses due to a magnitude 7.8 earthquake. The deficit in emergency service assets plus the additional resources needed to respond to the estimated 53,000 injured persons, 300,000 damaged structures, 3600 mortalities, 1600 initial fires, and 81 million tons of debris required to be cleared can then be calculated. Preparations can then be made to fill the gap to make up for the loss of damaged assets and the supplementary resources needed for an incident of this scale.⁷

Through the use of GIS the southern California plan has devised the concept of priority response areas (PRA). Data sets comprising of population concentration, structural density, and earthquake shake magnitude have been layered to form these PRAs. The result is a geographical representation that identifies the areas that emergency service providers need to primarily focus on in order to have the most impact in the immediate aftermath of a large-scale earthquake. Another benefit of identifying the PRAs prior to a catastrophe allows for first responders to understand where to concentrate their efforts, even in the event they lose communications with higher commands or other adjacent units.

The PRA concept has applications beyond earthquake response preparation and can be used across all hazards. This can be accomplished by retaining the variables of population concentrations and structural density and adding a third variable for the likely hazard for a particular region. Examples include height and inland distance of a tsunami induced wave, flood zones and plume modeling, or explosive blast radius for industrial accidents. The progressive PRA concept is a key strength of the catastrophic earthquake

⁷ FEMA Region IX, and the California Office of Emergency Services, *Southern California Catastrophic Earthquake Plan*, 59.

plan, but it also has a significant level of detail derived from the involvement of hundreds of vital stakeholders.

The second case study that meets the criteria of a well developed, vertically synchronized, catastrophe response plan is the *Integrated Improvised Nuclear Device Plan: City of Chicago, County of Cook, State of Illinois and FEMA Region V*. Like the southern Californian plan, it also was developed with the contributions of hundreds of stakeholders and is well founded with evidence and data-based operational conclusions. However, it differs in that it addresses a manmade threat that is not geographically fixed. Because of this, its framework varies from the GIS based catastrophic earthquake plan and instead uses an innovative “execution checklist” annex as its basis.⁸

The execution checklist is a functional matrix that chronologically lists tasks that are essential to a successful response to the detonation of an IND within the first 72 hours. The tasks in the checklist have been pre-determined by the stakeholders and are prioritized to insure that the lifesaving actions with the maximum effects are performed at the earliest stages. Since the tasks have been agreed upon, this allows for the checklist’s immediate use at the onset of a crisis. An additional benefit of the pre-established execution checklist is that the sequence of the tasks is synchronized so they complement and build upon each other. Furthermore, they can be implemented at any level, without direction from higher command in the event communications are lost, as is expected in this scenario. The structure of the Chicago plan also has applications to other catastrophes and important features that can be replicated in other response plans.

Both of these plans demonstrate that an extraordinary level of attention to detail and an extensive amount of time and effort are needed to develop a plan that will be operationally feasible for incidents of this magnitude. Through his extensive research, Dr. Quarantelli has concluded that catastrophes differ from smaller scale disasters and crises not just quantitatively but qualitatively. Therefore, he advises that catastrophe response plans cannot simply be larger scale editions of plans developed for less complex disasters and crises.⁹ Consequently, it is imperative to establish a framework for developing

⁸ FEMA Region V, *Integrated Improvised Nuclear Device Plan*, Annex 1.

⁹ Quarantelli, *Researched Based Criteria*, 5.

catastrophe response plans among regional stakeholders including federal agencies. The plans that are created must meet the established criteria gleaned from the leading emergency management standards if they are to be successful.

In order to do this, the federal government could adapt the task force models it currently uses for law enforcement, such as joint terrorism task forces (JTTF) or the FEMA urban search and rescue (USAR) teams, to create joint catastrophe planning teams (JCPT). These teams would receive federal funding to help organize regional stakeholders into groups similar to the New Zealand MCDEM model to develop response plans. These regional plans developed by the JCPT would then be incorporated into a national catastrophe response plan.

However, one vital aspect is missing from both of the case studies and the current national framework. Like the plans presented in the case studies, the plans developed by the JCPTs can establish concepts of operations, pre-designate supply and staging areas, and identify potential avenues of ingress and egress. While this answers the “what” “where” and “how” of the plans, it does not answer the “who.” This essential information is absent from both of the case studies. The plans do mention intrastate mutual aid agreements that are in place and the national interstate Emergency Management Assistance Compact (EMAC) program. However, the enormity of a true catastrophe will immediately exceed the resources allocated in support of these agreements. Federal catastrophe response doctrine consistently cites having enough “capability” to address a “meta-scenario” or a “maximum of maximums” event, but it does not make the distinction of insuring there is enough “capacity” in regards to emergency services and other resources. Therefore, the sheer magnitude of catastrophes requires a massive response well beyond those that are governed by existing practices.

Insuring there is enough immediate capacity or inventory of first responders and their associated assets to address a national level catastrophe is hindered by the country’s federalist form of government. Current agreements to aid other jurisdictions with civilian emergency services are all voluntary and are not coordinated nationally to have dedicated resources to rapidly respond to catastrophes beyond their immediate region. In order to close this gap, federal grants could be given to local agencies to maintain resources and

personnel at the county level that are slated for mandatory, rapid response to catastrophes anywhere in the country.

Under this proposed program, participating agencies would receive equipment, such as firefighting or emergency medical apparatus, under the grants and would have first responders salaries supplemented for training. The equipment would be allowed for use on a daily basis by the local agency, but it would be legislatively mandated to respond to a catastrophe on short notice when requested. FEMA would then track all of the resources provided under the grants on a daily basis, similar to the military's Defense Readiness Reporting System (DRRS), using EMAC as its foundation. As a result, local jurisdictions would benefit from the use of federally funded equipment and the nation would have a definitive emergency services capacity for immediate response to national scale contingencies.

The evident gap between the federal, state, and local governments is well recognized in terms of catastrophe planning. Although this is a complex issue, many of the building blocks needed to successfully create a solution already exist. Using the criteria developed from the leading emergency management standards and adapting federal task force models would create a framework for intergovernmental collaboration. Structuring grants to provide incentives for state and local agencies to maintain resources that enhance national capabilities and capacities would increase the readily deployable inventory of emergency response resource for national catastrophes. Finally, continuing with the initiatives and partnerships the FEMA regional offices have developed to create catastrophe response plans, like those exemplified in the case studies, are essential to bridging the gap between state and local governments and their federal counterparts.

If collectively implemented, these recommendations will increase collaboration by bolstering relationships across all levels of government. Grant funded resources will be able to rapidly deploy to catastrophes and will mutually benefit the local region on a daily basis and the nation in time of a catastrophe. The fusion of local and federal emergency management professionals that follow the criteria established in this thesis will produce catastrophe response plans that are significant to all stakeholders' perspectives, needs,

and requirements. As a result, these proposals will merge hometown security with homeland security, resulting in a safer and more resilient nation.

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

I would first like to acknowledge J. Thomas Manger, chief of the Montgomery County, Maryland Department of Police, for his continued support of the Center of Homeland Defense and Security (CHDS) by allowing me and others from our agency to attend the master's program at a considerable expense in terms of time away and added strain to the department. It is evident that he believes that it will pay dividends in the development of future leaders and bring added value to our organization.

I would also like to extend my gratitude to all of the faculty and staff at the CHDS for their assistance—administratively, logistically, and of course, academically. Although I and the members of my cohort are all professionals in the field, we have graduated from the center with a greater understanding of the homeland security enterprise and how each of our small contributions to it collectively strengthens the resilience of the nation. This is not only because of the varied disciplines and experiences of each of the students but also due to the appreciation we gained of the differing perspectives provided by the many outstanding speakers and professors over the duration of the program.

I would especially like to thank John Rollins for his help in development of my thesis and Dr. Nadav Morag for refining it, ensuring I never compromised and that I met his high expectations. As a result, I hope my thesis defines standards and establishes a framework for the formation of intergovernmental catastrophe response plans and provides possible solutions to the issue of resource capacity, in addition to capability when responding to events of national significance.

Most importantly, I want to thank my wife and children who endured weeks without me during the in-residence portion of the program, and despite the many nights I was home, I essentially was still absent, doing “homework.” Without their support and understanding, I could not have achieved this long-standing personal goal and been a part of such an enriching experience surrounded by extraordinary people. It is because of the everyday sacrifices of families, such as mine, that homeland security practitioners are

able to prepare for, respond to, mitigate, and begin the recovery process for the crises that affect both our hometowns and our homeland.

DEDICATION

This paper is dedicated to Peggy Collins, PhD, my aunt, who supported me through the application process, the course work, and the initial development of my thesis. Unfortunately, she did not live to see its completion. I am grateful for the interest she showed, her counsel, and her encouragement. I have tried to model her examples of establishing and meeting personal goals and the importance of attaining higher education. I wish I could have shared the finished product with her, in person, but I know I have in spirit.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. BACKGROUND

Catastrophe preparedness in the United States faces a considerable disparity between local emergency response plans and those for catastrophes requiring a national response. There is a significant gap between federal strategic planning doctrine and local operational response capabilities and capacities in terms of catastrophe planning. Despite the improvements in emergency preparedness since September 11, 2001, problems between the various levels of government persist during large scale disasters, as was demonstrated during Hurricane Katrina and Super Storm Sandy.

Catastrophe response planning at the federal level has been mostly limited to a horizontal approach incorporating only federal agencies and departments. National planning has not integrated state and local first responders thus, excluding a significant portion of the emergency response resources and personnel. The numerous publications that make up the national response doctrine only offer strategic guidance and do not provide specific direction for developing operational plans or a structure to implement intergovernmental planning. Therefore, more needs to be done to synchronize federal and local catastrophe preparedness efforts in order to create meaningful and actionable response plans.

B. PROBLEM STATEMENT

Federal catastrophe response publications focus on strategic coordination through the use of frameworks and broad planning concepts, while state and local jurisdiction concentrate on the immediate operational needs of the crises that affect their communities on a daily basis. A gap is created by the competing priorities of these tiers of government and leaves the nation destined to repeat the failures of past intergovernmental catastrophe responses.

1. Catastrophe Preparedness at the Local Level

The main causes for the lack of intergovernmental synchronization in catastrophe planning are twofold. First, there is a lack of collaboration among the various levels of government. Emergency responders at the state and local levels often do not fully comprehend the magnitude of destruction, degradation of resources, and the complexity of challenges inherent in operating in a truly catastrophic environment. As a result, training and planning at the local level fails to prepare first responders for disasters of national significance. Conversely, the wealth of experience that local emergency response professionals bring to the table is often not incorporated into the national planning process. Therefore, plans such as the *National Response Framework* (NRF) and *Presidential Policy Directive-8* (PPD-8) remain strategic in nature and only provide conceptual guidance to local first responders.¹

2. Federal Preparedness

Second, current federal doctrine and practices are centered on strategic overviews and ambiguously assessed goals. There is an insufficient focus on translating these strategic concepts into a structure that incorporates operational necessities and emergency resource capacity into the overall national framework. The national catastrophe planning doctrine that is comprised of the multitude of federal publications, including the *National Preparedness Goal*,² the *National Response Plan*, and the succeeding *National Response Framework*,³ provide guidance as to core capabilities and mission areas. These publications fail to impart structures or processes for operational essentials such as differentiating priorities, designating logistics hubs, or calculating resource needs.

¹ “National Planning Frameworks,” Federal Emergency Management Agency, last modified March 19, 2015, <https://www.fema.gov/national-planning-frameworks>; White House, *Presidential Policy Directive 8-National Preparedness* (Washington, DC: White House, 2011), <http://www.dhs.gov/xlibrary/assets/presidential-policy-directive-8-national-preparedness.pdf>.

² U.S. Department of Homeland Security, *The National Preparedness Goal* (Washington, DC: U.S. Department of Homeland Security, 2011).

³ U.S. Department of Homeland Security, *National Response Framework* (Washington, DC: U.S. Department of Homeland Security, 2008).

This is fundamentally important to establish, particularly when the overwhelming numbers of civilian emergency response resources are maintained at the local level. In the words of former Federal Emergency Management Agency (FEMA) Administrator Michael Brown,

FEMA doesn't own fire trucks; we don't own ambulances; we don't own search-and-rescue equipment. In fact, the only search-and-rescue or emergency equipment that we own is a very small cadre to protect some property that we own around the country. FEMA is a coordinating agency. We are not a law enforcement agency.⁴

Furthermore, the Department of Homeland Security (DHS) does not have operational authority over these key local assets nor does it have a means to inventory or track them. The same issue is also a problem between federal agencies. According to Ithier, "Fundamentally, the federal government does not have a viable system for operational planning that provides a reasonable assurance that the departments and agencies have, and can provide the capabilities required during single or multiple national catastrophes."⁵

3. Systemic Problems

The fact that the nation has gone through several iterations of national strategic documents in a relatively short timeframe demonstrates that gaps still exist. It is even more concerning that a common operational planning component for catastrophe response has yet to be incorporated at the federal level. From the local perspective, many jurisdictions train for the threats and hazards they are likely to face, and they are limited by time and budgetary constraints. Therefore, it is difficult for local organizations to commit personnel to outside planning meetings for potential catastrophes, especially for ones that may never materialize. It is even more arduous for departments to deploy resources for extended periods to assist in catastrophe relief missions elsewhere in the country. This is because long term deployments limit the capacity of the deploying

⁴ "Former FEMA Director Testifies before Congress," *The New York Times*, September 27, 2005, sec. National / National Special, <http://www.nytimes.com/2005/09/27/national/nationalspecial/27text-brown.html>.

⁵ Jan Ithier, "Synchronizing Federal Operational Planning for National Catastrophes" (master's thesis, Naval Postgraduate School, 2010).

agency and requires it to shoulder the financial costs until it is reimbursed by the federal government months later.

As a result, national catastrophe planning lacks a cohesive framework that integrates the resources and experience of local first responders with the overall strategic vision offered in federal planning documents. This may be due in part to some local emergency practitioners' assumptions that "the feds" will immediately provide resources and/or will rapidly take command of a catastrophic incident. Thus, local emergency response agencies do not place much effort into planning for contingencies of this scale. A review of several state and local multiyear training and exercise programs (MYTEP) shows while they concentrate on the building blocks or core capabilities, they do not include exercises on a catastrophic level.⁶ History has shown the flaws of not discerning stakeholders' roles and expectations, as well as not building intergovernmental consortia prior to a catastrophe striking. Hurricanes Andrew, Hugo, and Katrina resonate as failures where there was little, if any, federal response in the initial hours, which left the depleted local authorities to manage as best as they could on their own.⁷

The fact remains that the bulk of federal assistance cannot mobilize quickly enough in the initial stages of a catastrophe. Also, current doctrine works under the

⁶ Federal Emergency Management Agency [FEMA] Region X, *Multi-Year Training and Exercise Plan, Fiscal Years 2013–2015: Federal Emergency Management Agency Region X* (Federal Emergency Management Agency, Region X, October 2012); http://www.ak-prepared.com/Preparedness/Training/Documents/Final_RX_MYTEP_2012.pdf; Utah Division of Homeland Security, *Multi-Year Training and Exercise Plan: Utah Department of Public Safety, Division of Homeland Security* (Salt Lake City, UT: Utah Division of Homeland Security, 2010), http://dem.utah.gov/wp-content/uploads/sites/18/2015/02/Utah_MYTEP_Final2011-2013rev1.pdf; Nebraska Emergency Management Agency, and Federal Emergency Management Agency [FEMA] Region VII, *Nebraska Multi-Year Training and Exercise Plan 2012–2015 (MYTEP)* (Washington, DC: Nebraska Emergency Management Agency, and Federal Emergency Management Agency Region VII, 2011), http://www.nema.ne.gov/pdf/training/mytep_19dec11.pdf; State of Florida, Division of Emergency Management, *State of Florida, Division of Emergency Management (FDEM) 2013–2015 Multi-Year Training and Exercise Plan (MYTEP)* (Tallahassee, FL: State of Florida, Division of Emergency Management, 2013); Maryland Emergency Management Agency, *State of Maryland 2015–2016 Multi-Year Training and Exercise Plan* (Reisterstown, MD: Maryland Emergency Management Agency, 2015), <https://news.maryland.gov/mema/wp-content/uploads/sites/7/2015/01/2015-2016-Multi-Year-Training-and-Exercise-Plan-Approved.pdf>; Washington Military Department, Emergency Management Division, *State of Washington, 2013–2015 Training and Exercise Plan* (Camp Murray, WA: Washington Military Department, Emergency Management Division, 2012).

⁷ Daniel Franklin, "The FEMA Phoenix," *Washington Monthly*, July 2005, <http://www.washingtonmonthly.com/features/2005/0509.franklin.html>.

assumption that state and local personnel and assets will primarily have to manage an incident for at least the first 72 hours until federally owned or coordinated resources arrive.⁸ Additionally, not all jurisdictions know in advance how to integrate both their operations and resources for a smooth transition to a joint effort.

In a true catastrophe, a coordinated response from across the country will be needed to obtain sufficient resources to manage the resulting devastation and sustain basic human needs. It is important for state and local officials to remember that National Guard units from all 50 states, three territories, and the District of Columbia all responded and provided assistance to the regions affected by Hurricane Katrina.⁹ Therefore, even if a jurisdiction cannot foresee a natural catastrophic event occurring in its immediate vicinity, the states, at a minimum, must be prepared to send resources from their National Guard cadres.

States and other jurisdictions that will send personnel to catastrophes outside their regular areas of operation must not only prepare and train their personnel for the differing operations inherent to a catastrophe zone but also how they fit in the overall national organizational structure prior to arriving in a disaster zone. Having a working understanding of the National Incident Management System (NIMS) and Incident Command System (ICS) are the minimum training standards needed to operating at a national level. National catastrophe response planning helps prevent self-deployment of units, duplication of effort, and counter productivity.

C. RESEARCH QUESTIONS

Most jurisdictions will never have to face a major catastrophe in their communities. However, with the ever present threat of terrorism and extreme weather patterns, many of the nation's densely populated urban areas have a greater potential than ever to face a catastrophic event. International planning frameworks may present

⁸ "FEMA Funding the First 72 Hours," *Homeland Security Today*, June 30, 2006, <http://www.hstoday.us/channels/fema/single-article-page/funding-the-first-72-hours/07ac4288d2ecbc6f995722cc8034c088.html>, 1.

⁹ James A. Wombwell, *Army Support during the Hurricane Katrina Disaster*, Occasional Paper 29 (Fort Leavenworth, KS: Combat Studies Institute, 2009), <http://usacac.army.mil/cac2/cgsc/car1/download/csipubs/wombwell.pdf>, iii.

potential for the United States to prepare for catastrophes. Additionally, some regions of the country that cope with the threat of impending, large-scale, natural disasters or are more likely to be targeted by terrorists using weapons of mass-destruction, have established plans that meet established criteria from the leading emergency management standards.

1. Primary Questions

Are there examples of well-developed, synchronized, catastrophe response plans that have integrated the operational response requirements of state and local emergency practitioners and the strategic needs of the federal government?

What criteria can be used to validate or create catastrophe response plans?

2. Secondary Question

What processes assist in the development of well-coordinated, intergovernmental, catastrophe response plans?

D. METHODOLOGY

Research found the New Zealand Ministry of Civil Defence Emergency Management's CDEM groups provide a planning framework that emphasizes synchronization between the various tiers of government that can be adapted for use in the United States. One of California's regional catastrophic earthquake plans and a plan to respond to the detonation of an improvised nuclear device in Chicago provide the case studies for the thesis. These plans are then compared to the leading government, professional, academic, and emergency management standards.

1. Overview

The thesis uses a combination of the case study and comparative analysis methods to evaluate exemplars of collaborative intergovernmental processes and jointly developed operational plans that have potential for improving integration and effectiveness of national responses to catastrophes. While researching examples to support the original hypothesis that there is a gap between the various levels of government in national

catastrophe planning, several examples of well developed, intergovernmental plans were discovered. As a result, the case study method was selected to present these examples of robust domestic catastrophe response plans that were designed to meet the mutual needs of federal strategic goals and local operational considerations.

Research of alternative international emergency management models revealed a comparative study from New Zealand. New Zealand's Ministry of Civil Defense and Emergency Management's (MCDEM) structure legislatively mandates the incorporation of regions into the national planning framework.¹⁰ Although it is legally compulsory, New Zealand's regions provide the majority of input for the MCDEM national plan that establishes the foundation of the central government's plan. The mutual process that New Zealand uses has some correlations to the United States' national planning process that can be adapted to the American federalist system by adapting models from other disciplines that incentivize federal and local collaboration.

The New Zealand comparative analysis presents a framework that encourages a "bottoms up," collaborative approach between the various levels of government. Whereas the domestic case studies of response plans are exemplars of the latest criteria from the emergency management field. Together, the comparative analysis of New Zealand's Civil Defense and Emergency Management (CDEM) system and the American case studies provide models for other regions to emulate and adapt for their unique circumstances. An overview of each follows.

2. New Zealand Civil Defense and Emergency Management Framework

New Zealand's Ministry of Civil Defense and Emergency Management (MCDEM) has a legislatively designed framework that mandates the participation and coordination of the central and regional governments in developing catastrophe response plans. The foundation of the New Zealand model is the CDEM group that integrates executives from the emergency services, senior elected officials from the regional and

¹⁰ New Zealand Parliamentary Counsel Office, "Civil Defence Emergency Management Act 2002," 2002, <http://www.legislation.govt.nz/act/public/2002/0033/latest/DLM149789.html>.

local governments, and members of the health community.¹¹ The members of the CDEM group have planning, preparedness, and operational responsibilities. Each CDEM group is charged with developing a group plan that begins as a locally developed plan that must be socialized throughout the region's communities to receive input about their level of risk tolerance and priorities. Additionally, a group's plan must be able to acquire the resources to support its plan. Once the regional plan has been finalized, it is forwarded the MCDEM to be integrated into the national plan.

The New Zealand comparative study was derived from an analysis of academic reviews, online publications from the MCDEM, and legislation from New Zealand's parliament. These include the CDEM act and the CDEM plan. Critiques of the New Zealand CDEM model's effectiveness during the 2011, magnitude 6.3, Christchurch earthquake were drawn from government inquiries, academic sources, and media accounts covering the event.

The New Zealand model was chosen after reviews of literature of other international emergency management models. Although New Zealand has a centrist form of government and national police and fire services, it surprisingly does not have a "top down" catastrophe planning framework. Furthermore, New Zealand's approach to catastrophe response planning meets many of the criteria that are discussed later in the thesis as measures for the merging of national and local interests. The New Zealand comparison provides a template that can be adapted to fit within American constitutional parameters to foster joint efforts between federal emergency management planners and first responders at the state and local levels.

¹¹ Ibid., 22.

3. Southern California Catastrophic Earthquake Response Plan

The Southern California Catastrophic Earthquake Response Plan is one of three plans developed by the California Emergency Management Agency¹² (CalEMA) for the state's most impacted earthquake prone zones. The plan was produced in conjunction with the FEMA Region IX office and stakeholders from the various levels of government, non-government organizations, and the private sector—particularly those entities that own and maintain vital critical infrastructure.

The more extensive For Official Use Only version (FOUO) is a sizeable 612 pages but covers the greater Los Angeles area including the eight surrounding counties. The plan is heavily infused with data that was used to develop a detailed assessment of the physical damage and human toll that is expected from a large magnitude earthquake. More importantly, from an emergency management standpoint, the plan correlates the number of available response resources to metrics, such as the predicated number of casualties, buildings damaged, tons of debris, etc. This allows for the region to identify shortfalls in resources and to collectively develop means to fill those gaps. The plan's use of geographic information systems (GIS) to calculate data sets of the specific effects of earthquake magnitude, population, and building density resulted in the identification of priority response areas (PRA). Because greater Los Angeles is one of the country's largest regions, the plan can easily be adapted to meet the needs of the nation's other metropolitan areas or can also be scaled down for smaller sized jurisdictions.

The plan's Unified Coordination Group (UCG) provides a model of intergovernmental coordination, integrating both federal and state officials into the response plan's command structure. The significant amount of critical data and the analysis conducted are relevant to the strategic goals of the federal government and the immediate operational needs of local first responders. The plan has eliminated many of

¹² The agency is currently the California Governor's Office of Emergency Services (CalOES) and is the organizational name used on some of the state's other response plans. Federal Emergency Management Agency [FEMA] Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*, 2010, [http://www.caloes.ca.gov/PlanningPreparednessSite/Documents/SoCalCatastrophicConops\(Public\)2010.pdf](http://www.caloes.ca.gov/PlanningPreparednessSite/Documents/SoCalCatastrophicConops(Public)2010.pdf).

the obstacles that can hinder interoperability, providing a number of smart practices that can be implemented elsewhere. Furthermore, it meets all of the established evaluative criteria from the various emergency management sources.

4. Integrated Improvised Nuclear Device Plan: City of Chicago, County of Cook, State of Illinois, and FEMA Region V

The Integrated Improvised Nuclear Device Plan: City of Chicago, County of Cook, State of Illinois, and FEMA Region V revolves around a data-based scenario involving the detonation of an improvised nuclear device (IND) in Chicago.¹³ The plan combines the expertise of federal, state, and local practitioners to create a consortium of emergency responders of all levels of government. The “base plan” section provides a strategic overview of an IND detonation and provides geographic and scientific data that predict the resulting conditions. However, the plan’s keystone is a functional “execution checklist” annex. It is designed to help initiate and sustain operations at even the lowest level of government. The execution checklist presents chronologically listed actions that were developed and agreed upon by federal and local stakeholders. This format is markedly different from the southern California plan, thus offering an alternative option for other jurisdictions that are considering developing their own plan.

The plan was selected because the unique effects of an IND detonation in one of the largest metropolitan areas in the country will automatically necessitate the involvement of specialized federal resources to assist local responders. Due to the far reaching hazards of the associated radioactive fallout, multiple states also contributed to the plan. The plan presents a patent merger of federal strategic expertise and practical local operational necessities. It also meets the most widely accepted criteria and standards used throughout the emergency management community.

¹³ Federal Emergency Response Agency [FEMA] Region V, *Integrated Improvised Nuclear Device Response Plan City of Chicago, County of Cook, State of Illinois and FEMA Region V* (Washington, DC Federal Emergency Response Agency Region V, 2012).

II. LITERATURE REVIEW

A. OVERVIEW

There is no shortage of literature on catastrophe preparedness, the gaps in U.S. national response planning, and suggested solutions or policy changes to close them. The bulk of the literature on the subject comes from federal government sources but also includes contributions from public policy groups and academic sources. There are numerous sources citing the faults in the national preparedness system and the lack of coordination among federal agencies. Among these are the 9/11 and Gilmore Commission's reports, the Post-Katrina Emergency Management Reform Act (PKEMRA), and the Center for Strategic and International Studies report, *Managing the Next Domestic Catastrophe: Ready (or Not)?* Some of the literature also emphasizes the importance of the private sector and non-government organizations in national catastrophe response efforts. However, there are few if any that focus on the synchronization, or lack thereof, between the federal, state, and local tiers of government.

The literature also covers the United States' overall preparedness strategy and the way that it is structured. The literature also discusses the faults in the national preparedness framework, policies, and recommendations for improving them. No literature could be found praising the overall national catastrophe response doctrine. At best, there were some objective reports from the Congressional Research Service (CRS) and Government Accounting Office (GAO) that provided objective overviews but still provided recommendations for improvement. However, there are a few frameworks and actual response plans that serve as excellent models of intergovernmental collaborations from domestic or international sources. Those well-developed plans that do exist succeed in incorporating the measures of several established emergency management organizations.

These detailed, coordinated contingency plans were developed jointly by regional stakeholders who play operational roles in the response and recovery of catastrophic events. Case studies of a select number of these existing plans and their potential for

positively shaping future national catastrophic response include the *Southern California Catastrophic Earthquake Plan*¹⁴ and the *Integrated Improvised Nuclear Device Response Plan City of Chicago, County of Cook, State of Illinois and FEMA Region V*.¹⁵

Other recommendations found in the literature to help coordinate catastrophic event planning are the establishment of a National Center for Catastrophe Planning called for in Jan P. Ithier's thesis, "Synchronizing Federal Operational Planning for National Catastrophes"¹⁶ and expanding the current voluntarily accreditation program run by the Emergency Management Accreditation Program and linking it to grant funding. This approach was endorsed by Dr. Sharon Caudle in her testimony before the House Committee on Homeland Security, Subcommittee on Oversight, Investigations, and Management¹⁷ and Judson Freed in his thesis "No Failure of Imagination: Examining Foundational Flaws in America's Homeland Security Enterprise."¹⁸

The literature reviewed fits into several categories:

- Sources that identify strategic threats and hazards
- Examples of collaborative catastrophe response plans
- Strategic approaches to catastrophe planning
- Literature regarding international approaches
- Evaluative criteria for catastrophe response plans
- Case studies of exemplary catastrophe response plans
- Executive branch documents
- Other federal government publications
- Literature from academic sources and public policy groups

¹⁴ FEMA Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*.

¹⁵ FEMA Region V, *Integrated Improvised Nuclear Device Response Plan*.

¹⁶ Ithier, "Synchronizing Federal Operational Planning for National Catastrophes."

¹⁷ *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats, Statement before the House Committee on Homeland Security, Subcommittee on Oversight, Investigations and Management*, 114th Cong. (2012), (statement of Sharon L. Caudle), <http://homeland.house.gov/sites/homeland.house.gov/files/Testimony%20Caudle.pdf>.

¹⁸ Judson M. Freed, "No Failure of Imagination: Examining Foundational Flaws in America's Homeland Security Enterprise" (master's thesis, Naval Postgraduate School, 2011).

This varied selection of literature provides a comprehensive overview of evaluation of intergovernmental collaboration. The sources provide a good foundation for an analysis of homeland security catastrophe response plans that support the recommendations and conclusions of the thesis. The categories of literature outlined in the following sections.

1. Sources that Identify Strategic Threats and Hazards

Research for this thesis was in-part, initially focused on what the perceived strategic threats and probable catastrophic events that the United States will encounter in the future. There is ample literature on this topic from a variety of sources. Therefore, the review process initially focused on the primary open source documents that consist of the federal government's open source overviews of the intelligence, defense, and homeland security communities. These include the quadrennial reviews of the Departments of Defense (DOD) and Homeland Security (DHS), and the Director of National Intelligence's (DNI) *Statement of Record, Worldwide Threat Assessment of the U.S. Intelligence Community, Senate Select Committee on Intelligence*. Among these three communities, there is a lack of unanimity on all of the perceived threats the nation faces; however, each of these reports cited the following common threats:

1. Cyber-attack/espionage
2. Terrorism
3. Weapons of mass destruction (WMD) and chemical, biological, radiological, nuclear and explosive (CBERNE) attack
4. Infectious disease
5. Natural resource (energy) scarcity/security.

Noticeably absent from these five shared threats to the nation is any mention of natural disasters. However, DHS's *2010 Homeland Security Quadrennial Review*¹⁹ does discuss natural disasters, major accidents, and pandemics as well as the 2010 DOD

¹⁹ U.S. Department of Homeland Security, *Quadrennial Homeland Security Review Report* (Washington, DC: U.S. Department of Homeland Security, 2010), <http://www.dhs.gov/sites/default/files/publications/2010-qhsr-report.pdf>.

report²⁰ devotes some attention to the military's responsibilities during a national catastrophe. Other sources concentrate on specific natural occurring, large scale catastrophes such as space weather, particularly solar flares that can generate electromagnetic pulses (EMP) as outlined in the Lloyd's report *Space Weather: Its Impact on Earth and Implications for Business*.²¹ In addition to the well documented potential for catastrophic earthquakes in southern California and the Bay Area, numerous sources examine the potential effects of other significant looming earthquakes such as the one predicted to occur along the New Madrid seismic zone²² and the Cascadia subduction zone along the northwest Pacific coast.²³ An earthquake along the Cascadia fault lines would be compounded because, like recent events in Japan, it would also trigger a tsunami along the United States' and Canada's Pacific coasts.²⁴

Other documents from private policy organizations attempt to predict the most significant threats to the United States over longer periods. These include *2025 Global Trends*²⁵ and *2030 Global Trends*,²⁶ both published by the National Intelligence Council. These differ from the government written reports in that they also go into depth about non-traditional and slow onset or emerging threats, including the effects of global

²⁰ U.S. Department of Defense, *Quadrennial Defense Review* (Washington, DC: Department of Defense, 2010), http://www.defense.gov/QDR/images/QDR_as_of_12Feb10_1000.pdf.

²¹ Mike Hapgood, *Space Weather: Its Impact on Earth and Implications for Business* (London: Lloyd's, 2010), http://www.lloyds.com/~media/lloyds/reports/360/360%20space%20weather/7311_lloyds_360_space%20weather_03.pdf#search=%27space%20weather%27

²² "FEMA Region 6 NMSZ Planning Brief," Power Point, July 14, 2011, <http://gohsep.la.gov/agencyrelated/exercises/LANMSZBrief14Jul2011.pdf>.

²³ Oregon Military Department, Office of Emergency Management, *State of Oregon Cascadia Subduction Zone Catastrophic Earthquake and Tsunami Operations Plan* (Salem, OR: Oregon Military Department, Office of Emergency Management, 2010), http://www.oregon.gov/OMD/OEM/plans_train/docs/CSZ/1_csz_plan_final.pdf.

²⁴ Ibid.

²⁵ National Intelligence Council, *Global Trends 2025: A Transformed World* (Washington, DC: National Intelligence Council, 2008), http://www.dni.gov/nic/PDF_2025/2025_Global_Trends_Final_Report.pdf.

²⁶ National Intelligence Council, *Global Trends 2030: Alternative Worlds* (Washington, DC: National Intelligence Council, 2012), <https://publicintelligence.net/global-trends-2030/>.

warming and population growth as well as the strengthening of transnational criminal organizations.²⁷

Other major weather events, such as hurricanes and tornados, are also prominently represented in the literature. Hurricane Katrina appears most frequently, not only due to its intensity and level of destruction but also because of the failure of coordination at all levels of government to sufficiently respond to its devastating aftermath. The response to Hurricane Katrina is often cited as the prime example that demonstrates that the nation is still not prepared and has significant hurdles to overcome in its catastrophe response planning and execution.²⁸ Congressional hearings on this momentous incident led to even further reforms and more legislation culminated in the Post-Katrina Emergency Management Reform Act of 2006 (PKERA).²⁹ However, this bill also fails to provide mechanisms that create the necessary operational components to create effective catastrophe response plans.

2. Examples of Collaborative Catastrophe Response Plans

Response methods to particular natural and man-caused catastrophic events, such as hurricanes, tsunamis, improvised nuclear devices, and pandemics, are analyzed throughout the literature. Further analysis reveals that in states and/or regions where natural disasters are an eventuality rather than a possibility, the depth and level of planning is much more detailed and coordinated. California's three catastrophic response

²⁷ National Intelligence Council, *Global Trends 2025*, 18, 51, 63; National Intelligence Council, *Global Trends 2030*, 30.

²⁸ Christine E. Wormuth, and Anne Witkowski, *Managing the Next Domestic Catastrophe: Ready (or Not)?: A Beyond Goldwater-Nichols Phase 4 Report* (Washington, DC: CSIS Press, 2008), vi.

²⁹ "Post-Katrina Emergency Management Reform Act of 2006 (2006 - S. 3721)," accessed January 5, 2015, <https://www.govtrack.us/congress/bills/109/s3721>.

plans for their most susceptible earthquake prone areas: southern California (greater Los Angeles)³⁰ the San Francisco Bay Area,³¹ and Cascadia³² are all exceedingly well done and are products of the combined efforts of practitioners from local, state, and federal governments as well as other entities such as utility operators and non-profit organizations.

Other catastrophe response plans were reviewed, including ones for the multi-state earthquake prone region centered on the New Madrid seismic zone (NMSZ).³³ Elements of the NMSZ are extremely detailed. Some of the planning includes the preferable placement of resources, such as shipping containers and temporary housing at regional airfields.³⁴ Having a plan developed to this level of detail saves time and optimizes the space and efficiency for getting critical assets into limited, vital spaces. When possible, emergency management agencies should strive to achieve this level of planning.

The state of Oregon's response plan for an earthquake along the Cascadia subduction zone also includes actions to be taken for the resulting tsunami that will occur.³⁵ Predicting which evacuation routes will most likely be unusable based on the scientific analysis of tsunamis allows for alternative egress routes to be identified and communicated to public in advance of this inevitable, no notice event. The use of

³⁰ FEMA Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*.

³¹ U.S. Department of Homeland Security, Federal Emergency Management Agency Region IX, and California Governor's Office of Emergency Services, *San Francisco Bay Area Earthquake Readiness Response: Concept of Operations Plan* (U.S. Department of Homeland Security, Federal Emergency Management Agency Region IX, and the California Governor's Office of Emergency Services, 2008), <http://www.calema.ca.gov/PlanningandPreparedness/Pages/Catastrophic-Planning.aspx>.

³² U.S. Department of Homeland Security, Federal Emergency Management Agency [FEMA] Region IX, and California Governor's Office of Emergency Services, *California Cascadia Subduction Zone Earthquake and Tsunami Response Plan* (U.S. Department of Homeland Security, Federal Emergency Management Agency Region IX, and California Governor's Office of Emergency Services, 2013), <http://www.calema.ca.gov/PlanningandPreparedness/Pages/Catastrophic-Planning.aspx>.

³³ State of Missouri, and Federal Emergency Management Agency, Region VII, *New Madrid Seismic Zone Joint Missouri Response Operations Plan* (State of Missouri, and Federal Emergency Management Agency Region VII, 2011), <https://www.llis.dhs.gov/sites/default/files/NewMadridSeismicZonePlan.pdf>.

³⁴ "FEMA Region 6 NMSZ Planning Brief."

³⁵ Oregon Military Department, *State of Oregon Cascadia Subduction Zone*.

scientific, and evidence based data should be a fundamental element of any catastrophe response plan.

The NMSZ and Oregon plans also were developed with the input of federal, state, and other local stakeholders. Having members from across the spectrum of the different levels of government is important as it helps in establishing expectations and responsibilities. Partnering with the private sector, particularly those who own and/or control critical infrastructure, insures priorities are maximized for the re-establishment of life sustaining utilities. All of these steps assist in synchronizing operations during the critical hours immediately following a catastrophe.

3. Strategic Approaches to Catastrophe Planning

Additional literature concentrates on the broader “whole of government” or “whole of community” response strategies.³⁶ These reports attempt to analyze the best method for developing a strategic homeland security policy. Different models include the capabilities based, the worst case or “meta-scenario” based, and threat based strategies.³⁷ Current FEMA Administrator Craig Fugate is making a push toward a blended approach. This is being accomplished by defining the core capabilities that are essential to mitigating almost all catastrophes. At the same time, FEMA has developed the meta-scenario and its associated benchmarks, which have created an understanding of the magnitude of devastation and the capacity of resources and personnel needed to provide for survivors and manage secondary hazards.

4. Literature Regarding International Approaches

There is also a body of literature from foreign countries’ efforts in this arena that provide comparative lessons for the United States. Dr. Nadav Morag’s textbook, *Comparative Homeland Security: Global Lessons*,³⁸ and FEMA’s online comparative

³⁶ *Evolution of Emergency Management and Communication, before the U.S. Senate Committee on Appropriations, Subcommittee on Homeland Security*, 112th Cong. (2011) (statement of Craig Fugate, Administrator of the Federal Emergency Management Agency), 2.

³⁷ *Ibid.*, 5.

³⁸ Nadav Morag, *Comparative Homeland Security: Global Lessons*, 1st ed. (Hoboken, NJ: Wiley, 2011).

emergency management (EM) book collection³⁹ on various nations' homeland security structures provide detailed overviews in comparison to the United States'. The Australian and British systems are most similar to the American system. While the New Zealand model is not as close in contrast, it does offer valuable lessons that could be adapted and implemented in the United States.

Despite New Zealand's centrist form of national government, it provides an innovated example of a locally formed basis for catastrophe response planning that legislatively mandates the inclusion of regions and local authorities in national planning. New Zealand's Civil Defence Emergency Management (CDEM) Act⁴⁰ is the legal foundation which the National CDEM Plan⁴¹ is built upon. The establishment of CDEM groups at the regional level is delineated within both the CDEM Act and CDEM plan and is the core mechanism that drives the New Zealand model.

While the United States federalist structure of government does not lend itself to a direct adoption of the New Zealand centralist model, there are other ways the CDEM system could be modified into the United States' catastrophe planning architecture. This thesis presents an overview of the New Zealand CDEM structure and recommendations for adaptation in the American emergency management structure.

5. Evaluative Criteria for Catastrophe Response Plans

There are several recognized sources in the emergency management field that have established standards and/or criteria to evaluate emergency response plans. These can be adapted to critique large scale catastrophe response plans. Those criteria established by the DHS⁴² and the University of Delaware's Disaster Research Center

³⁹ David A. McEntire, ed., *Comparative Emergency Management: Understanding Disaster Policies, Organizations, and Initiatives from Around the World* (Washington, DC: Federal Emergency Management Agency), <https://training.fema.gov/hiedu/comparative%20em%20book%20-%20introduction%20chapter.doc>

⁴⁰ Civil Defence Emergency Management Plan 2002 (2002) [New Zealand], <http://www.legislation.govt.nz/act/public/2002/0033/latest/DLM149789.html?src=qs>.

⁴¹ Ibid.

⁴² U.S. Department of Homeland Security, *The National Preparedness Goal*; Federal Emergency Management Agency, *The Comprehensive Preparedness Guide 101*, version 2.0 (Washington, DC: Federal Emergency Management Agency, 2010).

(DRC)⁴³ specifically outline measures for catastrophe response plans. *The National Fire Prevention Association 1600, Disaster/Emergency Management and Business Continuity Programs*⁴⁴ and *the Emergency Management Accreditation Program (EMAP) Standard*⁴⁵ are the primary documents of nonprofit organizations that have developed criteria for emergency planning and plans. In the academic realm, Dr. Enricho L. Quarantelli of the DRC has conducted extensive research on the criteria of good disaster planning and has concluded that there are 10 general principles of good disaster planning.⁴⁶

Government sources that provide planning guidance and have developed measures include DHS's *2008 National Response Framework* (NRF)⁴⁷ and FEMA's *Comprehensive Planning Guide (CPG) 101* (version 2.0). The CPG is a derivative of the 2008 NRF and is dedicated to catastrophe response and vertical intergovernmental planning. Both share some common criteria for evaluating response plans specific to large scale public planning.

The literature for providing measures for evaluating emergency and catastrophe response plans is balanced as it comes from a variety of disciplines, including academia, non-profit organizations, and the federal government. The criteria from each source can be analyzed against the others to find commonalities, correlations, and differences between them to develop a core set of measures to evaluate the case studies presented later in the thesis and response plans in general.

⁴³ Enricho L. Quarantelli, *Research Based Criteria for Evaluating Disaster Planning and Managing* (Newark, DE: University of Delaware, 1997), http://www.nifv.nl/upload/179144_668_1168610952796-quarantelli-1998.pdf.

⁴⁴ National Fire Protection Association, *NFPA 1600, Standard on Disaster/emergency Management and Business Continuity Programs* (Quincy, MA: National Fire Protection Association, 2013).

⁴⁵ Emergency Management Accreditation Program [EMAP], *The Emergency Management Standard* (Lexington, KY: The Emergency Management Accreditation Program, 2013), <http://www.emaponline.org/>.

⁴⁶ Quarantelli, *Research Based Criteria for Evaluating Disaster*.

⁴⁷ U.S. Department of Homeland Security, *National Response Framework* (2008).

6. Case Studies

There are also domestic case studies from the United States that detail well-coordinated and synchronized catastrophe response plans between local, state, and federal agencies. These can serve as a good basis for other regional partnerships to emulate or to form a national standard. As previously stated, the literature shows that those regions that face the prospect of a naturally occurring catastrophic event as an eventuality, rather than a possibility, tend to have well established, detailed plans.

The state of California is an excellent example of this because of the three earthquake prone zones within its borders. Of the plans for these three regions, the *Southern California Catastrophic Earthquake Plan*⁴⁸ was selected for inclusion as a case study in the thesis. In addition to being a detailed collaborative plan, it was selected as a case study, because of the sizeable geographic area and population it covers. The plan's data driven assumptions and operational models could be used to address any emergency incident or large scale disaster. Accordingly, it provides examples in both planning and coordination for other jurisdictions across the country to follow.

The FEMA Region V office has developed a catastrophe response plan for the less geographically fixed, manmade threat of a detonation of an Improvised Nuclear Device (IND) in conjunction with the City of Chicago, Cook County, and the State of Illinois.⁴⁹ This plan also included private sector entities and non-government organizations in the planning process and also incorporated them into the operational response portion of the plan. This plan has a detailed execution checklist as an appendix to the base plan. The execution checklist is an innovative matrix that chronologically lists essential tasks that must be completed over the first 72 hours after the detonation of an IND. While specific to Chicago, the plan itself can be adapted to an IND detonation in another metropolitan region or the methodology of the comprehensive checklist matrix can be customized to another hazard.

⁴⁸ FEMA Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*.

⁴⁹ FEMA Region V, *Integrated Improvised Nuclear Device Response Plan*.

7. Executive Branch Documents

The President of the United States has developed a national catastrophe preparedness strategy through the issuance of several executive orders and other documents issued through the Department of Homeland Security (DHS). The executive orders span several administrations beginning with President Franklin Roosevelt's issuance of Executive Order 8757 establishing the Office of Emergency Management within the Office of the President in 1941.⁵⁰ President Jimmy Carter established the Federal Emergency Management Agency (FEMA) combining disparate agencies from various federal departments through executive order. The Department of Homeland Security (DHS) was similarly formed by President George W. Bush.

After the unprecedented attacks of September 11, 2001, executive orders specific to homeland security were distinguished from other executive orders. Under the George W. Bush administration, these were issued as homeland security presidential directives (HSPDs), and under the Obama administration, these evolved into presidential policy directive's (PPDs).⁵¹ Like the presidential orders or directives before them, the PPDs established executive branch offices and mandates that only have authority over federal agencies. State and local jurisdictions remain unaffected by presidential executive orders.

8. Other Federal Government Publications

The government produced literature on national catastrophe preparedness is not limited to the executive branch. A new set of documents related to homeland security encompassing catastrophe preparedness were developed as a result of the formation of the DHS. Collectively, they form the federal doctrine for national preparedness. Among these strategy documents are the *National Preparedness Goal*, the *National Preparedness Report*, the *National Preparedness Plan*, and the national preparedness frameworks. Yet,

⁵⁰ John Woolley, and Gerhard Peters, "Franklin D. Roosevelt, XXXII President of the United States: 1933–1945. 52—Executive Order 8757 Establishing the Office of Civilian Defense. May 20, 1941," American Presidency Project, accessed May 17, 2014, <http://www.presidency.ucsb.edu/ws/index.php?pid=16117>.

⁵¹ Jared T. Brown, *Presidential Policy Directive 8 and the National Preparedness System: Background and Issues for Congress* (Washington, DC: Congressional Research Service, 2011), <http://fas.org/.sgp/crs/homesecc/R42073.pdf>, 9.

all of these volumes continue to state strategic goals but do little in terms of operational direction.

Congress has also addressed this issue through hearings, investigative reports and legislation. Testimony reviewed from various House and Senate committees include topics such as *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats*,⁵² *How Prepared is the National Capital Region for the Next Disaster*,⁵³ *A Failure of Initiative: The Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina*,⁵⁴ and Senator Tom Coburn's widely circulated report, *Safety at Any Price: Assessing the Impact of Homeland Security Spending on U.S. Cities*.⁵⁵

The GAO and the CRS each have produced numerous reports regarding the topic as well. Jared T. Brown an analyst in emergency management and homeland security policy for the CRS has produced numerous reports researching the impact and effectiveness of federal policies. An example is *Presidential Policy Directive 8 and the National Preparedness System: Background and Issues for Congress*.⁵⁶ Dr. Sharon Caudle, who was formally with the GAO and is a past professor at the George Washington and Texas A&M Universities, has written extensively on the topic.⁵⁷ Much of Dr. Caudle's research and recommendations center around capabilities based planning, a concept originally developed by the Department of Defense (DOD) as the basis for its

⁵² *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*

⁵³ *How Prepared Is the National Capital Region for the Next Disaster? Hearing Before the Subcommittee on Emergency Management, Intergovernmental Relations, and the District of Columbia of the Committee on Homeland Security and Governmental Affairs United States Senate, 113th Cong.* (2013), <http://www.hsgac.senate.gov/subcommittees/emdc/hearings/how-prepared-is-the-national-capital-region-for-the-next-disaster>.

⁵⁴ *Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, A Failure of Initiative: Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina* (Washington, DC: U.S. Government Printing Office, 2006), http://katrina.house.gov/full_katrina_report.htm.

⁵⁵ Tom Coburn, *Safety at Any Price: Assessing the Impact of Homeland Security Spending in U.S. Cities* (Washington, DC: Homeland Security and Governmental Affairs Committee, 2012), <https://info.publicintelligence.net/SenatorCoburn-UASI.pdf>.

⁵⁶ Brown, *Presidential Policy Directive 8 and the National Preparedness System*.

⁵⁷ "Senior Fellows/Sharon Caudle," George Washington University.

strategy development. Dr. Caudle's work also questions the effectiveness of national level exercises (NLE) run by DHS and of the concept of setting a standard criteria across the country based on a national scale worst case scenario as FEMA has recently adopted.

9. Literature from Academic Sources and Public Policy Groups

Literature from think tanks, such as the Council on Foreign Relations' *Emergency Responders: Drastically Underfunded, Dangerously Unprepared*,⁵⁸ government reports and even legislation concentrate on the lack of synergy between the federal components of government. Some of the literature criticizes the nation's level of preparedness while at the same time presenting potential solutions. The work of Christine E. Wormuth and Anne Witkowski on behalf of the Center for Strategic and International Studies, entitled *Managing the Next Domestic Catastrophe: Ready (or Not)?*,⁵⁹ is an excellent resource that analyzes the root causes behind the gap in catastrophe preparedness while offering recommendations to improve readiness across the federal system.

10. Assessment of the Literature

The literature does agree on the need for greater collaboration both horizontally at the federal level and vertically across the federal, state, and local levels. Much of the literature points to a consensus that a national strategy or doctrine exists. However, the literature almost universally expresses a need to create a comprehensive approach towards building a national operational catastrophe response capacity. Very little literature deals directly with the relationship between the local and federal governments in specific terms on the subject of national catastrophe response planning. In his thesis, Ithier mentions the need for further research on the topic of integrating catastrophe response across the different levels of government.⁶⁰ His focus on the barriers between federal interagency coordination and cooperation suggests that if there is not a unity of

⁵⁸ Jamie Frederic Metzler, Warren B. Rudman, and Richard A. Clarke, *Emergency Responders: Drastically Underfunded, Dangerously Unprepared: Report of an Independent Task Force Sponsored by the Council on Foreign Relations* (New York: Council on Foreign Relations, 2003).

⁵⁹ Wormuth, and Witkowski, *Managing the Next Domestic Catastrophe*.

⁶⁰ Ithier, "Synchronizing Federal Operational Planning for National Catastrophes," 97.

effort at the federal level; then there should be even greater concern for interoperability between the other independent levels of government.

The majority of the reform recommendations by Wormuth and Witkowsky are also targeted toward the federal agencies and some that will have an impact at the state and local level.⁶¹ The review conducted to date by this author has found Freed's thesis to be the only source written from the state or local perspective on this issue.⁶² The void in the literature from this standpoint alone is further evidence that there is a significant problem in our national catastrophe response strategy that needs solutions to address it.

National preparedness doctrine has constantly evolved to address the pressing threats facing the country. Although arguably centered on terrorism, the current status of national policies are attempting to have an all-hazards focus. While the contemporary version provides all tiers of government more guidance and structure than ever before, it still remains largely disjointed and lacks an effective overall operational response framework. The literature identifies the various components for catastrophe response, including threat/hazard identification, interoperability models, and other broad, planning concepts. Absent from the literature are any sources that provide comprehensive direction for synchronization of vertical intergovernmental catastrophe response planning.

Sources discuss the aftermath of and mitigation techniques for individual hazards or threats; however, there is not a holistic guide or complete single source for the synchronization of intergovernmental catastrophe planning and mitigation. Although there are a varied amount of potential catastrophes that face the nation, there is not a consensus on the approaches to planning. The literature does provide a number of methodologies, including hazard specific, worst case or meta-scenario, and capabilities based planning that create foundational bases in planning design. The cascading effects, infinite variables, magnitude, the geographic landscape, and demographics of a region all contribute to the complexity of any catastrophe. Therefore, each event has distinctive characteristics, and in general, the overwhelming scope of catastrophes make it difficult to move beyond foundational planning and into specifics.

⁶¹ Wormuth, and Witkowski, *Managing the Next Domestic Catastrophe*, 83–85.

⁶² Freed, "No Failure of Imagination."

However, the literature does include established catastrophe response plans. The research has shown that these plans are definitive sources for examining synchronized intergovernmental catastrophe response plans. The best examples of well-organized catastrophe plans have been organically derived from communities that face inevitable rather than possible catastrophes. The thoroughness and functionality of these plans is predicated on the realization that they will actually be put into practice instead of merely drafted to justify more grant dollars or fulfill an administrative requirement. In order to reach this level of detail, the well-developed plans rely heavily on data and evidence based information in their planning. These relatively recent concepts are essential in the development of catastrophe response plans and are also subjects not found in the literature.

Therefore, catastrophe response planning requires a process that incorporates all of the stakeholders and utilizes the principles, best practices, professional standards of the emergency management field, and case studies to develop a regional operational response plan. Rather than being limited by just one methodology, a blended approach of the different planning concepts can be combined to better suit the plan for a particular region and/or hazard. The comparative study that examines the New Zealand emergency management model, the response plans presented in the case studies,⁶³ and similar existing plans offer the most comprehensive sources to research or model in the development of future response plans.⁶⁴

The next chapter provides an overview of the evolution of national catastrophe preparedness efforts. From their beginnings with a single office in the executive branch focused on wartime civil defense, to the development of the all-hazards, multi-agency, cabinet-level, Department of Homeland Security. However, the changes in policies and bureaucratic agencies have done little to address the gap between federal, state, and local

⁶³ FEMA Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*; FEMA Region V, *Integrated Improvised Nuclear Device Response Plan*.

⁶⁴ However, researchers and emergency management planners should realize these are end products and that they provide limited insight as to how the collaborative efforts that developed these plans were created and sustained to successfully arrive at solid finished products. Thus, this may be a topic of future research.

coordination of catastrophe plans. Possible exceptions are the post-World War II, Office of Civil Defense programs, where fallout shelters were designated and stocked at the community level with supplies provided by the Department of Defense.

With every new presidential administration come changes in agency restructuring and overall strategy. Collaboratively developed and well-coordinated operational response plans have been addressed in limited circumstances and only very recently. The case studies featuring good intergovernmental response plans will demonstrate where the evolution of catastrophe response planning needs to be and continue into the future.

III. EVALUATION OF NATIONAL PREPAREDNESS STRATEGY

This chapter outlines the progression of American national level preparedness doctrine. The focus of many of the policies and establishment of most of the agencies charged with developing federal catastrophe response plans correlate with the nation's anticipated or actual involvement in wars or other overseas conflicts. Although the federal government has more recently taken an all-hazards approach in its planning, this overview will show that vertical intergovernmental synchronization to catastrophes has still not fully been addressed.

A. ORIGINS OF NATIONAL PREPAREDNESS POLICY (WORLD WAR II–COLD WAR)

The course of U.S. national emergency preparedness policy has evolved from its origins in the civil defense movement of both world wars and later during the Cold War. Early homeland security preparedness programs included air raid drills, food rationing, and the designating of bomb or fall-out shelters.⁶⁵ These were developed and run from organizations such as the Office of Emergency Planning and the Civil Defense Corps. While these early policies were strategically formed to enhance the nation's resilience to the potential of conventional military aerial bombing and later a nuclear attack they had an operational component, in the form of designating shelters, storing rations, and designating neighborhood wardens thereby incorporated local stakeholders in the process.⁶⁶ This provided strategic guidance, yet applied a local operational structure and resource allocations in direct support of operations down to the local neighborhood level. In a whole of government strategy, this is what is needed and what the present overall national doctrine is missing.

⁶⁵ "Civil Defense Museum: Significant Events in United States Civil Defense History," Civil Defense Museum, accessed May 20, 2014, www.civildefensemuseum.com/history.html.

⁶⁶ Ibid.

B. POST-COLD WAR (DISASTER RESPONSE ERA)

As the civil defense responsibilities diminished with the end of the Cold War, the federal disaster response mission advanced. This was also initiated by several large scale incidents, including the Three Mile Island Disaster and Hurricanes Hugo and Andrew.⁶⁷ This evolved at the state level in an almost bureaucratic and ad hoc manner as each event needing federal resources required its own congressional resolution.⁶⁸ Therefore, the federal government formally entered the emergency management field, which had previously been the exclusive domain of the states. As a result, national preparedness policy has undergone additional transformations since its origins in an attempt to make it more efficient.

Several significant pieces of legislation and two notable government restructurings have occurred during which smaller programs and/or agencies were combined into larger entities. Ultimately, this has culminated in the creation of the Department of Homeland Security (DHS). Furthermore, there have never been more legislation, plans, or policies than there currently are governing national preparedness. An overview of the progression of national preparedness policy shows there has been a greater emphasis for federal involvement and an increased focus on planning and responding to large scale, catastrophic events. However, more reliance on federal agencies has not always translated into a more efficient system and national scale planning has not always incorporated crucial first responders and the vital resources they bring to bear during a catastrophe.

The first major policy to centralize national preparedness into a single agency was Executive Order 12148, *Federal Emergency Management*, which was enacted by President Jimmy Carter in 1979 to establish the Federal Emergency Management Agency (FEMA). Similar to the creation of DHS in 2003, FEMA's establishment led to the absorption of several smaller independent disaster response and recovery agencies such as the Department of Housing and Urban Development's (HUD) Federal Disaster

⁶⁷ Ithier, "Synchronizing Federal Operational Planning for National Catastrophes," v.

⁶⁸ Anna Marie Baca, "History of Disaster Legislation," *FEMA—On Call: Disaster Reserve Workforce News* (September 2008): 1, <http://www.fema.gov/pdf/dae/200809.pdf>.

Assistance Administration and the General Services Administration's (GSA) Office of Preparedness.⁶⁹ The intent of the merger was largely designed to reduce the number of agencies the states had to engage during and after a crisis to obtain federal aid.

In 1988, the Stafford Act amended the earlier Disaster Mitigation Act of 1974 in an attempt to streamline federal aid to the states in times of crisis by eliminating the need for a congressional resolution for each disaster and allowed the president to direct federal agencies, military units, and their assets to respond to incidents that are beyond the range and capabilities of state and local governments. The act also grants the president, and therefore the federal government, the authority to coordinate all disaster relief assistance, including federal, state, local, and even private and volunteer organizations.⁷⁰ However, the term coordination is vague and does not have the same emphasis as the terms direct and control. This is because the federal government cannot exact its power over state, local, and private resources.

In keeping with the constitutional legal concept of "states' rights" ingrained in the 10th Amendment, a state must first make a formal request for assistance to the president and then a presidential declaration of disaster or emergency must be issued in order to receive federal assistance.⁷¹ The affected or assisting states' resources remain under the physical control of their personnel but they take direction from an appointed incident commander under the National Incident Management System.⁷² This framework balances the sometimes contentious relationship between the states and the federal governments. Additionally, it is another progression, although an imperfect one, toward a national preparedness system.

As the Cold War diminished, federal catastrophic planning moved further away from civil defense policies and focused more on an all-hazards approach, emphasizing the response to major natural disasters. President Ronald Reagan issued Executive Order

⁶⁹ Ibid., 3.

⁷⁰ Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., vol. 5121, Title 3, §302 (2013).

⁷¹ Ibid., 5121, Title IV, §401.

⁷² U.S. Department of Homeland Security, *National Response Framework* (2008), 10.

12656 in 1988.⁷³ This reasserted FEMA’s role as the primary federal agency assigned to lead “the implementation of national security emergency preparedness policy by coordinating with other Federal departments [and] agencies and with State and local governments.”⁷⁴

While this executive order presents advancement in national preparedness by designating a single agency as the “lead” federal coordinating agency, it still did not vest authority over state and local resources because of the constitutional boundaries that appropriately prevent this from occurring. Furthermore, it did little to extend FEMA’s authority over other federal agencies either. As Ithier has argued, even after the post 9/11 era and the establishment of the DHS, there continue to be siloed efforts among federal agencies that have created redundancies in effort, resources and command structures.⁷⁵

C. POST 9/11 – ALL-HAZARDS APPROACH

Up to this point, presidential executive orders were the primary instrument to address national preparedness responsibilities within the federal government. After September 11, 2001, executive orders regarding national preparedness transformed once again. Although they still addressed all-hazards, homeland security became the predominant focus. Executive orders addressing homeland security took on added significance and became distinguished from other executive orders.⁷⁶

Under the George W. Bush administration, these took the form of homeland security presidential directives. One of the main directives issued in December 2003 by President Bush was *Homeland Security Presidential Directive 8: National*

⁷³ “Executive Order 12656—Assignment of Emergency Preparedness Responsibilities,” National Archives, November 18, 1988, <http://www.archives.gov/federal-register/codification/executive-order/12656.html>.

⁷⁴ Lisa Noel Gniady, *Bridging the Gap: Department of Defense’s Planning for Domestic Disaster Assistance* (Leavenworth, KS: U.S. Army Command and General Staff College, 2008), <https://www.hsdl.org/?view&did=728985>, 23.

⁷⁵ Ithier, “Synchronizing Federal Operational Planning for National Catastrophes,” 2.

⁷⁶ Brown, *Presidential Policy Directive 8 and the National Preparedness System*, 2.

Preparedness.⁷⁷ This established a strategic policy for preparedness for the entire country. The strategy emphasized four main areas

1) prevent and disrupt terrorist attacks, 2) protect the American people, critical infrastructure, and key resources, 3) respond to and recover from incidents that do occur, and 4) continue to strengthen the management foundation of homeland security to ensure long-term success.⁷⁸

Like the civil defense efforts established during previous wartime footings, homeland preparedness policy again centered on external enemy threats.

As the importance for homeland security and thus, national preparedness grew, so did the volume of policies. HSPD-8 established the foundation for the 15 national planning scenarios and five overarching mission areas.⁷⁹ The mission areas were sub-categorized into a 578 page *Target Capabilities List* encompassing hundreds of tasks for almost every conceivable hazard the nation faced.⁸⁰ These formed the foundation of the national preparedness strategy during the onset of the global war on terrorism. However, the uncoordinated response to the resulting aftermath of Hurricane Katrina demonstrated that considerable gaps in synchronization between all levels of government during a catastrophic event persisted—despite the extensive revisions to national preparedness policy after 2001 and the establishment of the DHS.

Congress then passed the Post-Katrina Emergency Reform Act (PKEMRA) in 2006,⁸¹ in an effort to close the significant gaps that were exposed. This legislation mandated the president establish a set of policies that addressed national preparedness beyond HSPD-8. The Obama administration incorporated many of the PKEMRA’s mandates in its versions of homeland security specific executive orders. In 2011,

⁷⁷ *Ibid.*, 1.

⁷⁸ *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*, 2.

⁷⁹ U.S. Department of Homeland Security, *National Preparedness Guidelines* (Washington, DC: U.S. Department of Homeland Security, 2007), http://www.fema.gov/pdf/emergency/nrf/National_Preparedness_Guidelines.pdf, 4, 31.

⁸⁰ U.S. Department of Homeland Security, *Target Capabilities List: A Companion to the National Preparedness Guidelines* (Washington, DC: U.S. Department of Homeland Security, 2007), <http://www.fema.gov/pdf/government/training/tcl.pdf>.

⁸¹ “Post-Katrina Emergency Management Reform Act of 2006 (2006—S. 3721).”

Presidential Policy Directive 8: National Preparedness (PPD-8). Consequently, the Bush era order (HSPD-8) was rescinded and PPD-8 became the preeminent directive and guidance on national preparedness. Similar to previous policies the updated strategy “called for a national framework of collective efforts and shared responsibilities to build and sustain critical homeland security capabilities.”⁸²

However, PPD-8 not only fulfilled the legislative requirements of the PKEMRA, it transformed and expanded upon the foundations of HSPD-8 by moving from a multiple scenario based model and changed the mission areas. Furthermore, the mission areas were divided into separate publications entitled “Frameworks” for each of the following: prevention, protection, response, recovery, and, the newly added mission area, mitigation.⁸³ This represented a change from a single, concentrated document as was the case in the preceding *National Response Plan* developed under the direction of HSPD-8.

Furthermore, the strategy under PPD-8 “reaffirmed the ‘whole of government’ approach, which is the need for all levels of government, if not the whole country, to strengthen national preparedness.”⁸⁴ The stated purpose of PPD-8 is to establish a “common intent and fostering of robust partnerships across all communities and levels of government; building the capacity of partners across jurisdictional boundaries; and encouraging coordination and cooperation.”⁸⁵

Both HSPD-8 and PPD-8 were similar in that both utilized the original Department of Defense concept of “capability-based planning” as their foundations.⁸⁶ The main elements of capability-based planning are: planning under uncertainty, for a wide range of current challenges, and while working within an economic framework.⁸⁷ Theoretically, by concentrating on the core capabilities needed to respond to all

⁸² *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*, 3.

⁸³ “National Planning Frameworks,” 1.

⁸⁴ *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*, 2.

⁸⁵ Brown, *Presidential Policy Directive 8 and the National Preparedness System*, 3.

⁸⁶ *Ibid.*, 4.

⁸⁷ Paul K. Davis, *Analytical Architecture for Capabilities-based Planning, Mission-System Analysis, and Transformation* (Santa Monica, CA: RAND National Defense Institute, 2002), http://www.rand.org/content/dam/rand/pubs/monograph_reports/2005/MR1513.pdf, 1–2.

catastrophic events, such as fatality management services or mass search and rescue, emergency responders can expand these foundational skills to meet the scale and scope of the incident. This does not translate so simply in terms of national catastrophe preparedness, as the extensive research by Dr. Enricho L. Quarantelli proves.⁸⁸

Also, unlike the disparate federal, state, and local emergency management and response entities, the military has a cohesive, integral structure where the most subordinate units understand their roles in conjunction with the overall mission of the upper levels of command. In general, each branch of service also maintains its own resources and controls its personnel. However, local responders do not always understand their roles and responsibilities in a federal framework when faced with or assisting with a catastrophe response, especially if responding to an out-of-state jurisdiction where protocols differ and the organizational structures may be unfamiliar.

In order to better facilitate capabilities-based planning, PPD-8 amended the extensive *Target Capabilities List* into a concentrated sum of 31 “core capabilities” through the publication of the 2011 *National Preparedness Goal*.⁸⁹ The goal made clear that the “core capabilities presented an evolution from the voluminous target capabilities list in response to HSPD-8.”⁹⁰ Under FEMA Administrator Craig Fugate, the focus on the core capabilities has also led to the latest policy emphasis on maximum capacity for a major disaster or catastrophe.⁹¹ As a result, preparedness planning at the strategic level was now based on a “maximum of maximums” concentrated into a “meta-scenario.”⁹²

The meta-scenario is a generic hypothetical “no notice” incident that outlines a series of specific benchmarks in terms of mass casualties and affected geographic area with severely damaged infrastructure that hinders response efforts. The meta-scenario

⁸⁸ Quarantelli, *Research Based Criteria for Evaluating Disaster*, 5.

⁸⁹ U.S. Department of Homeland Security, *National Preparedness Goal*, 2.

⁹⁰ *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*, 4.

⁹¹ *Ibid.*, 3.

⁹² Brown, *Presidential Policy Directive 8 and the National Preparedness System*, 19, footnote 68.

was developed by FEMA and is permeating through many federal agencies.⁹³ Its extreme scope is being utilized as the basis for federal preparedness planning, but it does not appear to have been widely disseminated at the local government level.

This maximum of maximums approach is not without its detractors who argue that it is too broad and does not apply to large segments of the country where they neither are confronted with large scale natural disasters nor are assessed to be targeted for catastrophic terrorist attacks.⁹⁴ However, the criteria set in the meta-scenario helps establish an understanding of the magnitude of the impact of a catastrophic event, which enhances planning, especially for state and local emergency management practitioners who are generally more locally and narrowly focused.

D. SUMMARY

The course of national catastrophe response planning has progressed over the last century from an emphasis on civil defense, to a doctrine centered primarily on terrorism, and then to “all-hazards” in the first years of this millennium. Wartime settings have influenced the basis for national domestic emergency management planning frameworks throughout their evolution. Increasingly, more involvement by the federal government has become evident—from its first venture into the emergency management realm with a small adjunct office in the executive branch to a cabinet-level department with well over 200,000 employees. In that course of time, multiple transitions have occurred from wartime domestic preparedness, to providing federal financial aid to states affected by large scale disasters, to a capabilities-based, all-hazards approach, and the addition of the meta-scenario in planning considerations.

Each of these transitions in the national doctrine has benefitted and added to the overall national preparedness; however, a coordinated planning and response effort across all levels of government has been lacking. The key element of a viable national operational framework must include local first responders’ technical experience and

⁹³ Sharon Caudle, “Homeland Security: Advancing the National Strategic Position,” *Homeland Security Affairs* VIII (August 2012): 6.

⁹⁴ *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*, 8.

input, along with the federal government's broader understanding of the scale of catastrophes, and the necessary logistics and coordination apparatus needed to insure an effective response. It appears that FEMA is making progress toward putting the whole of government concept into practice in the planning stages. As the case studies will demonstrate, detailed, coordinated catastrophe contingency plans have been developed among the various levels of government and represent a positive development in implementing meaningful, synchronized operational policy.

The latest evolution in national catastrophe planning, based in part on the meta-scenario, shows promise because it provides a tangible, data-based set of criteria for federal emergency managers and local first responders to conceptualize and base their planning for natural and man-made catastrophic events. FEMA is also placing the responsibility of coordinating plan development with the state and local agencies and the FEMA regional offices. This too is a positive development that bridges a regional understanding with strategies made in Washington, DC. The latest plans to be created under this model assign responsibilities and take into consideration the strengths and limitations of the participating agencies capabilities and capacities. Overall gaps in these areas can then be identified and mitigated before a catastrophe occurs.

However, as this overview of national catastrophe preparedness has shown, there has been a long history of federally-centric strategies that have not been inclusive of the states or local emergency responders. Before positive examples of good, cross-tiered government catastrophe response plans can be presented, evidence of the continuing gap and associated problems must first be established.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. EVIDENCE OF A GAP

Fractious and disparate planning always leads to fractious and disparate response.⁹⁵

A. CATASTROPHES—A LACK OF UNDERSTANDING

Despite the numerous changes and additions in legislation and the creation and merger of agencies to address the evolving demands of the national preparedness doctrine, there is still a gap in the synchronization of local, state, and federal catastrophe operations. The magnitude of catastrophes and scope of planning needed to begin to mitigate them is often underestimated, even by experienced practitioners, as the examples below demonstrate. The following chapter confirms that there is still a gap, notwithstanding the progress that has been made and concludes with some of the underlying reasons why the gap remains.

In November 2010, the Consortium for Homeland Defense and Security in America—a conglomeration of the United States Army War College’s Center for Strategic Leadership, George Washington University’s Homeland Security Institute, the Center for Strategic and International Studies and the Heritage Foundation, held a symposium concentrating on developing a “unity of effort” in preparing for and responding to catastrophic events. During the two-day forum, several panel discussions occurred. Themes presented emphasized planning include: coordination between active duty military and National Guard components; command and control; and the incorporation of the concept of the “whole of community,” including private and non-government organization based partnerships during catastrophic incidents.⁹⁶

⁹⁵ Pietro Marghella, Adam Montella, and William Josko, “Dump the 3-Ring Binders: Changing the Paradigm for Enhanced Preparedness and Response,” http://www.academia.edu/3595570/Dump_the_3-Ring_Binders_Changing_the_Planning_Paradigm_for_Enhanced_Preparedness_and_Response, 2.

⁹⁶ Bert B. Tussing, *Implementing a New Vision: Unity of Effort in Preparing for and Responding to Catastrophic Events*, issue paper 2–11 (Fort Leavenworth, KS: Center for Strategic Leadership, U.S. Army War College, 2011), 6.

Dr. Christopher Bellavita, of the Naval Postgraduate School's Center for Homeland Defense and Security, also spoke at the conference. In his comments, Dr. Bellavita suggested that several of the other panelists were building on a flawed paradigm. He explained that many of the previous solutions offered worked under the supposition that the structures and processes needed to implement them would still be intact. Dr. Bellavita continued stating, "If the structures and processes of Unity of Effort are still present...maybe you're not really talking about a catastrophe."⁹⁷

Dr. Bellavita's questioning the assumptions of senior homeland security policymakers and practitioners is very telling of our overall national preparedness efforts. If there is this level of disagreement concerning the magnitude of destruction and degradation of resources and infrastructure associated with operating in a catastrophic environment among this type of assemblage, then clearly an even greater misperception exists among first responders.

A significant portion of local emergency response workers' level of preparedness correlates to Dr. Bellavita's remarks.⁹⁸ An examination of a sample of state, regional, and local multiyear training and plans (MYTEP) demonstrates that trainings and drills conducted at the state and local level do not always integrate the conditions inherent to catastrophes in their mock scenarios. These should include criteria such as the complete loss of or significant degradation of their workforces, functioning communications and data services, existing hospitals, and other healthcare facilities. These lessons learned from disasters and catastrophes from all over the globe are already accounted for as part of the case studies that are presented in later chapters. This reveals why federal officials and state and local authorities need to share their collective experiences to draft catastrophe response plans. Furthermore, exercises generally only test within or slightly above organizations' current capabilities and capacities. As Dr. Bellavita counseled, by definition, a catastrophe will immediately overwhelm any organization far beyond its standard abilities.⁹⁹ As a result, the prioritization of "incidents within the incident" and

⁹⁷ Ibid., 5.

⁹⁸ *Evolution of Emergency Management and Communication*, 2.

⁹⁹ Tussing, *Implementing a New Vision*, 5.

the limited resources available to mitigate them inherent in proactive planning will become a key component to any response to an event of this scale.

Current FEMA Administrator Craig Fugate, who previously served as the Director of the Florida Division of Emergency Management, has also expressed these concerns. In his June 16, 2011 testimony, he stated, “emergency management historically planned for scenarios to which government could respond and recover from.”¹⁰⁰ Instead, he emphasized, “modern disaster planning should be for a “meta-scenario” (or “maximum of maximums” event) destined to overwhelm all levels of government.¹⁰¹

Dr. Caudle states, “Such worst-case planning would require the efforts of a ‘whole community’ approach intended to leverage the expertise and resources of governmental and non-governmental stakeholders—the entire emergency management community from the federal government to individuals, families, and communities.”¹⁰² Administrator Fugate’s recognition of a whole of community approach constitutes a needed shift in strategy on the part of the federal government. While this buzz phrase summarizes exactly what is called for during a catastrophe, it does not, in and of itself, translate into a blueprint for operational implementation across all segments of American society.

While there is an emphasis on “target capabilities lists” or the more recent “core capabilities” in the national preparedness doctrine, there is not a distinction or enough attention on response capacity or where it will be drawn from during a catastrophe.¹⁰³ In December 2013, Dr. Alexander Isakov, the Executive Director of Emory University’s Office of Critical Event Preparedness and Response, presented a case study that illustrated this point at the Joint Counterterrorism Awareness Workshop. Dr. Isakov explained to the audience of homeland security professionals that the 2004 Madrid terrorist bombings of commuter trains resulted in nearly 2000 casualties that were transported primarily to just two hospitals. This resulted in a patient surge at each of the

¹⁰⁰ *Evolution of Emergency Management and Communication*, 5.

¹⁰¹ *Ibid.*

¹⁰² *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*, 8.

¹⁰³ U.S. Department of Homeland Security, *National Preparedness Goal*, 2.

two hospitals of approximately 272 patients that had injuries that required admission in the time span of just two and a half hours.¹⁰⁴

Dr. Isakov challenged the attendees by asking, “Can your hospital do this?”¹⁰⁵ The rhetorical nature of his question implies that not many, if any, hospitals have this capacity. His presentation demonstrated that it does not take a catastrophe to quickly overwhelm standard emergency response plans. If there is a question as to whether most hospital systems are prepared to handle an incident like the one that occurred in Madrid, where terrorists used conventional, improvised weapons, how prepared are they for a true catastrophe or “meta-scenario” that FEMA estimates could have more than 200 times as many casualties?¹⁰⁶

Jared Brown, an analyst specializing in emergency management and homeland security policy for the Congressional Research Service, produced a research report, *Presidential Policy Directive 8 and the National Preparedness System: Background and Issues for Congress*. In the report, Brown recognizes that the meta-scenario created by FEMA was most likely used to drive the development of the listed response and recovery capabilities in the new executive order. In view of that, he stated, “The extreme nature of the meta-scenario may necessitate revision of the National Response Framework (NRF) simply because the event demands the nation to achieve higher standards of response capabilities.”¹⁰⁷ He concluded by noting:

If holistically, the standard for preparedness is based in part on the meta-scenario described in the National Preparedness Goal, Congress may wish to evaluate whether existing appropriated resources are sufficient to meet the challenge of the consequences described in the catastrophic scenario.¹⁰⁸

¹⁰⁴ Alexander Isakov, “Clinical and Systems Preparedness” (presented at Joint Counterterrorism Awareness Workshop, Washington, DC, December 2013).

¹⁰⁵ Ibid.

¹⁰⁶ *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*, 3.

¹⁰⁷ Brown, *Presidential Policy Directive 8 and the National Preparedness System*, 19.

¹⁰⁸ Ibid., 25.

Dr. Sharon Caudle also brings attention to the federal government's inability to accurately assess the catastrophe response capabilities at all levels of government. Testifying before the House Committee on Homeland Security, Subcommittee on Oversight, Investigations, and Management, she reported:

Assessing preparedness based on national preparedness capabilities remains very elusive. Summarizing the difficulties, the U.S. Government Accountability Office (GAO) found that evaluation efforts that collected data on national preparedness capabilities faced limitations such as data reliability and the lack of standardized data collection. According to GAO, FEMA had problems in completing a comprehensive assessment system and developing national preparedness capability requirements based on established metrics.¹⁰⁹

B. GAPS BETWEEN FEDERAL DOCTRINE AND STATE/LOCAL OPERATIONAL RESPONSE PERSIST

During another hearing of the House Subcommittee on Management, Oversight and Investigations, the Chairman, Congressman Christopher Carney ridiculed the inaugural *Quadrennial Homeland Security Review*, stating that “there was no discussion of the status of cooperation between the Federal Government and State, local, and Tribal governments in preventing terrorist attacks and preparing for emergency response to threats to National homeland security.”¹¹⁰

In his thesis entitled “Examining Flaws in America’s Homeland Security Enterprise,” Judson M. Freed the Director of the Ramsey County (MN) Emergency Management and Homeland Security provides a view from the local practitioner’s perspective when he explains:

Current United States policy vis-à-vis the nation’s homeland security enterprise is built on a fatally flawed foundation. It is a top-down, federal-centric model rather than on a constitutional model that develops

¹⁰⁹ *Is DHS Effectively Implementing a Strategy to Counter Emerging Threats?*, 6.

¹¹⁰ *Laying the Framework for the Task Ahead: An Examination of the Department of Homeland Security’s Quadrennial Homeland Security Review. Hearing Before the Subcommittee on Management, Investigations, and Oversight of the Committee on Homeland Security House of Representatives*, 110th Cong. (2010) (statement of Christopher P. Carney) <http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg62542/html/CHRG-111hhrg62542.htm>.

capability for resilience, response, protection and preparedness for crises¹¹¹

The top-down model that Freed negatively critiques is the opposite approach that is taken in the New Zealand “bottom up” CDEM Group model and in the two domestic case studies that are presented as examples of smart practices in later chapters.

An emergency management professional with over 25 years of experience, Freed further asserts:

that the unprecedented federal oversight and multitudes of federal laws, hearings, and investigations that have resulted in massive interference by the federal government in the operation of local and state agencies, has not facilitated the achievement of the goals of these various oversight bodies. The top-down, one-size-fits-all federal mandate method has resulted in a system of systems that duplicates effort of various jurisdictions competing for grants.¹¹²

He suggests that nationally scoped, coordinated programs that increase the resiliency of state and local first responders will help mitigate catastrophic events.

The Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, better known as the Gilmore Commission, was assembled in response to the domestic terrorist bombing of the 1995 Alfred P. Murrah Federal Building. The members of the commission represent a broad spectrum of government, non-government organizations, private sector, and senior emergency response professionals from across local, state, and federal enterprise. The collective group of subject matter experts produced updated reports every year over a five year period (1999–2003) on the status of the United States’ preparedness level for a terrorist initiated or other catastrophe.

In its fifth report, the commission recommended a comprehensive national strategy “that is not simply a Federal strategy but rather one that integrates and synchronizes local, State, and Federal government and private sector efforts in a true

¹¹¹ Freed, “No Failure of Imagination,” v.

¹¹² *Ibid.*, 3.

nationwide effort.”¹¹³ However, the last report still called for “general strategies to be turned into specific roadmaps to direct, local, State, Federal and private sector actions.”¹¹⁴ In what the commission phrased a “New Normalcy for 2009,” it recommended “strong preparedness and readiness across State and local government and the private sector with corresponding processes that present an enterprise-wide national capacity to plan, equip, train, and exercise against measurable standards.”¹¹⁵ The commission’s report also recognized that the proper mechanisms include an extensive analysis of gaps in national capability and capacity, proper processes, and equipment needs to be developed in order to build a successful national planning and response structure.

Moreover, the commission recognized that the current national preparedness framework is federally-centric resulting in a focus that is too narrow. In the 2003 report’s “Enterprise Architecture for the Future” section, the commissioners recommend greater participation by the states and local governments and for a comprehensive national risk assessment to be conducted. The authors bluntly state, “Such a process does not exist.”¹¹⁶ The building of national capabilities and capacities for catastrophe response cannot be accomplished without first establishing a baseline understanding of the impact of the threats and hazards the country faces. In order to institute this, states and local emergency preparedness partners need to have a conduit to work with the federal government to form a complete picture of the nation’s current status and requirements needed for an effective response to a catastrophe.

The thesis, “Synchronizing Federal Operational Planning for National Catastrophes,” written by Jan P. Ithier, the Deputy Director of North American Aerospace Defense Command (NORAD) and U.S. Northern Command

¹¹³ *The Fifth Annual Report to the President and the Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, V. Forging America’s New Normalcy: Securing Our Homeland, Preserving Our Liberty* (Arlington, VA: RAND Corporation, 2003), http://www.rand.org/content/dam/rand/www/external/nsrd/terrpanel/volume_v/volume_v.pdf, ii.

¹¹⁴ *Ibid.*, 1.

¹¹⁵ *Ibid.*, iv.

¹¹⁶ *Ibid.*, 7.

(USNORTHCOM) at the Pentagon, reveals that since the Three Mile Island disaster, the federal catastrophic response framework has been reconfigured to address problems with operational issues following each subsequent major disaster. He has concluded, “The federal government is in dire need of reform in respect to national and homeland security.”¹¹⁷ More specifically, his research shows:

The Department of Homeland Security (DHS) has no means to identify available capabilities and the potential gaps, overlaps and duplication of these capabilities until an incident happens. In this void, DHS has the daunting task of coordinating federal preparedness and response efforts without the knowledge of other federal agencies’ plans capabilities and milestones.¹¹⁸

As stated earlier, if the federal government cannot collectively accomplish this among its own various agencies, how can it account for the resources maintained at the state and local levels? In reality, this problem is only exacerbated on the state and local side because of the relative independence of each of the states and localities. Additionally, there are no legislative or other official mandates that obligate a state or local jurisdictions to report the availability of their resources or contribute them to any other jurisdiction other than voluntary memorandums of agreement and the Emergency Management Assistance Compact (EMAC).¹¹⁹ Furthermore, EMAC simply facilitates the requests by states for critical resources during disasters and fills them by those agencies willing to do so with the understanding that the assisting organization will be reimbursed for their costs at a later time.

The executive summary of the study, *Managing the Next Domestic Catastrophe: Ready (or not)?*, authors Christine E. Wormuth and Anne Witkowsky lead off by bluntly stating, “America is not ready for the next catastrophe.”¹²⁰ Many of their conclusions concur with those already cited in this chapter. However, this authoritative study that took over a year to research, organized a working group of officials from the multiple

¹¹⁷ Ithier, “Synchronizing Federal Operational Planning for National Catastrophes,” 1.

¹¹⁸ *Ibid.*, 3.

¹¹⁹ “Emergency Management Assistance Compact (EMAC),” Federal Emergency Management Agency, <http://emilms.fema.gov/IS800B/lesson2/NRF0102190t.htm>.

¹²⁰ Wormuth, and Witkowski, *Managing the Next Domestic Catastrophe*.

levels of government, academia, public policy organizations, and homeland security experts to assist in developing their recommendations. The authors of this study understood the importance of the states and local governments in the homeland security enterprise. Therefore, the research team took considerable time to interview current and former officials at this level “seeking to help bridge what at times appears to be a substantial divide between them and federal personnel.”¹²¹

The study by Wormuth and Witkowsky details the gap in emergency preparedness efforts between the state and local governments and the federal government and many of the causes for this divide. Among the examples cited are the lack of detailed government-wide plans to respond to a catastrophe, confusion over who is the lead in a disaster, and a lack of guidelines to assess the capabilities or determine the capacity of emergency response resources at the state and local levels.¹²² The authors also cite the inconsistencies in the numerous federal documents that create confusion about the roles and responsibilities between the federal government and state and local governments.¹²³

Additionally, study maintains that many of the components needed to successfully manage a catastrophe exist, but the lack of coordination and need to assess and mitigate gaps in capabilities and capacities hampers the ability to effectively respond in a whole of nation approach. Just as the Gilmore Commission affirmed, this study’s findings also conclude that the “country is still not ready for a domestic catastrophe because the major relationships and processes needed to coordinate a response to a catastrophic event are not yet clear or mature and because attempts to date to implement a homeland security system that will organize these relationships and processes have struggled mightily.”¹²⁴

Furthermore, Wormuth and Witkowsky go on to state, “the only way to orchestrate the complex assembly and deployment of capabilities across the various levels of government and other stakeholders in a response to a catastrophe is to build relationships and the framework that defines the governance and interaction between

¹²¹ Ibid., 3.

¹²² Ibid., vi.

¹²³ Ibid., 10.

¹²⁴ Ibid., 3.

them.”¹²⁵ In addition, they warn, “these relationships do not exist today.”¹²⁶ Wormuth and Witkowsky even more strongly argue, “added to the continuing ambiguity about inter-government roles and responsibilities is a critical weakness in structure: the process necessary to prepare the nation at all levels to respond effectively to a catastrophe are nascent at best and in some areas simply do not exist.”¹²⁷

In the guide *Managing Chaos: The Disaster Manager’s Handbook*, Mitch Stripling of the New York City Department of Health and Mental Hygiene emphasizes the need for plans to be operational. He writes, “The best plan only really exists in the minds of those who will run the response.”¹²⁸ In addition, he emphasizes the need for senior leaders and outside stakeholders to be part of disaster response planning process and that plans written by a single person or organization will most likely sit on a shelf and not be useful during an actual crisis. He believes one of the reasons for this is that “organizations are rarely comfortable with productive jurisdictional planning because it sits outside their comfort zone.”¹²⁹ Furthermore, Stripling encourages moving beyond “response networks” and instead mapping out a “network of means.”¹³⁰ Once the resources are identified that contribute to the end solution of a scenario, he then recommends completing a framework of any organization that can contribute to fill the means that were developed into the plan. This will help identify non-traditional partners who can bring solutions to parts of the greater number of interconnected challenges.

C. CONCLUSION

The assessments of these research papers, study conclusions, and commission findings all conclude that despite numerous federal legislative and policy reforms that gaps still exist in national catastrophe preparedness between the local, state, and federal

¹²⁵ Ibid.

¹²⁶ Ibid.

¹²⁷ Ibid., 9.

¹²⁸ Mitch Stripling, *Managing Chaos: The Disaster Planner’s Handbook in Eight Parts* (New York: New York City Department of Health and Mental Hygiene, 2013), <http://www.nyc.gov/html/doh/downloads/pdf/em/mc-disaster-handbook.pdf>, 2.

¹²⁹ Ibid., 4.

¹³⁰ Ibid., 8.

governments. The limited authority of the federal government over state and local governments is a contributing factor in the failure to build inter-government planning teams. National doctrine that concentrates on strategic concepts without providing much in the way of operational response guidance is another challenge to successful national catastrophe preparedness. The top-down approach for developing strategy that the federal government has taken until recently further inhibits the participation of state and local emergency responders to participate in a collaborative effort with the DHS.

The multiple changes in federal-centric national doctrine have led to ever shifting standards, guidelines, and priorities. The lack of consistency reduces the credibility of national preparedness doctrine as doctrine has changed with almost every new administration. The comparative model and case studies presented in the next chapters provide excellent exemplars of collaborative, multilateral response plans based on multilateral planning processes. They take into consideration the different regional threats, infrastructure and assemblage of resources; however, they still integrate the federal perspective with local operational requirements.

THIS PAGE INTENTIONALLY LEFT BLANK

V. COMPARISON MODEL FOR CATASTROPHE PREPAREDNESS—THE NEW ZEALAND MODEL

A. INTRODUCTION

This section presents a comparative model of the structure and process of New Zealand's Ministry of Civil Defense and Emergency Management (MCDEM) has established for its catastrophe response planning. This model is centered on CDEM groups that are composed of stakeholders from the emergency services and national, regional, and local governments. Although the participants are legislatively required to be members of these groups, the plans they produce are representative of all parties' perspectives. Once completed, the regional plans are forwarded to the MCDEM for inclusion into the national CDEM plan. New Zealand tested this model during the 2011, magnitude 6.3, Christchurch earthquake. Evaluations of the plan's effectiveness were overall very positive. This comparative model presents an international viewpoint and an example that can be adapted to meet the legislative and procedural requirements of the U.S. national catastrophe framework.

Sir Geoffrey Palmer, the Former Prime Minister of New Zealand, once put the threats to his nation and the need for preparedness quite succinctly:

Sometimes it does us a power of good to remind ourselves that we live on two volcanic rocks where two tectonic plates meet, in a somewhat lonely stretch of windswept ocean just above the Roaring Forties. If you want drama—you've come to the right place.¹³¹

This has led New Zealand to design and implement a national strategy that incorporates local stakeholders on the front end of the planning process as well as incorporates them in the operational response mission in the event of a significant emergency event. Although New Zealand is much smaller country than the United States and has a centrist form of government, the New Zealand CDEM model provides a case

¹³¹ David A. McEntire, and Chris Webb, *Emergency Management in New Zealand: Potential Disasters and Opportunities for Resilience* (Washington, DC: Federal Emergency Management Agency, 2008), <https://training.fema.gov/hiedu/downloads/compemmgmtbookproject/comparative%20em%20book%20-%20chapter%20-%20em%20in%20new%20zealand.doc>, 1.

study with a global perspective that offers aspects that can be adapted to meet the legal and structural parameters of the United States' system.

The U.S. can learn from the New Zealand Ministry of Civil Defence and Emergency Management, which “provides a model for others wishing to reduce the risks from hazards and respond more effectively to disasters due to its progressive approaches to emergency management.”¹³² Through its Civil Defence and Emergency Management Act of 2002, New Zealand has strengthened the emergency management structure by defining “roles and responsibilities across local communities, local authorities, central government, emergency services and lifeline utility operators.”¹³³

The key difference from the U.S. system is that the local or regional governments in New Zealand are incorporated into the planning and structuring of the national emergency management process. Central to this model is the establishment of CDEM groups. These legislatively delineated groups develop plans at the local level to address the hazards and identify the emergency response resources germane to their regions that are then incorporated into New Zealand's *National CDEM Strategy*.¹³⁴

This “bottom-up” approach is more effective because it incorporates the local understanding of the regional hazards and, more importantly, the shortcomings in the first responders' capabilities and capacities. This allows for the central government at the strategic level to either build capabilities where none exists or coordinate across regional and national levels of government to provide the capacity needed to mitigate the identified risks. The regional CDEM group may also be tasked to fill the gap on its own by obtaining the necessary capability or building the needed capacity.

¹³² Ibid.

¹³³ Ibid., 10.

¹³⁴ New Zealand Ministry of Civil Defence and Emergency Management [MCDEM], *National Civil Defence Emergency Management Strategy* (Wellington, New Zealand: New Zealand Department of Internal Affairs, 2008), <http://civildefence.govt.nz/assets/Uploads/publications/national-CDEM-strategy-2008.pdf>.

B. NEW ZEALAND CIVIL DEFENSE AND EMERGENCY MANAGEMENT STRUCTURE

New Zealand is a nation with a strong central government where even police and fire services are operated at the national level; therefore; it seems almost counterintuitive that emergency preparedness and management are organized at the local level. Theoretically then, the New Zealand CDEM group based model should work well with a decentralized federalist system of government such as that of the United States.

During the end of the last century, New Zealand dramatically reorganized the way it responded to disasters. As a result, this led to significant legislative and policy changes.¹³⁵ The definitive piece of legislation that was drafted was the Civil Defence Emergency Management Act 2002. The CDEM Act emphasizes “the importance of hazard management in local authority plans; the strengthening of emergency management arrangements; and clearer roles and responsibilities across local communities, local authorities, central government, emergency services and life line utilities (critical infrastructure) operators.”¹³⁶

The New Zealand Ministry of Civil Defence and Emergency Management (MCDEM) summarized the act’s primary objectives as:

- Promotes sustainable management of hazards
- Encourages and enables communities to achieve acceptable levels of risk
- Provides for planning and preparation for emergencies, and for response and recovery
- Requires local authorities to coordinate planning and activities
- Provides a basis for integration of national and local civil defence [sic] emergency management
- Encourages coordination across a wide range of agencies, recognizing that emergencies are multi-agency events.¹³⁷

¹³⁵ McEntire, and Webb, *Emergency Management in New Zealand*, 10.

¹³⁶ *Ibid.*, 10.

¹³⁷ *When Disaster Strikes Will You be Ready? An Introduction to the Civil Defence Emergency Management Act 2002*, New Zealand Ministry of Civil Defence Emergency Management, Wellington, New Zealand, 2002, <http://www.civildefence.govt.nz/assets/Uploads/publications/cdem-act-2002-introduction-brochure.pdf>.

The important distinction in the CDEM Act, which U.S. strategic policy does not account for, is its overarching emphasis on the responsibilities and compulsory requirements of local authorities to plan for and respond to catastrophic events. It also “provides a basis for the integration of national and local civil defence [sic] emergency management planning and activity through the alignment of local planning with a national strategy and national plan.”¹³⁸

As a result, the MCDEM has a doctrine created with input from local first responders, who are the “boots on the ground” who understand the terrain, communities, hazards, challenges, and resources in the region. In turn, the central government provides a comprehensive national scope picture concentrating on large scale disasters. The incorporation of the local authorities through the regional and national planning process ensures that both strategic and operational needs are taken into consideration.

Although, the CDEM Act has given the director of the MCDEM substantial power, especially during a state of national emergency to manage catastrophic events, the cornerstone of New Zealand’s national preparedness framework is the Act’s requirement for the formation of regional CDEM groups which are given the responsibilities of identifying hazards and insuring there is both the capability and ample capacity to respond to them. The CDEM groups consist of:

- The chief executive of each regional council (similar to a governor in the U.S.)
- The chairperson or other delegated elected official from each of the local authorities within the region.
- An executive officer from the New Zealand Police assigned to the region
- An executive officer from the national fire service assigned to the region
- Members of the rural fire service, if applicable, within a region
- Members of the hospital and health services¹³⁹

¹³⁸ *Civil Defence Emergency Management Act 2002*, New Zealand Ministry of Civil Defence Emergency Management, Wellington, New Zealand, reprinted January 1, 2014, <http://www.legislation.govt.nz/act/public/2002/0033/latest/DLM149789.html>, 8.

¹³⁹ *When Disaster Strikes Will You be Ready?* 4–5.

The CDEM group members have planning, preparedness, and operational responsibilities. They are tasked with: identifying and preemptively mitigating hazards within their respective regions, defining and attaining the resources needed to insure there are both the necessary capabilities and capacities to respond to the potential hazards, and executing emergency response and recovery.

The CDEM Act requires each group to compile and publish a regional CDEM group plan that outlines the above listed responsibilities. In addition, public consultation is also required throughout the development of the groups' plans to gain constituents' input and ensure hazards and risks are dealt with to a level the community accepts.¹⁴⁰ Obtaining the community's "grass roots" perspective further enhances the breadth of knowledge and experience in comprehending not only the hazards to the region but the resources needed to mitigate and respond to them.

The act also specifies that the community helps determine the level of risk it is willing to accept. This becomes vital for the CDEM groups in their calculation as far as budgeting and resource management. For example, if the feedback from a region's residents is that they are willing to live with the risks of seasonal flooding, then the CDEM group may not budget for levee's to mitigate flood waters or invest extensively in response equipment, such as swift water rescue assets. Conversely, if they were concerned about the effects of earthquakes the CDEM group may provide funding to retrofit older constructed buildings as a mitigation measure and invest in urban search and rescue (USAR) equipment and training to better the region's preparedness for earthquakes. This is essential in setting the communities expectations and understanding as to the limits and priorities of funding for preventative efforts and of first responders' operational tasks particularly during catastrophes.

The CDEM Act states that each CDEM group must also establish a coordinating executive group (CEG). Legislatively mandated members of the CEG are the chief executive of each region's council and representatives of the emergency services. The purpose of the CEG is to advise and provide subject matter expertise to the CDEM group,

¹⁴⁰ Ibid., 4.

execute CDEM group decisions, oversee the development and implementation of the CDEM groups' plans.¹⁴¹

The development of a regional CDEM plan is another way local elected officials and first responders contribute to and are integrated into the broader *National Civil Defence Emergency Management Plan*. The CDEM Act dictates that the CDEM groups' plans "must not be inconsistent with the national civil defence [sic] emergency management strategy and must take account of the Director's guidelines, codes, or technical standards."¹⁴² This keeps the process between the various levels of government consistent administratively and procedurally allowing for mutual assistance among the regions or from the central government when needed.

Among the *National CDEM Plan's* declared purposes "is to state the hazards and risks to be outlined at the national level; and provide for the civil defense emergency management arrangements to meet those hazards and risks."¹⁴³ It sets as its first objective: "to provide for effective management of states of national emergency or civil defence [sic] emergencies of national significance through a planned and co-ordinated [sic] whole-of-government response."¹⁴⁴ Other objectives listed in the plan include the effective recovery from national level events and effective management of national support in states of local emergency.

In keeping with the principle of the community's determination of risk tolerance, the plan acknowledges that at the national level "New Zealand has finite capacity and capability" in terms of responding to national scale disasters.¹⁴⁵ However, the plan makes the MCDEM:

1. Responsible for assessing resource requirements needed to manage civil defence [sic] emergencies at the national level;

¹⁴¹ *Civil Defence Emergency Management Act 2002*, 22–23.

¹⁴² *Civil Defence Emergency Management Act 2002*, Part 3, §53.

¹⁴³ *The National Civil Defence Emergency Management Plan Order 2005*, §8, subsection (5), paragraphs (a), (b), (c), 2005, §2, subsection 4, paragraphs (a), (b), <http://www.legislation.govt.nz/regulation/public/2005/0295/latest/DLM357064.html>.

¹⁴⁴ *Ibid.*, Part 2, §8, subsection (1).

¹⁴⁵ *Ibid.*, §94 subsection (a).

2. Will monitor the capacity and capability of CDEM groups; and
3. Alert CDEM groups, agencies and the government to any significant shortcomings in national civil defence [sic] emergency management capacity and capability.¹⁴⁶

This is an essential segment of the legislation. Implicit in the above three tasks assigned to the MCDEM, is that there is a distinction between capability and capacity. Also, it essentially demonstrates that there are mechanisms in place to determine any gaps and instructs the MCDEM notify the regional CDEM group or the appropriate central government ministry in order to take corrective action.

By design, New Zealand has built its catastrophe preparedness strategy from the local level up. This commonsense approach goes beyond recognition that there needs to be better coordination at the operational and strategic levels of emergency management. It integrates local first responders as vital partners in shaping national catastrophe response policy, and they are a fundamental element. While there are other aspects of the New Zealand approach, the ones captured here are those that show promise for adaption to improve the U.S. system of emergency preparedness across all levels of government.

Ithier's assessment of the New Zealand approach is that it "not only optimizes emergency planning but it also makes better use of existing capabilities by placing responsibilities on the appropriate level for development of plans and the conduct of response operations."¹⁴⁷ Furthermore, Ithier also recognizes that the New Zealand model incorporates both operational and planning elements. Just as importantly, by stating it places responsibilities at the appropriate level, he acknowledges that local first responders are crucial in the planning process. However, New Zealand's model would face the ultimate measure of its effectiveness during an actual catastrophe.

C. FRAMEWORK ASSESSMENT

On February 22, 2011, New Zealand (NZ) suffered a magnitude 6.3 earthquake that struck the South Island, severely damaging the central business district of the

¹⁴⁶ *The National Civil Defence Emergency Management Plan Order 2005*, §8, subsection (5), paragraphs (a), (b), (c).

¹⁴⁷ Ithier, "Synchronizing Federal Operational Planning for National Catastrophes."

country's second most populous city, Christchurch. Ultimately, the earthquake resulted in 185 deaths and an estimated NZ \$40 million in damage. The earthquake resulted in a declaration of a national state of emergency that remained in effect until April 2011. Unfortunately, this disaster provided the MCDEM the opportunity to test the *National CDEM Plan* and its overall catastrophic response strategy.

The independent commissioned after action report, entitled *Review of the Civil Defense Emergency Management Response to the 22 February Christchurch Earthquake*, states, "Overall the response to this extremely challenging situation can justifiably be regarded as having been well managed and effective."¹⁴⁸ This is markedly different than the almost universal criticism FEMA received in the wake of Hurricane Katrina and the muted critiques after Super Storm Sandy. In terms of the *CDEM Plan*, the review also states that in general terms the current legislation and subsidiary documents provide an adequate basis for emergency management and that changes would be limited based on its findings.¹⁴⁹

Additionally, the review mentions several positive aspects of the response. One constructive finding was that agency command was well established across emergency services.¹⁵⁰ The British USAR team leader who flew in to assist in the response stated, "The organisation [sic] has been outstanding, the best-organised [sic] emergency I've been to."¹⁵¹ This is quite an endorsement from an experienced team that has deployed to other disasters. The review's overall critique of the response effort can be summarized in the following statement and should serve as major lesson for U.S. catastrophe planning:

In examining the Response one feature was strikingly apparent: organisations [sic] that were well prepared in advance responded much

¹⁴⁸ Ian McLean Consultancy Services, Ltd, *Review of the Civil Defense Emergency Management Response to the 22 February Christchurch Earthquake* (Christchurch, New Zealand: Ian McLean Consultancy Services Ltd, 2012), http://static1.squarespace.com/static/5006875e24ac21f35d8de8d2/t/51624a1fe4b080e511781833/1365395999422/ReviewOfTheCDEMResponseTo22FebChchEarthquake_Final+Report_4+July+2012.pdf, 27.

¹⁴⁹ *Ibid.*, 27.

¹⁵⁰ *Ibid.*

¹⁵¹ Derek Cheng, "Christchurch Earthquake: Search Teams Leaving No Stone Unturned," *The New Zealand Herald*, February 28, 2011, accessed March 31, 2014, http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10709161

better than those who were not. This was seen both at the highest level and with almost all supporting and peripheral agencies. It is a natural human reaction to any emergency to use those contacts and communication channels that apply in normal life. It was strikingly obvious that those organisations [sic] that responded most effectively had emergency responses that closely mirrored normal operations where possible and in which emergency responses had been predetermined and embedded in normal operations.¹⁵²

The New Zealand model for national catastrophic planning offers several lessons for the United States. Most importantly is New Zealand's bottom-up approach that incorporates the local communities' knowledge of their area's hazards, resources, expertise, and risk tolerance. This helps in setting expectations and accounting for asset and personnel shortcomings needed to respond to the specific challenges of that region. The conduit through which to do this is through the regional CDEM groups.

D. CONCLUSION

The New Zealand model has clearly bridged the gap between local responders and national policy planners. The CDEM groups' utilization of an extensive, collaborative, intergovernmental planning process is a proven method to form fully synchronized catastrophe response plans. The CDEM groups provide an excellent example for the U.S. to adapt and establish a similar framework to create a more efficient and coordinated national strategy that incorporates local operational response requirements. Examples of this kind of integrated government collaboration can already be found in the United States. The case studies presented in later chapters are exemplars of excellent coordinated catastrophe response plans that conform to the standards and criteria of government, non-profit, and academic emergency management measures. These standards and criteria and the source documents that established them are presented and analyzed in the next chapter.

¹⁵² Ian McLean Consultancy Services, Ltd, *Review of the Civil Defense Emergency Management*.

THIS PAGE INTENTIONALLY LEFT BLANK

VI. CRITERIA FOR EVALUATING THE EFFECTIVENESS OF CATASTROPHE RESPONSE PLANS

Preventing, protecting against, preparing for, and responding to catastrophes inside the United States requires a national approach based fundamentally on coordination and cooperation horizontally between different types of organizations such as governments, the private sector, nonprofit organizations, and individuals and vertically between the federal, state, and local levels of government (6).¹⁵³

A. OVERVIEW

One of the most significant aspects to successful catastrophe preparedness is the development of a strong, jointly-developed, intergovernmental plan. The elements that make up quality catastrophe response plans can provide insight into what aspects will assist in merging federal strategic concepts and local operational requirements. The case studies in the upcoming chapters can then be evaluated by the criteria developed as an outcome of analysis of the various standards presented in this chapter. Although equally important, the creation of a collaborative process in order to develop a plan is not the focus of this thesis. This chapter will concentrate on the standards for inclusion and the criteria by which to judge a catastrophe response plan.

Standards from non-government associations include: the *National Fire Protection Association (NFPA) 1600 Standard on Disaster/Emergency Management and Business Continuity and the Emergency Management Accreditation Program (EMAP) Emergency Management Standard*. The NFPA 1600 is a publication widely used in industrial and corporate sectors.¹⁵⁴ The EMAP Standard is the primary accreditation manual used by emergency management agencies throughout the United States.¹⁵⁵ The federal government has also developed and revised its evaluation criteria for emergency response plans.

¹⁵³ Wormuth, and Witkowsky, *Managing the Next Domestic Catastrophe*.

¹⁵⁴ David A. McEntire, *Disciplines, Disasters and Emergency Management* (Charles C. Thompson Publishers Ltd. Springfield, IL, 2007), 287.

¹⁵⁵ Emergency Management Accreditation Program, *The Emergency Management Standard*, i.

The Department of Homeland Security's *2008 National Response Framework*¹⁵⁶ (NRF) and FEMA's *Developing and Maintaining Emergency Operations Plans: Comprehensive Preparedness Guide 101* (CPG 101)¹⁵⁷ establish criteria to measure key aspects of response planning. Both share five criteria, while the earlier published NRP has an additional two listed. Academic researchers have even examined the development process and evaluative criteria for catastrophe response plans.

A scholarly work, *Researched Based Criteria for Evaluating Disaster Planning and Managing*, includes "10 general principles" to evaluate disaster planning.¹⁵⁸ This analysis was conducted by Dr. Enrico L. Quarantelli, a research professor and founding director of the Disaster Research Center (DRC) at the University of Delaware. This builds upon his earlier research on this topic and is also included in this thesis for analysis and comparison.

The analysis of these sources has found commonalities among each of the various measures and any criteria that are universal to all of the source publications. The evaluation also identified differences among the various standards, criteria, and research. An analysis of the evaluated measures established criteria for those characteristics and metrics to evaluate catastrophe response plans. The five primary sources are discussed in greater depth in the following sections.

B. NATIONAL RESPONSE FRAMEWORK AND COMPREHENSIVE PREPAREDNESS GUIDE 101

The 2008 and 2013 versions of DHS's *National Response Framework* (NRF) are both strategic in scope. In its introduction, the 2008 NRF is described as "a guide to how the Nation conducts all-hazards response."¹⁵⁹ This NRF gives an overview of the United States' preparedness system describing the roles and responsibilities of the multiple federal agencies and the general structure of state emergency management. Additionally,

¹⁵⁶ U.S. Department of Homeland Security, *National Response Framework* (2008).

¹⁵⁷ Federal Emergency Management Agency, *The Comprehensive Preparedness Guide 101*.

¹⁵⁸ Quarantelli, *Researched Based Criteria*.

¹⁵⁹ U.S. Department of Homeland Security, *National Response Framework* (2008), 1.

covers response actions and organization, concentrating on the National Incident Management System and the recommended steps to take for an effective response. The 2008 NRF has an entire chapter dedicated to planning in which it lists the criteria of the “key aspects of response planning.”¹⁶⁰ It concludes with a summary of additional resources that are available to emergency management practitioners to further assist in response planning. In contrast, the 2013 NRF does not have a chapter dedicated to planning and refers readers to the CPG 101, which was published in 2010 during the interim between the two versions of the NRF. However, the 2008 NRF chapter on planning has an established list of criteria to evaluate response plans: therefore, the newer 2013 version will not be referenced in this thesis.

Chapter IV of the 2008 NRF, “Planning: A Critical Element of Effective Response” has a section devoted to the “Criteria for Successful Planning.” The section lists the following criteria as key aspects of response planning:

Acceptability. A plan is acceptable if it can meet the requirements of anticipated scenarios, can be implemented within the costs and timeframes that senior officials and the public can support, and is consistent with applicable laws.

Adequacy. A plan is adequate if it complies with applicable planning guidance, planning assumptions are valid and relevant, and the concept of operations identifies and addresses critical tasks specific to the plan’s objectives.

Completeness. A plan is complete if it incorporates major actions, objectives, and tasks to be accomplished. The complete plan addresses the personnel and resources required and sound concepts for how those will be deployed, employed, sustained, and demobilized. It also addresses timelines and criteria for measuring success in achieving objectives, and the desired end state. Completeness of a plan can be greatly enhanced by including in the planning process all those who could be affected.

Consistency and Standardization of Products. Standardized planning processes and products foster consistency, interoperability, and collaboration

¹⁶⁰ Ibid., 74.

Feasibility. A plan is considered feasible if the critical tasks can be accomplished with the resources available internally or through mutual aid, immediate need for additional resources from other sources (in the case of a local plan, from State or Federal partners) are identified in detail and coordinated in advance, and procedures are in place to integrate and employ resources effectively from all potential providers.

Flexibility. Flexibility and adaptability are promoted by decentralized decision making and by accommodating all hazards ranging from smaller-scale incidents to wider national contingencies.

Interoperability and Collaboration. A plan is interoperable and collaborative if it identifies other plan holders with similar and complementary plans and objectives, and supports regular collaboration focused on integrating with those plans to optimize achievement of individual and collective goals and objectives in an incident.¹⁶¹

These seven “key aspects” from the 2008 NRF provide a good foundation for the criteria used to evaluate response plans. All of these criteria will help in merging federal stakeholders with their counterparts at the state and local level. However, the objectives of interoperability and collaboration and consistency and standardization have the most direct correlation for bridging the gap between the varied levels of government. As stated earlier, an outcome of the 2008 NRF is the CPG 101 that focuses entirely on the planning process and including developing and evaluating plans.

C. COMPREHENSIVE PLANNING GUIDE 101

The original CPG 101, released in 2008, is another government published document, this time attributed to FEMA. The “version 2.0” was released in November 2010. As the title implies the guide’s entire focus is on developing emergency operations plans. The CPG 101 asserts that it “is the foundation for state, territorial, tribal, and local emergency planning in the United States.”¹⁶²

Moreover, the CPG 101 explains the “planning environment” in its second chapter by going over the structure in which federal, state, and local plans intersect. It also addresses planning principles and processes as well as the criteria for actual plans. In

¹⁶¹ Ibid., 74–75.

¹⁶² Federal Emergency Management Agency, *The Comprehensive Preparedness Guide 101*, i.

addition, it describes different types of plans based on the level of government, the department/agency, or specific threat hazard; however, the guide only lists five criteria for evaluating plans. They are essentially five of the seven listed in the 2008 NRF; however, the CPG 101 elaborates on those not included in the list more fully in separate sections.¹⁶³

The two criteria specified in the 2008 NRF but not the CPG 101 are flexibility and interoperability and collaboration. Both of these are addressed in the first chapter of the CPG 101, “The Basics of Planning.”¹⁶⁴ Interoperability and collaboration is addressed in a paragraph with the heading “Planning Must Include Participation from All Stakeholders in the Community.” There is a greater emphasis on whole of community planning in these sections and the overall CPG 101 than there was in the NRF standard. Additionally, this section in the CPG 101 goes into depth about the inclusion of a diverse planning team to include civic leaders, businesses, faith-based, advocacy, and educational organizations, for example.

Flexibility is addressed in a paragraph with the heading “Planning Should Be Flexible Enough to Address Both Traditional and Catastrophic Incidents.”¹⁶⁵ The NRF criterion for flexibility is vague and mentions the need for scalability and is contained in a single sentence. Whereas, the CPG 101 states there are differences between incidents of varying magnitude and distinguishes catastrophes by stating, “that exceptional policies and approaches are necessary for responding to and recovering from catastrophic incidents.”¹⁶⁶

The five common criteria are listed in Chapter 4 of the CPG 101, The Planning Process. Under the section labeled as “Step 5: Plan Preparation, Review, and Approval” and the subcategory, “Review the Plan,” it states, “Commonly used criteria can help decision makers determine the effectiveness and efficiency of plans.”¹⁶⁷ It goes on to list

¹⁶³ Ibid., 4–18.

¹⁶⁴ Ibid., 1–1.

¹⁶⁵ Ibid., 1–2.

¹⁶⁶ Ibid.

¹⁶⁷ Ibid., 4–17.

the five criteria and a brief definition of each, which have been slightly modified from the 2008 NRF. Additionally, the criterion listed as “consistency and standardization of products” in the NRF has had its title changed to “Compliance” in the CPG 101. The five criteria in CPG 101 are as follows:

Adequacy. A plan is adequate if the scope and concept of planned operations identify and address critical tasks effectively; the plan can accomplish the assigned mission while complying with guidance; and the plan’s assumptions are valid, reasonable, and comply with guidance.

Feasibility. A plan is feasible if the organization can accomplish the assigned mission and critical tasks by using available resources within the time contemplated by the plan. The organization allocates available resources to tasks and tracks the resources by status (e.g., assigned, out of service). Available resources include internal assets and those available through mutual aid or through existing state, regional, or Federal assistance agreements.

Acceptability. A plan is acceptable if it meets the requirements driven by a threat or incident, meets decision maker and public cost and time limitations, and is consistent with the law. The plan can be justified in terms of the cost of resources and if its scale is proportional to mission requirements. Planners use both acceptability and feasibility tests to ensure that the mission can be accomplished with available resources, without incurring excessive risk regarding personnel, equipment, material, or time. They also verify that risk management procedures have identified, assessed, and applied control measures to mitigate operational risk (i.e., the risk associated with achieving operational objectives).

Completeness. A plan is complete if it:

- Incorporates all tasks to be accomplished
- Includes all required capabilities
- Integrates the needs of the general population, children of all ages, individuals with disabilities and others with access and functional needs, immigrants, individuals with limited English proficiency, and diverse racial and ethnic populations
- Provides a complete picture of the sequence and scope of the planned response operation (i.e., what should happen, when, and at whose direction)
- Makes time estimates for achieving objectives
- Identifies success criteria and a desired end-state.

Compliance. The plan should comply with guidance and doctrine to the maximum extent possible, because these provide a baseline that facilitates both planning and execution.¹⁶⁸

There are several differences between the definitions provided in the 2008 NRF and the CPG 101. The criterion acceptability has added additional language regarding the managing of risk to personnel, resources, and the community in the CPG 101. The definition of adequacy has remained essentially unchanged between the two documents. Under the term completeness in the 2008 NRF, it stated that the plan would have to consider “all those who could be affected.”¹⁶⁹ The CPG 101 is more specific, spelling out several of the special needs populations, such as children, non-English speakers, and individuals with disabilities, who must be cared for during a crisis. As noted above, consistency and standardization of products has been streamlined to compliance. Not only is the word standardization absent from the heading but it does not appear in the definition. Instead, the CPG 101 recommends complying “with guidance and doctrine to the maximum extent possible”¹⁷⁰ allowing for more latitude in following federal doctrine. Feasibility in the CPG 101 also includes timeframes as a measure and not just resources to complete the required tasks. As noted earlier, the categories of flexibility and interoperability and collaboration are not listed as criteria for evaluating plans but are addressed in more depth elsewhere in the CPG 101.

D. NFPA-1600: STANDARD ON DISASTER PLANNING AND BUSINESS CONTINUITY PROGRAMS

The National Fire Protection Association (NFPA) 1600: Standard on Disaster Planning and Business Continuity Programs is a non-government publication listing standards for organizations in emergency preparedness including mitigation, risk assessment, and planning and operational procedures. Chapter 5 of the NFPA 1600 is

¹⁶⁸ Ibid., 4–17, 4–18.

¹⁶⁹ U.S. Department of Homeland Security, *National Response Framework* (2008), 74.

¹⁷⁰ U.S. Department of Homeland Security, *National Response Framework* (2008), 4–18; Federal Emergency Management Agency, *The Comprehensive Preparedness Guide 101*, i.

based on planning and lists several standards including the planning and design process, risk assessment, and business impact analysis.¹⁷¹

This chapter is geared more toward the planning process and not response plans. Also, because the NFPA 1600 is intended for businesses and private entities, it does not directly correlate to the plans for a regional or national catastrophe response plan. However, there are certain standards that are applicable and can be used to evaluate an intergovernmental response plan. Standards such as 5.2 Risk Assessment, and 5.5 Performance Objectives, which are listed in the chapter on planning, can be incorporated to evaluate governmental response plans.¹⁷²

Chapter 6 of the NFPA 1600 is entitled “Implementation” and has more of the listed standards apply to the evaluation of response plans than those in the preceding chapter. All of the sub-categories in Standard 6.1 Common Plan Requirements would apply and are listed as follows:

6.1.1 Plans shall address the health and safety of personnel.

6.1.2 Plans shall identify and document the following:

1. Assumptions made during the planning process
2. Functional roles and responsibilities of internal and external, organizations, departments, and positions
3. Lines of authority
4. The process for delegation of authority
5. Lines of succession for the entity
6. Liaisons to external entities
7. Logistics support and resource requirements

6.1.4 The entity shall make sections of the plans available to those assigned specific tasks and responsibilities therein and to key stakeholders as required.¹⁷³

¹⁷¹ National Fire Protection Association, *NFPA 1600*.

¹⁷² *Ibid.*, 7–8.

¹⁷³ *Ibid.*

Other standards that would apply to the evaluation of catastrophe response plans include 6.4 Crisis Communications and Public Information, 6.5 Warnings, Notifications, and Communications, 6.6 Operational Procedures, and 6.7 Incident Management.¹⁷⁴ Of those, 6.6 Operational Procedures is the most applicable as it presents guidance on the response phase of a plan. Criteria in this standard are:

6.6.1 The entity shall develop, coordinate, and implement operational procedures to support the program.

6.6.2 Procedures shall be established and implemented for response to and recovery from the impact of hazards identified in 5.2.2. [this is an extensive list of natural occurring hazards and manmade threats that could potentially effect an entity using this standard].

6.6.3 Procedures shall provide for life safety, property conservation, incident stabilization, continuity, and protection of the environment under the jurisdiction of the entity.

6.6.4 Procedures shall include the following:

1. Control of access to the area affected by the incident
2. Identification of personnel engaged in activities at the incident
3. Accounting for personnel engaged in incident activities
4. Mobilization and demobilization of resources¹⁷⁵

Standard 6.8 Emergency Operations/Response Plans only has four subcategories. They include defining responsibilities and carrying out specific actions, protective actions for life safety, and resource and donation management.¹⁷⁶ It also refers back to the standards on warning and notification and crisis communications for inclusion in these plans. This may seem limited; however, the audience NFPA 1600 is intended for is private entities that have little if any response capabilities. Instead, they would build notification procedures into their plans to insure the proper public safety departments would respond.

¹⁷⁴ Ibid., 8–9.

¹⁷⁵ Ibid., 8.

¹⁷⁶ Ibid., 9.

Other chapters in the NFPA 1600 include standards for prevention, mitigation, and exercise and tests. These standards do not correspond directly to response plans. As such, they will not be used as criteria for the case studies presented in the following chapters. However, another private organization's accreditation standards may provide further, pertinent criteria for evaluation.

E. EMERGENCY MANAGEMENT ACCREDITATION PROGRAM STANDARD

The *Emergency Management Accreditation Program (EMAP) Standard* is published by EMAP, a non-profit organization dedicated for establishing credible standards for the emergency management communities and providing a peer reviewed accreditation process.¹⁷⁷ Therefore, the standard has broad focus on entire emergency management programs, although it has a section focused entirely on operational planning. Under Chapter 4 Emergency Management Program Elements, subsection 4.6 Operational Planning can be found. This subsection not only covers operational planning but recovery plans,¹⁷⁸ continuity of operations (COOP), and continuity of government (COG) plans.¹⁷⁹ Similar to NFPA 1600, not all the standards apply to response planning. Of the five listed in this section, three are directly related. These include Standard 4.6.1, which requires that formal planning processes involve stakeholders to be involved in the development of the plan.¹⁸⁰ Standard 4.6.2 states that operational plans need to address the following:

1. purpose, scope and/or goals and objectives;
2. authority;
3. situation and assumptions;
4. functional roles and responsibilities for internal and external agencies, organizations, departments and positions;

¹⁷⁷ Emergency Management Accreditation Program, "Our Vision," accessed May 15, 2014, <http://www.emaponline.org/.index.php/what-is-emap/our-mission>

¹⁷⁸ Recovery is considered its own separate phase apart from planning, prevention, mitigation, and response.

¹⁷⁹ Emergency Management Accreditation Program, *The Emergency Management Standard*, 7.

¹⁸⁰ Ibid.

5. logistics support and resource requirements necessary to implement plan;
6. concept of operations; and
7. plan maintenance¹⁸¹

Standard 4.6.3 lists 30 “areas of responsibility” that reflect most of FEMA’s 15 emergency support functions (ESF), such as firefighting, mass care and sheltering, and volunteer management that need to be addressed in operational plans.¹⁸² The EMAP Standard adds to the resources that are available to help in the evaluation of catastrophe response plans. Measures for evaluation that could assist in interagency collaboration from the federal government and two non-profit organizations have already been presented. Lastly, evaluation criteria researched and developed in an academic setting will be considered.

F. RESEARCH-BASED CRITERIA FOR EVALUATING DISASTER PLANNING AND MANAGING

Through his extensive research, Dr. Enricho L. Quarantelli has established 10 principles of disaster planning. These 10 measures appear throughout his published research, including *Research Based Criteria for Evaluating Disaster Planning and Managing*. In this paper, Dr. Quarantelli goes into depth about the 10 criteria for planning and 10 for managing disasters. For the purposes of this thesis, only those principles referring to disaster planning will be explored. The introduction explains just how extensive the research behind Dr. Quarantelli’s findings is:

It would be possible to advance an ideal version of what should be, but we prefer to root our answer in empirical research already undertaken by social and behavioral scientists. Although we use many specific findings from more than 500 different studies of disasters and mass emergencies done by the Disaster Research Center (DRC) since its establishment in 1963, our general observations and conclusions are based on the larger body of scientific knowledge accumulated in about four decades of research.¹⁸³

The 10 general principles this research concluded upon are listed in bold text:

¹⁸¹ Ibid.

¹⁸² Ibid.

¹⁸³ Quarantelli, *Research Based Criteria for Evaluating Disaster*, 3.

1. **Focus on the planning process rather than the production of a document.**
This is conveyed by stating “preparedness planning involves all of those activities, practices, interactions, and relationships, which over the short and long term are intended to improve the response pattern at times of disaster impact.”¹⁸⁴
2. **Recognize that disasters are both quantitatively and qualitatively different from minor emergencies and everyday crises.**
Disasters are not just a matter of scale and therefore cannot be handled as larger routine incidents. Most distinctively, disasters quickly overwhelm local capabilities and capacities requiring “more and different organizational relationships”¹⁸⁵ including those from the public, private and non-governmental realms.
3. **Be generic rather than agent specific.**
Do not plan separately for specific hazards. There are commonalities to most catastrophes that require the same resources, agencies, emergency personnel and procedures. Therefore, planning should be more generic and general and one major organization responsible for coordinating the overall planning.
4. **Avoid the development of a “command and control” model.**
Catastrophes are dynamic therefore a plan must be flexible enough to allow first responders to adapt to unforeseen or changing environments. Plans should concentrate heavily on coordination; not on control.
5. **Focus on general principles and not specific details.**
“Complex and detailed planning is generally forbidding to most potential users and will end up being ignored.”¹⁸⁶ Organizational structure should be focused on and the more tactical elements should not be overstated.
6. **Be based on what is likely to happen.**
“Good planning must be based on what realistically is likely to happen.”¹⁸⁷ It should avoid building too much on past events because every catastrophe is unique with its own set of challenges and anomalies.
7. **Be vertically and horizontally integrated**
Disasters do not impact only one sector or segment of a community; in fact, a disaster involves a disruption of community life across the board.”¹⁸⁸ This principle supports the more recently coined term of

¹⁸⁴ Ibid., 4.

¹⁸⁵ Ibid., 5.

¹⁸⁶ Ibid., 11.

¹⁸⁷ Ibid., 12.

¹⁸⁸ Ibid., 13.

“whole-of-community” effort. It directly supports the need for interagency collaboration between local, state and federal entities.

8. **Strive to evoke appropriate actions by anticipating likely problems and possible solutions or options.**

Catastrophe planning should concentrate on “appropriate actions” not on tasks found in templates or responses that are not appropriate for a specific region or community. Consequently, “it is more important to obtain valid information about what is happening than it is to take immediate actions.”¹⁸⁹

9. **Use the best social science knowledge possible and not myths and misconceptions.**

“Research has consistently shown that many popular views about disaster behavior are inaccurate.”¹⁹⁰ As a result, considerable effort is often wasted planning and preparing for predictions that will never materialize. For example, research has shown that mass sheltering is frequently not used to the estimated levels due to survivors preferring to stay in their own homes or with friends and family.¹⁹¹

10. **Recognize that crisis time disaster planning and disaster managing are separate processes.**

Planning should be viewed as preparing a community for a disaster, while managing involves the best tactics to be used to mitigate the various results of a catastrophe.¹⁹²

Each of the sources and their various measures have their own merits. Although they have different headings or titles, there are similarities across the different standards presented. An analysis of commonalities among the five sources and any resulting universally accepted criteria further aids in determinate measures that constitute smart practices in evaluating catastrophe response plans.

¹⁸⁹ Ibid., 15.

¹⁹⁰ Ibid., 16.

¹⁹¹ Ibid.

¹⁹² Ibid., 18.

THIS PAGE INTENTIONALLY LEFT BLANK

VII. COMPARISON AND ANALYSIS OF CRITERIA PRESENTED IN VARIOUS SOURCES

A. OUTLINING THE CRITERIA

Not all of the criteria from the various sources presented in the previous chapter easily translate across to one another. The NFPA 1600 and EMAP appear to be more tactical or specific in the standards that they present. Dr. Quarantelli's 10 principles, the 2008 NRF, and the CPG 101's criteria present more macro or strategic guidance. However, Table 1 endeavors to match like criteria from all of those presented from the five selected sources for comparison.

Table 1. Comparative Applicable Criteria Table

COMPARATIVE APPLICABLE CRITERIA TABLE				
2008 NRF	CPG 101	NFPA 1600	EMAP	Quarantelli
Acceptability Meets scenario's, applicable laws, costs and timeframe requirements	Acceptability	4.5 —Laws and Authorities 4.6 —Finance and Administration	4.6.2 —Parameters of legal authorities	
Adequacy Planning is valid and relevant Addresses Critical Tasks	Adequacy	5.2 —Risk Assessment		5. Focus on general principles and not specific details
Completeness Concept of Operations (CONOPS) Major actions, objectives, tasks and timelines are incorporated All stakeholders, resources & personnel requirements are addressed	Completeness	5.2- Risk Assessment 6.1.1 —Addresses the health and safety of personnel 6.1.2 —Identifies planning assumptions, roles, responsibilities, lines of authority, logistic and resource requirements 6.4 —Crisis Communications and Public Information 6.5 —Warning, notification, and communications 6.7 Incident Management (organizational structure) 6.8 —Emergency Operations/Response Plan (staffing, equipment, functions)	4.6.2 —Contains purpose, scope, goals CONOPS Logistics and resource needs 4.6.3 —List of 30 “Areas of Responsibility”	8. Strive to evoke appropriate actions by anticipating likely problems and possible solutions or options 9. Use the best social science knowledge possible and not myths and misconceptions

Consistency Applies with other policies, standards, and procedures	Compliance	6.8.4 —Compliance with regulatory requirements	3.1.2 —Has a method for evaluation, maintenance , revision and corrective action of program polices 4.2.2 —Maintains a process for identifying regulatory changes	
Feasibility Realistic and achievable with on-hand and/or obtainable resources	Feasibility	5.5 —Performance Objectives		2. Recognize that disasters are both quantatively and qualitatively different from minor emergencies and everyday crises 6. Be based on what is likely to happen
Flexibility Decentralized decision making, adaptable	*			3. Be generic rather than agent (hazard) specific 4. Avoid the development of a “command and control” model
Interoperability/Collaboration Integrated and complementary objectives	*	6.1.4 —Makes plan available to those tasked with responsibilities and other stakeholders	4.6.1 —Formal planning w/ all stakeholders	7. Be vertically and horizontally integrated
				1. Focus on the planning process rather than the production of a written document
				10. Recognize that crisis time disaster planning and disaster managing are separate processes
*Not listed specifically as a plan evaluation criteria but referred to elsewhere in the document				

It is also important to keep in mind that the intended audience and end products of the five sources these criteria were derived from also differ. For example, the NFPA 1600 is intended for private organization or “entities,” most of which have little, if any, response capabilities. In contrast, the EMAP standard is directed toward emergency management agencies, primarily in the public sector, and it is designed at a broader accreditation process for those agencies. The criteria listed in these sources tend to be more tactical because they are designed as accreditation or industry standards.

Conversely, the 2008 NRF, CPG 101, and Dr. Quarantelli’s research were specifically developed for regional disaster or catastrophe response plans. As a result, their criteria are more wide-ranging rather than narrowly focused or tactical in nature. This must be kept in mind when trying to interpret the data in the previous matrix. Conclusions can be drawn about the relevance of the criteria based on their inclusion or exclusion in the various emergency management publications or the number of individual standards that apply to a certain criterion.

For the purposes of this analysis, the 2008 NRF criteria will be used as the base or control criteria for comparison and reference against. Using this methodology, there is one true universal criterion among these five sources—completeness. It is mentioned, in one form or another, in all five publications. In addition, more of the individual standards or principles, 11 in total, relate to it. Interoperability/collaboration would also be universally accepted if it were listed as a specific evaluation criterion under the “Plan Preparation, Review, and Approval” section of Chapter 4 of the CPG 101.²⁰² However, it is referenced in more depth in an earlier chapter and should also be considered as a universal criterion among the five sources.

This is followed by acceptability, consistency/compliance, and feasibility as each listed in four documents. The criterion of adequacy appears in three documents and flexibility specifically in two documents but is also mentioned elsewhere in the CPG 101. The two principles that are found only in their own source document are: “focus on the

²⁰² Federal Emergency Management Agency, *The Comprehensive Preparedness Guide 101*, 4–16.

planning process rather than the production of a document”²⁰³ and “recognize that crisis time disaster planning and disaster managing are separate processes.”²⁰⁴ Both of these originate from Dr. Quarantelli’s work, but they speak more to processes than to criteria for the evaluation of response plans.

Working under the premise that these are five of the definitive sources on evaluating that catastrophe response plans, completeness would clearly be designated as a valid measure because of its inclusion in all of the sources. The same argument could also be made for interoperability/collaboration, which again is not specifically listed as a criteria for evaluating response plans but is mentioned in more depth elsewhere in the CPG 101. This makes it universally acceptable across all the sources. Feasibility and acceptability are also mentioned in four of the source documents, including the three that are dedicated to response plan design and evaluation: the 2008 NPF, CPG 101, and Dr. Quarantelli’s 10 principles. These criteria should also be endorsed because of their widespread use among the source documentation including those most relevant to the evaluation of response plans.

Consistency is also represented in four of the source documents; however, it is not included in Dr. Quarantelli’s research. Flexibility and adequacy are referred to in only three documents, but they are the three sources centered on response plan evaluations. They are not included in the two non-profit organization standards (the NFPA 1600 and EMAP Standard).

B. CRITERIA ASSESSMENT

With the exceptions of the two criteria that only matched one source, all of the others were referenced in the majority of the sources. Those that were included in four or more should be considered as valid criteria to evaluate response plans because of their broad acceptance. The remaining criteria are integrated in three of the five sources that included all three that are focused on intergovernmental catastrophe plans and should also be considered. Therefore, criteria from the 2008 NRF are representative of the major

²⁰³ Quarantelli, *Research Based Criteria for Evaluating Disaster*, 4.

²⁰⁴ *Ibid.*, 18.

emergency management standards and disaster planning research criteria that are currently in use.

Subsequently, the criteria set in the 2008 NRF will be the basis used to evaluate the case studies of actual catastrophe response plans that are featured as case studies in the following chapters. One case study is centered on a natural occurring hazard and the other on a man-made threat. They also differ in how they are structured; one is centered on geographical information systems (GIS) data and the other is task oriented. Both rely heavily on evidence and/or data based information in their plans. This is essential to the criteria of completeness and feasibility and should be considered an integral element to a modernized definition of these criteria. The first case study to be presented is the *Southern California Catastrophic Earthquake Plan* and the second is the *Integrated Improvised Nuclear Device Plan: City of Chicago, County of Cook, State of Illinois, and FEMA Region V*. Although the plans differ in how they are presented, each embodies the criteria of good response plans and affords outstanding templates for future planners or other researchers.

C. CONCLUSION

The eight identified criteria (acceptability, adequacy, completeness, consistency, feasibility, flexibility, and interoperability/collaboration) are consistent measures found across all five standards. The standards included publications from the federal government, nonprofit accreditation organizations, and academia. The established evaluative criteria support the leading guidance from major emergency management organizations and disaster research. Therefore, each of the criteria should be incorporated into future catastrophe or disaster plans and will be used to evaluate the case studies in the following chapters.

VIII. CASE STUDY: SOUTHERN CALIFORNIA CATASTROPHIC EARTHQUAKE PLAN

A. OVERVIEW

The state of California's catastrophic earthquake plans for the three regions primarily affected by earthquakes present well thought-out models of vertically synchronized preparedness that others should emulate. In particular, the *Southern California Catastrophic Earthquake Response Plan*, produced by the California Emergency Management Agency and FEMA Region IX, provides an excellent model that bridges the gap between strategic catastrophic planning and local operational response considerations. This empirical, data-based plan meets the criteria established in the previous chapter for sound catastrophe response plans.

The southern San Andreas Fault has generated earthquakes of magnitude 7.8 on average every 150 years. The United States Geological Survey's (USGS) estimates the last earthquake of this magnitude in southern California happened more than 300 years ago.²⁰⁵ The San Francisco earthquake of 1906 is estimated to have had a magnitude ranging from 7.7 to 8.3, and the portion of the fault system that caused it has an average occurrence rate of approximately every 200 years.²⁰⁶ The Cascadia subduction zone (CSZ) experiences a full fault rupture, with earthquakes of magnitudes greater than 7.0, once every 500 years, on average.²⁰⁷ The last major earthquake with a full CSZ rupture took place in the year 1700.²⁰⁸

As a result of these eventualities, the California Emergency Management Agency (CalEMA) and the Federal Emergency Management Agency (FEMA) have developed catastrophe plans for each of the three major areas that will be affected by major

²⁰⁵ FEMA Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*, 1.

²⁰⁶ United States Geological Survey, "Earthquake Hazards Program," accessed April 16, 2014, <http://earthquake.usgs.gov/regional/nca/1906/18april/whenagain.php>

²⁰⁷ U.S. Department of Homeland Security, FEMA Region IX, and the California Governor's Office of Emergency Services, *California Cascadia Subduction Zone Earthquake and Tsunami Response Plan*, v.

²⁰⁸ *Ibid.*

earthquakes. This case study concentrates on the planning for Los Angeles and the surrounding area that culminated in the *Southern California Catastrophic Earthquake Plan*.

Like the New Zealand CDEM groups, the authoring bodies incorporated both federal and local input to develop a comprehensive document that takes into account both the strategic view and the operational response requirements. It is important to note that the federal representation for this plan did not originate from Washington, DC but the FEMA regional office that encompasses all of California. Once again, this is similar to the New Zealand CDEM group model and is an important factor in its successful acceptance and completion.

Having regionally based federal and local practitioners work on the response plan for a catastrophe makes them intimately familiar with its overall direction and details prior to an event taking place. This also helps strengthen the relationships among the emergency services personnel that are likely to have to respond and/or manage a catastrophe and creates better respect, trust, and cooperation among the various stakeholders. Not only does this build professional relationships before the crisis strikes, but it lends credibility to the plan across all participating organizations.

B. PLAN DETAILS

The *Southern California Catastrophic Earthquake Plan* also took into account the expertise of hundreds of people. This is also reflected in the depth of the number of emergency support functions included in the plan. In fact, the plan states it:

is the result of more than 1500 emergency management professionals determining how best to use the combined capabilities of the private sector, non-governmental organizations (NGOs), local, state, tribal and federal resources to respond to a magnitude 7.8 earthquake on the southern San Andreas Fault.²⁰⁹

It is notable that not only were the different levels of government made a part of the process, including tribal institutions, but the private sector and NGOs were brought into

²⁰⁹ FEMA Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*, 2.

the planning and are integrated into the plan's concept of operation. This demonstrates great foresight and is a good illustration of incorporating the "whole-of-community" concept.

The *Southern California Catastrophic Earthquake Plan* exists in two formats—a public version and a restricted "for official use only" version. The public and restricted versions are both relatively comprehensive in conveying the overall concept of operations. However, the voluminous 612-page, restricted version contains an extensive number of finished geographical information systems (GIS) based maps and corresponding information that correlate to the operational response components of the plan. Each version of the plan is based on strong data sets that establish a firm foundation for prioritizing and directing various resources to areas of operation where their greatest impact and needs are predicted to be. This can then be used as a guide to determine where there are shortages in capacity of emergency response resources and core capabilities prior to an actual earthquake or any other catastrophe.

The public document, containing 118 pages, is also very robust and is based on the same data driven models as the restricted version and retains much of the same information. For the purposes of this thesis, only content from the publicly available version was evaluated and cited. The purpose in mentioning the for official use only (FOUO) version is to make emergency management practitioners aware of its existence and to give the reader a sense of the level of detail and resources put into this exhaustive plan, as indicated by its length.

What is immediately apparent when reading the plan is that this was not only a document published jointly by CalEMA and FEMA but that all levels of government are integrated functionally through the "Concept of Operations" section. One of the first items noted in the plan is a figure depicting "Basic Structure and Responsibilities of the Joint State/Federal Organization."²¹⁰ The figure illustrates that the plan is designed around a unified coordination group (UCG) made up of elements from federal, state, and local governments. Among the positions designated are a federal coordinating officer

²¹⁰ Ibid., 3.

(FCO), a state coordinating officer (SCO), a California Air National Guard representative, and the state adjutant general (AG), and a Department of Defense (DOD) representative (see Figure 1).

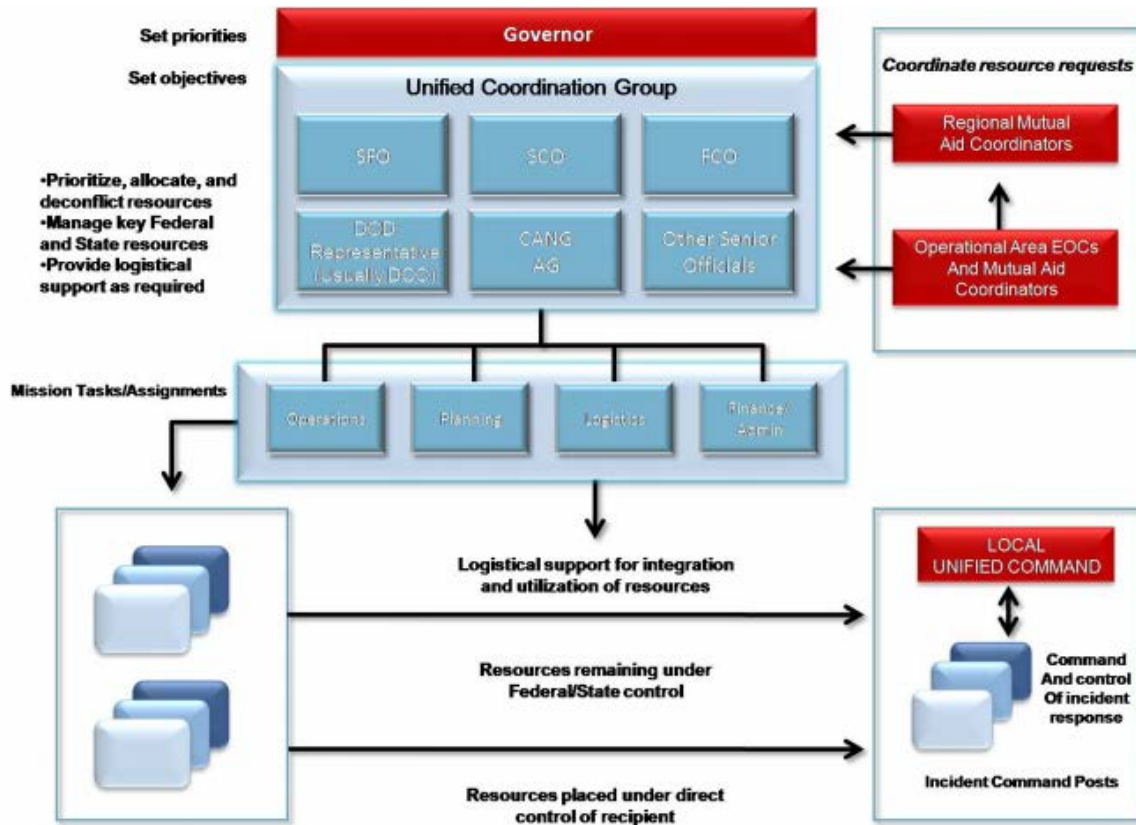


Figure 1. Basic Structure and Responsibilities of the Joint State/Federal Organization

This chart makes clear that federal, state, and local officials are to work together in a unified command structure. The fact that this is a jointly developed plan adds credibility and buy-in across agencies for the intended framework and will prevent unnecessarily modification it during an actual event. In addition, the plan's UCG exemplifies a good balance between federal and state officials in their respective disciplines. It is also important that the plan's authors have included a DOD

representative in the structure under the governor, as there has been a continual debate as to where active duty military assets fit into national catastrophe response structure.²¹¹

The plan also makes a point that the coordination between the federal and state partners permeates throughout the plan and extends beyond the top tiered UCG through the lower levels of the incident command system. The following statement is highlighted throughout the plan emphasizing this concept:

The “Unified Command” concept quite often extends into the Operations organization to the Branch and Division/Group level depending on the capability of State and Local government. As a result FEMA operations may have joint positions (FEMA, state, and/or local) throughout the organization.²¹²

Once again the development, statements, and organizational charts all provide a consistent message making it clear that the plan supports joint operations and efforts between the federal and local emergency management organizations.

C. ADEQUATELY PREPARING LOCAL EMERGENCY PROVIDERS FOR CATASTROPHIC EVENTS

The plan establishes three phases: Phase 1 normal operations, Phase 2 response, and Phase 3 recovery. The inclusion of the first phase for normal or “steady state” operations and its associated objectives of plan, organize, train, equip, exercise, evaluate, and take corrective action demonstrates the understanding that catastrophe planning does not start at the onset of the incident.²¹³ Through the plan’s following sections, it is apparent that first responders are being educated and are training for the magnitude of such an event and the degraded conditions and challenges they will be confronted with when a sizable earthquake strikes (see Figure 2).

²¹¹ Wormuth, and Witkowski, *Managing the Next Domestic Catastrophe*, viii.

²¹² FEMA Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*, 7.

²¹³ *Ibid.*, 4.

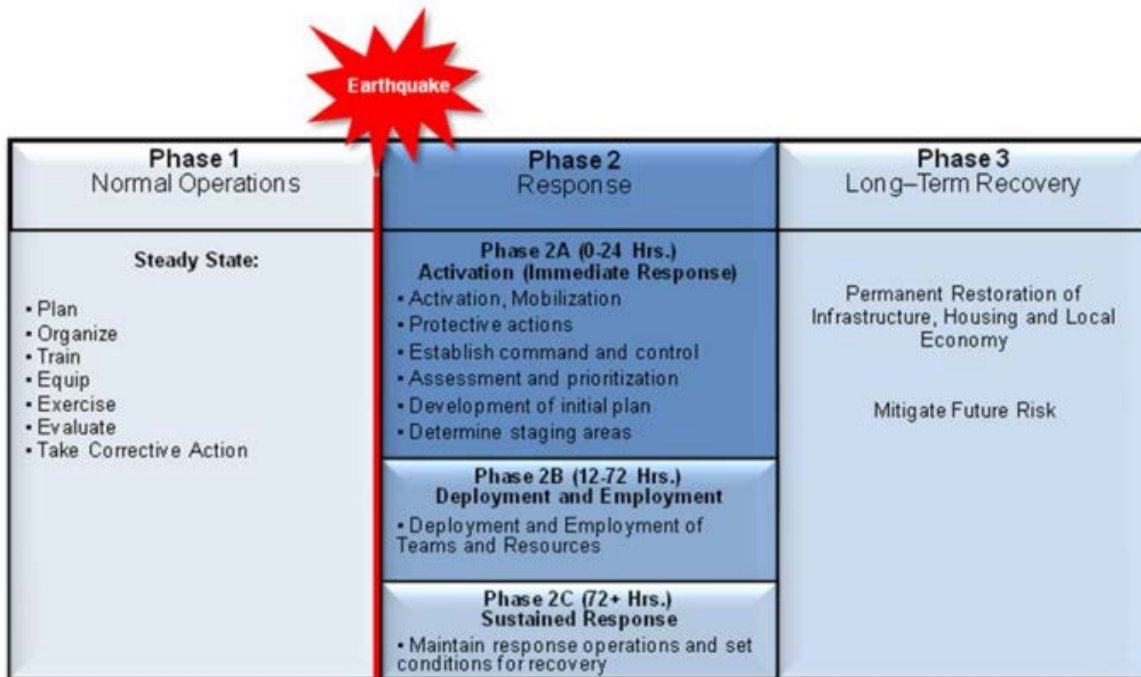


Figure 2. Phases of Earthquake Response

This is accomplished by utilizing the data-driven predictive statistics outlined in the plan to create a very bleak yet, realistic picture of the aftermath of a major earthquake occurring in the greater Los Angeles region. The plan envisions the eight counties that comprise southern California to all be affected in one form or another. Additionally, the plan describes the anticipated physical consequences of this type of earthquake to include fault offsets, landslides, and liquefaction. Under the “Critical Considerations” section, it states there will be a significant disruption of basic services including transportation, healthcare, water, power, and communications.²¹⁴

When examining the issue of hospital surge capacity based on the metrics developed for the earthquake scenario, the plan recognizes, “Demand will exceed capabilities; the system is currently taxed under normal conditions.”²¹⁵ This is reiterated by other examples, such as the need for USAR teams will be exceeded and that there will

²¹⁴ Ibid., 15.

²¹⁵ Ibid., 17.

be a “need to prioritize and merge competition for limited resources region wide.”²¹⁶ All too often, this type of blunt and pragmatic perspective is excluded from published government reports; however, it is essential in setting expectations, promoting understanding, and building personal responsibility and resiliency.

The “Critical Assumptions” section of the plan lists the following outcomes based on a 7.8 magnitude earthquake:

- 553,000 people are injured and in need of medical assistance
- 10,000 to 100,000 landslides
- 5,000 people are in completely collapsed buildings, 10,000 more in red-tagged uninhabitable buildings and 20,000 in severely damaged buildings
- 1600 fires ignite—many merge causing conflagrations engulfing approximately 4500 acres or the equivalent of 133,000 single family homes
- Fires double the initial fatality rate from the initial 1800 dead killed by the quake to over 3600 mortalities
- 140,000 hazardous material incidents occur including an anticipated three chlorine gas releases and one ammonia gas
- 300,000 buildings (1 in 16) are damaged to the point they require structural inspections
- 542,000 displaced persons require shelter
- 81 million tons of debris need removal
- 300 reservoirs fall within the affected area
- 15 percent of the 900 roads that cross the main fault will be severely damaged²¹⁷

These data-based predictions leave any one, including first responders, emergency services commanders, or elected officials, who reads them with a clear understanding of the aftermath and the enormity of the ensuing response needed to successfully begin to recover. The amount of effort that went into determining these estimates must have been quite extensive; however, the analysis of these metrics in terms of determining gaps in capability and capacity is even more impressive. The plan is an excellent example of

²¹⁶ Ibid., 15.

²¹⁷ Ibid.

preemptively comparing current resources against the estimated outcomes of an anticipated event to calculate deficiencies so they can be remediated beforehand.

The plan presents thorough analysis of capability and capacity using the various estimates of casualties and property damage delineated in the critical assumptions section. For example, the plan has identified that there are 5,926 trained building inspectors certified in the Safety Assessment Program for the estimated 300,000 structures that will require safety and occupancy inspections. The plan goes further in this category by identifying where state officials can draw capacity for additional inspectors. Additionally, it even divides this into additional subcategories for inspectors in bordering states (23) and throughout the rest of the country (416).²¹⁸ Based on these figures, California can develop a program to increase the number of certified inspectors. Furthermore, FEMA can institute training or incentives to train and make available more inspectors across the nation (realizing this is a gap in national capacity as well) or it may assess that it is satisfied with the current configuration. Whatever the decision moving forward, the emergency managers in California have a grasp of the capacity to inspect buildings and its potential impact on the response and recovery operations.

Additional analysis shows the following determinations when evaluating public health and medical services for the scenario presented. There are approximately 2600 ambulances in the state; however, 27 percent of them are components of fire departments that are also tasked with other previously noted priorities, such as fires and hazardous material incidents.²¹⁹ In the scenario, hospital functionality is decreased by 30 percent regionally and in the greatest affected areas it may be diminished by 75 percent. This results in the loss of 13,000 in-patient beds.²²⁰ Patients hospitalized at the time of the earthquake may not be directly affected, but they will need to be transported to suitable alternative medical facilities. Ambulances will also be needed to transport the estimated 40 percent of medical special needs patients from long-term care facilities in need of

²¹⁸ Ibid., 16.

²¹⁹ Ibid., 17.

²²⁰ Ibid.

immediate assistance and relocating another 60 percent that will need to be moved to other facilities after 72 hours.²²¹

Other points of this type of excellent analysis contained in the plan are the fact that 94 percent of all USAR team members are firefighters, which effects the prioritization of the tasking of those personnel.²²² Also, the region only has proper storage for 1400 bodies in order to provide mass fatality services.²²³ Knowing this, the plan has already identified the need to request federal disaster mortuary operational response teams (DMORT) and military mortuary affairs teams to supplement the local morgues and private funeral parlors. This is a prime example of local resources being supplemented by federally coordinated ones. The plan also points out that most of the 76 California landfills are almost full, requiring alternatives to remove the predicted 81 million tons of debris created as a result of the earthquake.²²⁴

This is an outstanding level of detail that is necessary in order to properly analyze and determine the anticipated capacities in a range of disciplines and their shortcomings. Phase 1 of the plan (pre-earthquake) is the optimal time to discover the types of deficiencies and establish alternatives or build supplemental capacity to close gaps. Moreover, the plan offers an exemplary template in this respect for other jurisdictions to model in their catastrophe preparedness planning. Additionally, the plan meets several of the criteria for good catastrophe plans as established in the last chapter. These include: adequacy, completeness, feasibility, flexibility, and interoperability/collaboration.

The plan goes further by instilling elements that insure it is actionable. In addition, the plan specifies a detailed training regime based on the factors resulting from the forecasted scenario. The plan's operations annex advises "private, non-profit, local, state, tribal and federal stakeholders to prepare for a catastrophic earthquake."²²⁵ It goes on to direct local jurisdictions, CalEMA, and FEMA Region IX to conduct a full scale

²²¹ Ibid.

²²² Ibid., 16.

²²³ Ibid., 18.

²²⁴ Ibid., 19.

²²⁵ Ibid., 68.

“Golden Guardian Exercise” every five years and a table top exercise or training every two years. It then instructs each level of government, mandating the necessary participating agencies including the eight southern California counties, CalEMA, FEMA Region IX, and their subsidiary sections to “organize/equip, train, exercise, evaluate and improve earthquake plans.”²²⁶

D. COLLABORATION OF STRATEGIC GOALS AND OPERATIONAL RESPONSE REQUIREMENTS

The plan addresses both strategic goals and operational requirements. Furthermore, the plan sets priorities in the scope of time by first constructing global operational goals outlined in the phases of operation. Then, for each discipline it establishes standardized benchmarks in specific terms for that emergency support function. For each group involved in the response, such as command, intelligence or operations, the annexes of the plan outlines their priorities and responsibilities through the following format:

1. Situation
2. Mission
3. Execution
4. Concept of operations:
 - Phase 1—Pre-incident (steady state), end state
 - Phase 2a—Activation (immediate response), end state
 - Phase 2b—Deployment and employment, end state
 - Phase 2c—Sustained response, end state²²⁷

This framework creates a guide for each group of responders to not only understand the tasks they are assigned but to know where they fit in during the overall response and when they should be moving on to the next mission set. An example of this is the debris removal function. The plan calls for a “phased approach to debris removal” delineating the first priorities being the major staging areas of the ports and airfields.²²⁸

²²⁶ Ibid., 27.

²²⁷ Ibid., 41.

²²⁸ Ibid., 26.

Next are primary and secondary transportation corridors that access mass care sites and those that lead to critical infrastructure so these two missions can be addressed. The plan also specifies that during these immediate phases debris will only be moved or staged in order to provide access to emergency responders and critical infrastructure restorers. It is not until the later phases that the debris is actually removed or hauled. These tasks are discussed in more depth and are listed under each phase for the overall plan so they can be synchronized with other mission areas that rely on debris removal to complete their duties during the same timeframe.

The plan has several operational considerations that are rather specific but remain flexible enough to give first responders the ability to make tactical decisions based on the future conditions on the ground. Through layered GIS analysis, the plan identifies priority response areas (PRAs). The PRAs are designated after an evaluation of three criteria: shake magnitude, population concentrations, and structural density.²²⁹ Therefore, first responders have advanced notice of the areas that will be most greatly affected by a strong magnitude earthquake and gives them starting points for their response efforts. Since they are pre-designated, even if there is a loss of communications with higher commands, first responders know where they should respond to make the most impact.

The plan indicates already pre-selected potential staging areas; however, they will not be formally designated until after damage assessments are completed. These staging areas were selected due to their abilities for offloading and staging incoming teams, equipment, and proximity to the projected incident area. Once a staging area is officially designated, it will be supplied with needed life sustaining supplies. The staging areas will then use a “hub and spoke” concept to deliver vital supplies to places where people historically have gone to seek shelter and assistance in the past.²³⁰ These areas include hospitals, stadiums, arenas, and schools. In addition, the staging areas will resupply designated points of distribution (POD) and shelters.

²²⁹ Ibid., 58–59.

²³⁰ Ibid., 70.

Public messaging is critical in any large scale disaster, and it will obviously be essential to the response to an earthquake on southern California of this magnitude. The plan's "Annex F: Public Messaging"²³¹ recognizes that many of its traditional means of communicating with the public will be greatly reduced due to the damage caused by the earthquake. However, it states first responders should continue to use traditional means of messaging, including social media but does not dismiss and rather encourages untraditional means of communication to successfully keep the public informed. To further the public information mission, several agreed upon, pre-drafted, jointly crafted (federal/state) messages are actually published in the plan for private media outlets and local municipalities alike to use. These templates address a number of foreseeable issues, including saving time and thus lives because the parties have agreed to the verbiage and context and have had them made available for use in the calm prior to the incident.

Furthermore, the plan calls for the triage of critical systems and infrastructure early on in the concept of operations. Not only is it obvious from the plan that the critical infrastructure in the predicted areas of operation have been surveyed, but private/public sector task forces for water restoration and port reconstitution have also been established. Because of the unique composition of this area, it has also created the Cajon Pass Task Force²³² to deal with the multitude of utilities and other critical infrastructures that traverse the pass from the west to provide essential services for southern California. In fact, the plan states, "In coordination with the California Utilities Emergency Association, FEMA will establish partnerships with the private sector before a catastrophic earthquake occurs."²³³

Similarly, a communications expert working group drafted the planning assumptions for the plan's communication annex, knowing there will be stresses and breaks in the existing communications systems. The plan's mission statement for the communications sector is concise, outlining the expectations before and after an earthquake. It reads as follows, "Insure the reliable, redundant, and uninterrupted

²³¹ Ibid., 82.

²³² Ibid., 6.

²³³ Ibid., 24.

communications for emergency responders during the initial phases of a no-notice disaster and to transition support to the private sector infra-structure and communication service as soon as possible”²³⁴ While this addresses the strategic intent for communications overall, the plan also addresses the operational communications needs as well.

During Phase 1 “expected communications shortfalls and requirements and concepts of operations for establishing emergency communications for responders after a catastrophic earthquake disaster”²³⁵ are to be identified and coordinated. California has already taken steps in this direction knowing that “a large number of radio transmitter/repeater sites will be non-functional; therefore, radio communications will have to transition to the Amateur Radio Emergency Services (ARES) and Radio Amateur Civil Emergency Services (RACES) networks.”²³⁶ For data and voice over Internet, California has invested in the Operational Area Satellite Information System (OASIS). OASIS provides 58 fixed satellite communications “earth stations” for each of the counties in the state and an additional six trailer-mounted, mobile platforms are operated by Cal EMA and another three by other state agencies.²³⁷ This investment in this alternative communication system is already paying dividends as it is used to manage wildfires by incident commands in remote and often rugged terrains.

E. SUMMARY

The plan is a detailed document that has utilized large amounts of data to not only predict the number of casualties and amount of damage that a catastrophic earthquake could potentially cause in southern California, but it also estimates current resources and the anticipated shortfalls in those critical areas needed to mitigate an event of this magnitude.

²³⁴ Ibid., 97.

²³⁵ Ibid., 99.

²³⁶ Ibid., 15.

²³⁷ California Emergency Management Agency, “Fact Sheet California Emergency Management Agency: Incident Telecommunications Support with Mobile Earth Station Equipment (OASIS),” 2010, www.calema.ca.gov/.../Fact%20Sheets/Handout%20OASIS-MES.pdf, 1.

The plan's extensive use of geographic information systems (GIS) and the resulting identification of priority response areas (PRA) are central to the overall plan. The plan incorporates the stakeholders of regional critical infrastructure and has developed private/public task forces to assist in restoring essential utilities as soon as possible. These are the primary strengths of the plan that will be evaluated in the following chapter against the criteria established earlier in the thesis.

IX. CRITERIA-BASED EVALUATION OF THE SOUTHERN CALIFORNIA CATASTROPHIC EARTHQUAKE PLAN

A. OVERVIEW

The previous section gave an overview of the *Southern California Catastrophic Earthquake Response Plan* and some highlights on how the plan merges federal strategy with the state and local operational requirements. The plan is very detailed in some respects but general enough to give responders the flexibility needed to work in a fluid environment. In addition, the plan meets the evaluative criteria established in the previous chapter for well-developed catastrophe response plans. The following section will provide examples from the plan that support each of the criteria.

B. ACCEPTABILITY

The plan discusses authorities, costs, and timeframe requirements. Section 1.3 Authorities lists the applicable state and federal authorities the plan operates under.²³⁸ For the state these include the California Emergency Services Act, *State Emergency Plan*, and the *California Disaster and Civil Defense Master Mutual Aid Agreement*. At the federal level, some of the authorities listed are HSPD-5, HSPD-8, the 2008 NRF, and the Post-Katrina Emergency Reform Act 2006.

The plan also has a section titled “4.0 Administration, Resources, and Funding” that meets the acceptability criterion.²³⁹ This plan discusses the responsibilities of managing financial activities among the various tiers of government, including federal aid through the Stafford Act.²⁴⁰ It also addresses the “Coordination of State Mutual Aid Agreement(s)” and the governor’s authority to implement inter and intra-state agreements.²⁴¹ Other areas in this section include the administration of policies regarding personnel and travel reimbursement.

²³⁸ FEMA Region IX, and California Emergency Management Agency, *Southern California Catastrophic Earthquake Response Plan*, 14.

²³⁹ *Ibid.*, 36.

²⁴⁰ *Ibid.*, 39.

²⁴¹ *Ibid.*, 36.

The plan manages timelines by outlining three primary phases: normal operations, response, and long-term recovery. The response phase is broken down even further into subsections. These consist of: activation (immediate response (0–12 hours), deployment and employment (12–72 hours), and sustained response (72+ hours).²⁴² The plan discusses each of the different mission areas, such as debris removal or mass care, in terms of these phases and the progress or level of their operations in conjunction with them.

These examples from the plan demonstrate its conformity with the criterion of acceptability. Additionally, it has specific sections dedicated to the main functions of this criterion. Authorities and legislation, costs, and timeframes are all covered in the plan. This standard is well rounded in this regard meeting the essential components of the criterion.

C. ADEQUACY

The plan meets the adequacy criterion by having valid planning, addressing critical tasks, and presenting an overall risk assessment. Moreover, it discusses general operational principles without becoming too rigid. The planning is clearly relevant as it addresses a natural occurring catastrophe that is an eventuality based on the best science. As the overview stated, a large magnitude earthquake occurs along the southern San Andreas Fault approximately every 150 years.²⁴³

A plan for an incident of this enormity must be addressed in general principles but simultaneously must be valid and relevant. The plan does this by defining its operational timeline in the three phases above. It gives an overview of the hazards that will be faced as a result of the predicted earthquake including fires, liquefaction, fault offsets, and landslides.²⁴⁴ The “Critical Assumptions” section is divided by objective areas that outline the challenges that may impact their operations. Other parts of the plan that round out examples of this criterion are the “Critical Considerations” section that gives an

²⁴² Ibid., 27.

²⁴³ Ibid., v.

²⁴⁴ Ibid., 14.

overview of the operations and expectations for each mission area and a “senior leaders’ intent” that provides a framework to coordinate the overall response including the unified coordination group and the National Incident Management System (NIMS).²⁴⁵

D. COMPLETENESS

Besides being thorough, the criterion of completeness strives to anticipate likely problems during a catastrophe and appropriate solutions to mitigate them. The Plan also uses the best social and evidence based sciences to formulate its responses. It incorporates many emergency management principles such as, a concept of operations (CONOPS),²⁴⁶ a crisis communications plan,²⁴⁷ and “areas of responsibility” or emergency support functions (ESF). The plan demonstrates it meets these and the other benchmarks, making it a sound operational plan that synchronizes the responses of the various levels of government into a single collaborative effort.

The plan features a CONOPS, which is one of the objectives listed under this criterion. The CONOPS is divided into the three phases of operations already mentioned. The second phase, response, is further subdivided into three additional timeframes. Tasks are incorporated into this phase to include activation/mobilization, protective actions, assessment, and prioritization.²⁴⁸ Protective actions address the risk assessment and the health and safety of personnel. The establishment of staging areas is also included in this phase, and the use of a “hub and spoke” concept of logistics is also outlined.²⁴⁹

The hub and spoke model anticipates likely problems and utilizes the best social science. Staging areas for supplies and needed resources act as the hub in this framework. These are pre-selected from likely locations such as airfields, ports, rail yards, and other established logistical centers. The plan then calls for delivery of the supplies and

²⁴⁵ Ibid., 15.

²⁴⁶ Ibid., 26.

²⁴⁷ Ibid., 97.

²⁴⁸ Ibid., 4.

²⁴⁹ Ibid., 8.

resources to those places, such as schools, stadiums, hospitals and fairgrounds, where survivors have typically congregated after a disaster.

The fact that over 1500 emergency management professionals contributed to the plan clearly demonstrates the wide variety of perspective taken into account in the plan's development.²⁵⁰ Moreover, essential private sector entities that own and operate critical infrastructure, such as power, water, and ports, were also included. These were further subcategorized into water, port reconstruction, and the Cajon Pass task forces. The Cajon Pass Task Force includes other vital functions such as communications, electric power, railroad, and natural gas services, all of which must quickly get back online, not only for restoration but to help in life saving and sheltering efforts.

The plan also demonstrates its completeness by the extensive data-based assessments it provides for the aftermath of a catastrophic earthquake. The calculations derived in the plan for the numbers of casualties, damaged structures, the tonnage of debris, and the other measures listed in the overview clearly leaves any reader with an understanding of the magnitude of an earthquake of this size and recognition that this is very different from everyday crises.

The plan identifies critical assumptions and addresses areas of responsibility for a number of important functions including public messaging, communications, emergency services, health and human services, and infrastructure.²⁵¹ In addition, the 15 emergency support functions (ESF) are listed as areas that are required to be coordinated. This meets the objectives listed throughout the completeness criterion and correlates to the EMAP Standard "4.6.3. Areas of Responsibility" and the NFPA Standard "6.8 Emergency Operations/Response Plan."

The plan meets all of the requirements outlined in the completeness criterion. Moreover, it includes all stakeholders, has a CONOPS, lists the purpose, scope, and goals and strives to provide appropriate solutions for anticipated problems and challenges.

²⁵⁰ Ibid., 2.

²⁵¹ Ibid., 15.

Furthermore, it utilizes strong data and social science in its development presenting an accurate depiction of the circumstances in the aftermath of a catastrophic earthquake.

E. CONSISTENCY

The plan is consistent with several other policies, regulatory requirements and applicable authorities that are noted in the plan. The plan has two specific sections specific to the measures outlined in this criterion. Section “3.3 Key Federal Roles and Responsibilities” states that the federal government’s response will be in accordance with the NRF and NIMS and will be carried out in accordance with the ESFs.²⁵² Section “3.4 State and Local Coordination Requirements” states all resources will be coordinated through the state in accordance with the California Emergency Services Act and the State Emergency Management System (SEMS).²⁵³

The applicable authorities have already been outlined in the acceptability criterion. The plan also assigns the appropriate agencies with authority over certain tasks such as the Department of Transportation (DOT) and Federal Aviation Administration (FAA) with operational assessment of commercial airports. Other examples can be found throughout the plan. The plan meets the various standards set in the consistency (or compliance) criterion by outlining the various federal and state policies it complies with and by assigning the applicable agency to perform tasks within their authorities.

F. FEASIBILITY

In its level of detail, the plan recognizes that this scenario is both quantitatively and qualitatively different from those emergencies that occur regularly. It also projects what is likely to happen. This is conveyed most effectively by incorporating the predicted data-based numbers such as: 140,000 hazardous material incidents, 53,000 injured persons needing medical assistance, and 542,000 displaced persons in need of shelter.²⁵⁴ As stated previously, this also provides a complete picture of the level of devastation and

²⁵² Ibid., 32.

²⁵³ Ibid.

²⁵⁴ Ibid., 65.

the magnitude of the contingencies that first responders and emergency managers would face and the need to prioritize limited resources to contend with the challenges they present.

The plan also utilizes the forecasted figures to also understand the limitations in the resources it has available and how the earthquake could affect them. Acknowledging that the scope of the situation will immediately exceed the national capacity of USAR resources is an illustration of the pragmatic assessments built into the plan. Calculating that 94 percent of California's USAR trained personnel are also firefighters further allows the emergency managers to realize an even greater shortfall in this vital skill set.²⁵⁵ This creates a realistic understanding that there are a finite number of USAR resources, particularly for a catastrophe of this scale. Therefore, the limited number of USAR assets will have to be limited to a few prioritized sites where they will have the greatest impact. This corresponds to the priority response areas (PRA) that are determined through GIS and other data.

Similar estimates were developed for structural inspectors and the number of inpatient hospital beds. Assessments of the number of shortages that can be expected in each of these areas can then be calculated and solutions developed to bridge the gaps in advance. For example, the plan accounts for obtaining inspectors from other regions in the state and outside of California. Hospital capacity outside of the southern California area can now prepare for the predicted loss of 13,000 inpatient beds resulting from an earthquake of this magnitude.²⁵⁶

It will be extremely difficult, even under the best of circumstances, to obtain the necessary resources to manage the life safety needs of those affected by any catastrophic event. However, the plan includes an extensive analysis of current resources and the potential shortfalls resulting from a sizeable earthquake. This analysis of resources and the damage estimates complete the expectations of the feasibility criterion. It also allows

²⁵⁵ Ibid., 16.

²⁵⁶ Ibid., 17.

for an accurate assessment of what to anticipate and to make contingencies based on the data-driven estimates of the aftermath of a catastrophic earthquake.

G. FLEXIBILITY

The plan meets the measures of the criterion of flexibility if it is adaptable, generic (rather than hazard specific), allows for decentralized decision making and is not a command and control model structure. On the surface, the plan may not seem to meet this criterion. It calls for the establishment of a unified coordination group (UCG), use of the National Incident Management System (NIMS), and is agent specific to an earthquake. However, a closer analysis reveals that the plan remains flexible by implementing adaptable frameworks and general emergency management practices.

As mentioned in the overview, the plan is detailed in describing the predicted negative outcomes of a large magnitude earthquake and charting critical geographical impact and response areas. However, it is general enough when addressing the operations of the different mission areas and how they are incorporated into the different phases. It does not specify individual units for certain tasks and addresses the tasks in general terms, such as public information and warning, firefighting, and mass care services.

From the command and control perspective, the senior level assembly of decision makers is named the UCG. The title is very telling of its approach to executing the plan. Rather than a single “incident commander” or even a “unified command,” the plan calls for a UCG. This translates to a merged, collective organization with a collaborative approach rather than a directed one. The UCG is a joint set of federal and state officials that the plan tasks with prioritizing, allocating, and de-conflicting resources. It also requires the UCG to provide logistical support as required.²⁵⁷

The plan does not state that the UCG will command, control, or direct resources or personnel. Rather, the intent of the plan is to clearly disperse the decision making among several officials representing both federal and local interests. Accordingly, the

²⁵⁷ Ibid., 3.

UCG will coordinate with local unified commands that will have command and control of tactical operations.

Unified commands are a component of the NIMS structure and are just one element of the adaptable framework proven to help organize and manage emergency situations. The composition of a NIMS compliant Incident Command System (ICS) organization is not pre-determined nor is it specified in the plan. This allows the unified command or incident commander to form a system that works best to mitigate the situation they are tasked with managing. The plan states NIMS will be employed during a catastrophic earthquake. This provides consistency across all levels of government yet allows the needed flexibility to those managing critical operations.

In addition, the plan's framework is flexible in and of itself. The plan does not provide a rigid structure that dispenses assignments or prescribes tactics for individual units. Rather, it incorporates a broader overall concept of operations, injects phases rather than strict timelines, and establishes a limited number of essential objective areas. Furthermore, the plan makes the distinction of identifying potential staging areas, as opposed to designating them prior to an earthquake. The staging areas will be officially designated during the post-event response based on the damage assessments from the area of operations.

The "hub and spoke" staging area methodology and infrastructure task force models presented in the plan are obviously intended for the response to a catastrophic earthquake. However, these concepts are generic enough that they may be used for almost any type of calamity including mudslides, wild fires, and flooding which also regularly impact the region. While Dr. Quarantelli's research suggests that a good response plan is not "agent specific,"²⁵⁸ the plan's operational foundations and "objective areas" could be pillars to any catastrophe response and not just an earthquake. Because of this and the other examples cited, the plan is consistent with the criterion of flexibility.

²⁵⁸ Quarantelli, *Research Based Criteria for Evaluating Disaster*, 8.

H. INTEROPERABILITY/COLLABORATION

For the plan to be deemed interoperable and collaborative according to the established evaluative measures it must be vertically and horizontally integrated with all of the stakeholders. The objectives of the plan should also be integrated, as well as complimentary of each other. The plan meets the criterion as demonstrated by several of the examples already provided in the other criteria.

As mentioned previously, the plan included the participation of over 1500 stakeholders. This included the integration of key, private sector, and infrastructure partners that were formed into task forces during the planning phase. The formation of the UCG is a primary example that shows the plan is both vertically and horizontally integrated. The plan states,

The 'Unified Command' concept quite often extends into the Operations organization to the Branch and Division/Group level depending on the capability of State and Local government. As a result FEMA operations may have joint positions (FEMA, state, and/or local) throughout the organization.²⁵⁹

This also insures synchronization across the various tiers of government.

Having the plan's response phase and the sub-phases of activation, deployment and employment, and sustained response correlate with the various objective areas removes impediments to making forward progress during the response. This ensures that specific functions are prioritized during these corresponding phases. It also allows for tasks to complement and build upon earlier performed assignments thus enhancing subsequent actions.

I. SUMMARY

The Southern California Catastrophic Earthquake Plan meets the objectives listed in the criteria from the leading emergency management standards outlined in the Comparative Applicable Criteria Table. Its extensive use of data-based planning lends authority to the criteria of adequacy, feasibility, and completeness. The considerable

²⁵⁹ Ibid., 7.

number of stakeholders, including the private sector and non-profit organizations, supports the interoperability/collaboration criterion. The plan's concept of operations and operations plans are broad enough to be flexible but contain enough specificity to be complete. The plan meets regulatory, legal, and other authorities and is compatible with state and federal guidelines.

The plan is an exemplar of intergovernmental collaboration and planning for a foreseeable natural hazard. Also, the plan incorporates several standard emergency management principles, which make it adaptable for other contingencies besides an earthquake. This chapter establishes that the plan meets the objective standards of the primary sources in the field of emergency management.

The next case study examines the response plan for a more random, manmade catastrophe—the detonation of an improvised nuclear device (IND) in a highly populated metropolitan area. It uses a very different format to achieve many of the evaluative criteria yet has many similarities to this chapter's case study. It is presented to give an alternative model for planners and emergency managers to consider.

X. CASE STUDY: THE INTEGRATED IMPROVISED NUCLEAR DEVICE RESPONSE PLAN: CITY OF CHICAGO, COUNTY OF COOK, STATE OF ILLINOIS, AND FEMA REGION V

A. OVERVIEW

The *Integrated Improvised Nuclear Device Plan: City of Chicago, County of Cook, State of Illinois and FEMA Region V* differs from the southern California plan in that it addresses a deliberate, man-made event. Although it utilizes GIS data, the Chicago plan is centered on an ambitious and detailed execution checklist. This effectively merges federal strategic concerns with local operational necessities. This case study is similar to the previous one due to its collaborative development among agencies from the various echelons of government, non-government organizations, and the private sector. This plan also makes extensive use of regional data and scientific modeling to create a firm understanding of the conditions created by the detonation of an improvised nuclear device (IND). In this, it provides an interesting contrast to compare to the southern California case study.

The Integrated Improvised Nuclear Device Response Plan: City of Chicago, County of Cook, State of Illinois and FEMA Region V is a catastrophe response plan that was developed around the scenario of an IND that is detonated at ground level within the confines of the city of Chicago. Although the immediate effects of the IND will devastate a major portion of the city, the ensuing collateral damage caused by radioactive fallout and the cascading effects caused by the thermal and blast damage will be widespread over a multi-state region. The projected cost to remediate and recover from such an event is projected to be in the hundreds of billions of dollars.²⁶⁰

Like the previous case study, this plan is also very detailed and provides an excellent example for other jurisdictions to consider when developing a plan of their own. The plan acknowledges that all catastrophes begin as local events regardless of magnitude and have to be managed at the local level until outside or higher level

²⁶⁰ FEMA Region V, *Integrated Improvised Nuclear Device Response Plan*, 1.

assistance arrives. However, as the full title implies, the plan is a collaboratively derived document between local, state, and federal stakeholders.

Paul Preusse, the Director of the FEMA Region V Response Operations Division and a principal partner in drafting the plan, talked about the importance of building collaborative efforts and the keys to an effective process. He explained,

To enable such regional planning efforts it is essential to create collaborative consortia that bring together the key stakeholders from all segments of government, non-profits, business, academe and the community. Gaining everyone's involvement is necessary to establish an enabling rapport and trust among the participants that will foster information sharing and coordination. These regional consortia are also essential to identifying and assessing preparedness shortfalls, endorsing the activities chosen for implementation, and undertaking individual and collective solutions to address the gaps.²⁶¹

B. PLAN DETAILS

The base plan section of the overall plan consists of 59 pages and has several appendices and annexes, including an innovative and functional "execution checklist" that is the primary instrument that makes the plan operational. Due to the nature of the threat it addresses, the entire plan is designated For Official Use Only (FOUO) and will only be discussed in broad terms to provide an overview of the strengths and positive attributes of the plan. However, the plan can still be evaluated to provide an effective case study. A copy of the draft version can be requested from the FEMA Region V Office for vetted purposes.

Like the *Southern California Catastrophic Earthquake Plan*, the regional FEMA office performed the main federal role in developing the plan. As stated in the case study from California, this allows for federal representation that is more knowledgeable of the region and the state and local participants who also contribute to the plan. In any enterprise, personal relationships, and local understanding of the issues are essential. This

²⁶¹ Paul Preusse, "Mega City/Mega Disaster Reduction" presented at National Center for Research on Earthquake Engineering Conference, Taipei, Taiwan, May 2014, <http://conf.ncee.org.tw/Proceedings/0-I0990506/06%20Concurrent%20Working%20Group%20Discussions/Bio%20&%20Position%20Papers/Preusse%20Paul.pdf>.

is even more important during emergency situations and crucial during an incident on the scale of an actual disaster or catastrophe.

In order to formulate a coalition to work on the plan, the Homeland Security Exercise and Evaluation Program's (HSEEP) framework, developed by DHS, was used to assist in the creation of the plan over a multiyear process.²⁶² It began with a series of workshops that included area emergency managers as well as officials from other government agencies, national voluntary organizations active in disasters (NVOAD), and representatives from the private sector.

As stated in the New Zealand comparative model and the southern California case study, the inclusion of the private sector, particularly those who own and operate critical infrastructure, such as energy and water utilities, are crucial to any response to a catastrophe. These stakeholders absolutely need to be a part of the planning phase before a catastrophe strikes. Similar to the New Zealand CDEM model, elected officials were also instrumental in participating in the initial planning stages and most importantly placing their support behind the development of the plan.²⁶³

C. BASE PLAN

The base portion of the plan generally illustrates the magnitude of the catastrophic event caused by the detonation of an IND and recognizes there will be cascading effects that will substantially overwhelm not only the abilities of emergency responders but the ability of all levels of government to respond. As did the southern California plan, this plan recognizes that the primary critical infrastructures will be greatly affected but also does an excellent job of highlighting the fact that those commodities essential to life saving operations, such as fuel and water, will also be severely impacted.²⁶⁴ In addition, the Chicago plan uses data to estimate the loss of these commodities due to the destruction of their storage areas, distribution networks, or supply chains. Moreover, it

²⁶² U.S. Department of Homeland Security, *Homeland Security Exercise and Evaluation Program (HSEEP)* (Washington, DC: U.S. Department of Homeland Security, 2013), http://www.fema.gov/media-library-data/20130726-1914-25045-8890/hseep_apr13_.pdf.

²⁶³ FEMA Region V, *Integrated Improvised Nuclear Device Response Plan*, 8.

²⁶⁴ *Ibid.*, 25.

also calculates the projected burn rates or daily allotment of these commodities for these emergency response resources that are vital to mitigating the physical damage of the catastrophe and caring for displaced survivors.²⁶⁵

The plan uses evidence based analysis and relies heavily on comprehensive research, extensive data, and modeling. It incorporates traditional technologies, such as GIS systems, but also includes the Nuclear Evacuation Analysis Code (NUEVAC)—a “tool for evaluation of sheltering and evacuation responses following urban nuclear detonations” that was developed by the Sandia National Laboratory.”²⁶⁶ The federal Interagency Modeling and Atmospheric Assessment Center (IMAAC) also provided radiological fallout plume modeling. Based on the expertise of the center’s personnel, the fallout is expected to extend well beyond the initial blast site and have an extended affect in Illinois and the surrounding states.²⁶⁷ Additionally, both of these modeling concepts are incorporated into the operational section of the plan to assist in directing the response.

The plan also utilizes modeling to predict the size of the geographic area expected to be affected by the kinetic effects of the IND. This allows for the designation of specific damage zones that inform emergency responders and managers of the level of destruction in impacted areas. First responders can then safely establish lifesaving operations in light and moderately damaged areas outside of the fallout plume’s direction of travel. Definitions of what constitutes the different levels of damage zones are stated in the base plan, allowing those in the field to properly assess and differentiate the different zones and safely function in them.²⁶⁸

The plan also uses scientific modeling to describe, in detail, the estimated number of fatalities and injured casualties.²⁶⁹ This is further broken down into sub-categorizes of the triage classification of those patients. The plan even includes an estimate of the

²⁶⁵ Ibid., 31.

²⁶⁶ Larry D. Brandt, and Ann S. Yoshimura, *Analysis of Sheltering and Evacuation Strategies for a Chicago Nuclear Detonation Scenario* (Livermore, CA: Sandia National Laboratories, 2011), <https://nige.files.wordpress.com/2011/12/brandt-and-yoshimura.pdf>.

²⁶⁷ FEMA Region V, *Integrated Improvised Nuclear Device Response Plan*, 29.

²⁶⁸ Ibid., 12–13.

²⁶⁹ Ibid., 23.

number of people who will suffer from acute radiation sickness, which is a condition that is specific to this type of event and requires specialized expertise and treatment.²⁷⁰ Therefore, any gaps in capability or capacity in this specific area of medical treatment can be addressed ahead of time.

As stated, the plan provides precise estimates that are restricted; however, a recent exercise conducted by the National Capital Region Incident Management Team (NCR-IMT) based on a similar scenario that occurs in Washington, DC, may provide some insight as to the magnitude of the numbers of casualties that may be involved. The NCR-IMT scenario predicts approximately 70,000 fatalities immediately occur and within 24 hours another 39,857 are also estimated to die.²⁷¹ The NCR-IMT exercise scenario also states, “Injuries and radiation exposure leave another 284,850 people with varying probabilities of dying in the hours that follow. Without medical attention, another 60,641 fatalities are virtually assured.”²⁷²

The plan even provides an approximation of the percentage of emergency response resources and personnel that are expected to be directly impacted and therefore inoperable as a result of the detonation. This demonstrates that an even greater workload will be placed on the remaining, functional assets and an even heavier reliance on outside resources. The most important lesson learned from this is that detailed analysis is what permits those developing catastrophe response plans to effectively and accurately forecast the resource requirements necessary to implement and respond to the respective scenarios they are formulating. Planners therefore must insure that they account for the anticipated losses of resources when determining the additional capacity required to mitigate a catastrophe.

As in the southern California case study, the Chicago plan’s analyses also help subject matter experts at the federal level provide a better understanding of the scope of the event to local first responders. This is especially important in this specific scenario

²⁷⁰ Ibid.

²⁷¹ *NCR IMT Spring Exercise 2014—Operation Unified Resolve* (Vienna, VA: Ascentra Inc., 2014), 10.

²⁷² Ibid.

because many first responders may have the false impression that there is little if anything they can do in response to the aftermath of a detonation of a relatively low yield nuclear weapon. The plan clearly explains that this is not the case and presents informative guidance and parameters on how and when to safely operate in this specific type of catastrophic environment.

D. PRE-DESIGNATING

The plan is also successful in its use of pre-planning, including the establishment of regional hub reception sites and the identification of major routes of vehicular ingress and egress that are anticipated to be limited in damage and alternative means of mass transit. It also discusses pre-staged resources and a “contact list” of stakeholders and essential service providers needed in the event of a catastrophe and is included as one of the appendices.

The plan also addresses specific areas listed in the source standards and in the completeness criterion that can be maximized through pre-planning including public messaging. Having already established and agreed upon public service and other messages is essential when time sensitive events, such as the direction and movement of radioactive fallout plumes, need to be immediately communicated. This also promotes consistency among all stakeholders and empowers any agency, regardless of the level of government, to rapidly deliver vital public messaging as soon as possible in order to save lives.

Another area of plan asserts the need for pre-event education of the public, especially of the importance of sheltering in place in the initial hours after the detonation. It also expresses the importance of the private sector to develop policies, protocols, and physical measures that harden critical infrastructure to make them more resilient to the threat of an IND and subsequently to other hazards. Emphasizing these pro-active steps prior to an event will reduce the burden on first responders by limiting the number of people requiring assistance and getting more essential services functioning more quickly to assist in supporting emergency functions.

E. EXECUTION CHECKLIST

The authors of the plan make a point to mention that it is not based on an organizational chart but instead on sound operational strategies that can be implemented by any agency in the impacted area.²⁷³ Whereas, California's catastrophic earthquake plans incorporate a significant amount of data from GIS information systems, the Chicago plan is more limited in this standpoint. Unlike established fault lines, the exact location of an IND detonation is not fixed and the direction of the resulting radiological fallout plume is dependent on several meteorological and other factors. Therefore, the cornerstone of the plan is the detailed execution checklist appendix.

The execution checklist is a functional matrix consisting of headings of major functional categories followed by subcategories of tasks that uses the core capabilities listed in DHS's *National Preparedness Goal*²⁷⁴ as its foundation. It is a comprehensive appendix to the base plan that is linearly designed and outlines chronological decision points or tasks to be completed in set timeframes, beginning immediately after the detonation of an IND through the evolution of 72 hours post-blast and ending when the state unified area command intends to transition to a federal unified coordinating group.²⁷⁵

The tasks listed in the execution checklist have been collectively predetermined and prioritized by the plan's many contributors. The benefit to this is that it enhances sense making during the chaos inherent in catastrophic events because it has already established the prioritization of individual tasks that are built upon in a logical, sequential order that maximizes lifesaving efforts.

This too is essential because the purpose behind the established order that some of these tasks follow may not be so evident. An overly simplified example of this is that the restoration of the water supply must precede the task of firefighting. Consideration to those missions that save the most lives is also an essential factor in ranking these

²⁷³ FEMA Region V, *Integrated Improvised Nuclear Device Response Plan*, 4.

²⁷⁴ U.S. Department of Homeland Security, *National Preparedness Goal*, 2.

²⁷⁵ FEMA Region V, *Integrated Improvised Nuclear Device Response Plan*, Appendix 1–89.

competing priorities. Therefore, one of the plan's first tasks is to institute public messaging to advise survivors to shelter in place and take other lifesaving measures.²⁷⁶ On the surface, this may not appear to be as essential as some other traditional emergency service functions. However, public messaging has been determined by the planning group to have the potential to save the most lives, thus reducing the inevitable and immediate strain on resources.

The execution checklist also catalogs the organization that is responsible for a particular task. The responsible agency can then be located in the contact list appendix and communicated with to see if it is still capable to execute the essential function or if it is no longer able to so. The matrix is also designed to allow the user to simply track a task from the time it began and the progress being made by indicating it as pending, in progress, or completed.²⁷⁷ An additional benefit to the execution checklist is that almost anyone can utilize it to initiate response operations in a methodical and organized fashion by following the sequential format. This also allows for separate units and commands to move in the same direction in mitigating the incident even when communications between them are lost. Therefore, the cumulative sum of their individual units' efforts will still have a positive aggregate effect on the incident.

F. SUMMARY

The plan is an outstanding exemplar of the merging of national catastrophe preparedness strategy and operational response guidance. The base plan portion provides a detailed strategic overview of the predicted situation and circumstances first responders can expect to encounter based on data analysis, modeling, and subject matter expertise from the federal level. The execution checklist provides a functional, user friendly means for emergency response personnel beginning at the local level to implement the appropriate sequence of operational tasks and decision points that will maximize the effectiveness of interdependent tasks and lifesaving actions.

²⁷⁶ Ibid., Appendix 1–1.

²⁷⁷ Ibid., Appendix 1.

This chapter has provided a thorough overview of the plan despite it being restricted as FOUO. The plan also provides a solid basis for further assessment. The next chapter will evaluate the plan against the criteria established in Chapter VI and the Comparative Applicable Criteria Table.

THIS PAGE INTENTIONALLY LEFT BLANK

XI. CRITERIA-BASED EVALUATION OF THE INTEGRATED IMPROVISED NUCLEAR DEVICE RESPONSE PLAN: CITY OF CHICAGO, COUNTY OF COOK, STATE OF ILLINOIS AND FEMA REGION V

A. OVERVIEW

Although the Southern California response plan's framework and methodology is different from the *Improvised Nuclear Device Response Plan: City of Chicago, County of Cook, State of Illinois, and FEMA Region V* it also meets all of the criteria established in Table 1, the Comparative Applicable Criteria. This chapter will outline how the Chicago plan meets each of the criteria. In some instances it will have similarities to the New Zealand CDEM comparison and the southern California case study while it will also cite independent validation of the evaluative criteria.

B. ACCEPTABILITY

The plan will be acceptable if it meets applicable laws and authorities. In addition, the plan must outline associated timeframes and procedures to capture and work within delineated costs. The plan's first chapter includes Section 1.3 which encompasses authorities. The section covers statutes and regulations, executive orders, and presidential directives. The sources cited include the Post-Katrina Emergency Management Reform Act of 2006, the Defense against Weapons of Mass Destruction Act, Executive Order 12656, and HSPD-8. Additional authorities are listed under headings such as environmental, military and chemical, biological and nuclear authorities.²⁷⁸

Chapter 4.0, Administration, Resources, and Funding, addresses the costs requirement of this criterion.²⁷⁹ Section 4.1.2 Senior Financial Advisor Responsibilities and 4.1.4 Financial Oversight are specific to accounting for the costs associated with implementing the plan.²⁸⁰ The plan also states that it does not impact or alter the

²⁷⁸ Ibid., 9–11.

²⁷⁹ Ibid., 53–56.

²⁸⁰ Ibid., 53–54.

responsibilities of the senior financial advisors of any federal, state, or local department or agency; however, it also states that FEMA's Office of the Chief Financial Officer provides the overall management of multi-agency coordination centers including region response coordination centers and joint field offices. It references the *National Response Framework* and its "Financial Management Support Annex" for guidance for management of federal agencies.²⁸¹

Section 4.3 Funding elaborates on the Stafford Act and establishes federal financial reimbursement for presidential declared disasters for federal as well as state and local response agencies. This section emphasizes that all participants must comply with established processes and laws and are responsible for tracking eligible expenditures. It concludes by stating that the FEMA mission assignment process is the mechanism for obtaining assistance under the Stafford Act.²⁸²

The plan's major component, the execution checklist, clearly fulfills the criteria's objective of addressing timelines. The logical, sequential checklist delineates tasks that must be addressed in a pre-determined sequence during the outlined phases of operations. This will maximize the efficiency of limited resources and maximize the number of lives saved. The execution checklist allows for the continuity of a unity of effort even though communications are anticipated to be severely hampered or have completely failed. By following the execution checklist, independently operating units can intrinsically work in a coordinated fashion although they may not be able to communicate with each other.

The Plan meets the criterion of acceptability as detailed above. The authorities and administration chapters of the plan respectively address the requirements of complexity with applicable laws and costs. The plan's execution checklist provides an excellent framework for managing operations within an established timeline. Combined these examples complete the established measures for this criterion.

²⁸¹ Ibid., 53.

²⁸² Ibid., 56.

C. ADEQUACY

In order to meet this criterion the plan must include valid and relevant concepts and address critical tasks. This may take the form of a risk assessment when a specific threat is not anticipated. The plan should also focus on general principles and not specific details. These measures create the basis for this criterion.

The plan meets this criterion in several ways. The situation chapter provides an overview of the nature of an IND detonation and puts it into context. This includes the scope of the affected geographic area, number of projected casualties, and the potential extent of damaged infrastructure. Radiological factors unique to this scenario, such as nuclear fallout and acute radiation sickness, are also mentioned. Since there has never been an IND detonation, the plan discusses other comparable radiological incidents, including Three Mile Island, Chernobyl, and Hiroshima and Nagasaki, to provide a baseline understanding of the magnitude of this type of potential scenario.²⁸³

The threat section and its 15 subsections go into depth regarding the effects of an IND. These comprise the kinetic or immediate blast results, thermal effects, and radiological consequences. This portion of the plan also discusses the anticipated injuries that result from an IND's destructive effects. The plan then discusses the specific impacts of the aftermath of an IND detonation relative to Chicago by listing specific data for the predicted number of casualties and other after effects.²⁸⁴

Section 1.1.2 Scope summarizes the operations plan. It states that the overarching mission of the plan is to save lives, and it emphasizes that it was *not* designed around an organizational chart. The plan establishes its primary and most effective lifesaving strategy as sheltering from the blast and the need to prepare for and work toward this goal.²⁸⁵

Similar to the southern California plan the Chicago plan has a critical assumptions section in the first chapter; however, it also has sections on critical considerations and

²⁸³ Ibid., 5–8.

²⁸⁴ Ibid., 11–23.

²⁸⁵ Ibid., 4.

mission-essential tasks. The critical assumptions and considerations section overlaps with these last two sections by emphasizing the need for a unified vertical response across all echelons of government. The two sections differ in that the critical assumptions section primarily deals with the effects of an IND, whereas the critical considerations section addresses factors of response planning. The mission essential tasks list broad operational necessities that must be accomplished in the immediate aftermath of the detonation of an IND.

The plan also incorporates a brief mission statement emphasizing lifesaving as the ultimate goal until operations can be effectively transitioned to a unified coordination group.²⁸⁶ There is also a senior leaders' intent that reiterates many of the mission essential tasks and focuses on the importance of properly managing an incident for those critical first 72 hours.²⁸⁷ Collectively, these parts of the plan and those previously reviewed under this section meet the measures defined in the adequacy criterion.

D. COMPLETENESS

The requirements delineated for the criterion of completeness are the inclusion of a concept of operations (CONOPS) and the incorporation of major actions, objectives, tasks, and timelines. Other requisites include the purpose, scope, and goals. To be complete a plan should also include a needs assessment of stakeholders, resources, and personnel. Additionally, plan that is complete will also define mission areas or assign responsibilities for the various emergency support functions (ESF). Furthermore, a complete plan should anticipate likely problems and envision appropriate solutions or alternatives. The best social and data-based sciences should be used in the design of the plan making it as empirically sound as possible. The Chicago plan complies with all of these evaluative standards using a comprehensive framework intended to promote a unity of effort even in the event of catastrophic losses of resources and infrastructure.

The plan includes a CONOPS. It is based upon the same phases as those utilized in the southern California plan—pre-incident, immediate response (the first 24 hours),

²⁸⁶ Ibid., 31.

²⁸⁷ Ibid., 32.

deployment (24 to 72 hours), sustained response (72 + hours), and short- and long-term recovery.²⁸⁸ The CONOPS recognizes that the capabilities and capacities of state, local, and federal resources will immediately be exceeded and prioritization of those remaining assets will be critical.²⁸⁹

The CONOPS also affirms the need to designate exclusion and tiered operational zones based on the hazards caused by the IND's blast and radiological fallout plume models. Furthermore, the plan's CONOPS discusses major actions that must be taken during the response phase to include evacuation, logistics and transportation mission functions. In addition, the CONOPS also addresses the initial command structure and how it evolves and transitions during the various phases.

The major phases outlined in the CONOPS broadly address the criterion's requirement for operational timelines. The combination of the standard incident phases along with the detailed execution checklist annex makes this measure of the completeness criterion exceedingly complete. This provides both a strategic overview of what stage the incident is functioning under and a tactical matrix for first responders to follow and synchronize operations.

The execution checklist also exemplifies the criterion's measures of integrating tasks and objectives. As described earlier, the execution checklist is a chronological annex of sequential tasks that are required to be completed over the three phases encapsulated in the first 72 hours. The list is very extensive and entails functions of all of the ESF's and the EMAP Standard's 30 areas of responsibility. It also delineates responsibilities among the numerous stakeholders. The sections of the plan mentioned in the criterion of adequacy, including the mission essential tasks, obviously addresses tasks and objectives and the senior leader's intent substantiates the scope and purpose of the plan.

The plan also addresses personnel and resource requirements. Like the southern California plan it calculates the projected losses in capacity of emergency medical

²⁸⁸ Ibid., 36–39.

²⁸⁹ Ibid., 36.

facilities; however, it also predicts the IND's impact on other public safety departments.²⁹⁰ This will allow for the region to not only plan for resources to mitigate the physical effects but also arrange for supplementation for the anticipated reduction in capacity in emergency response resources. The Chicago plan even examines, in detail, the estimated shortfalls in commodities essential for lifesaving such as fuel and potable water.²⁹¹

The "Planning Scenario Planning Assumptions" section provides additional examples of areas that will also be affected by an IND detonation, such as government services, banking and finance, and extensively on infrastructure and utilities.²⁹² These areas are supported by data, evidence-based research, and extensive modeling. GIS systems analysis is utilized to estimate and differentiate the extent of the damage zones, while the scientific methodologies such as the Nuclear Evacuation Analysis Code (NUEVAC)²⁹³ and the expertise of the Interagency Modeling and Atmospheric Assessment Center (IMAAC) are used to provide information regarding the radiological effects of an IND detonation.²⁹⁴

The plan meets the established requisites in Chapter VI for the most comprehensive criterion of completeness. It has a well-developed CONOPS and addresses other measures by incorporating goals, major actions, purpose, and scope through the range of other sections. Timelines and tasks are detailed in the execution checklist. The plan also makes extensive use of data and evidence based planning as well as other scientific models. These examples also demonstrate the plan's anticipation of problems and potential solutions. As a result, it anticipates several significant problems and has developed solutions in the form of tasks in the execution checklist. The plan therefore thoroughly meets the criterion of completeness.

²⁹⁰ Ibid., 23.

²⁹¹ Ibid., 23–27.

²⁹² Ibid., 23,24,28.

²⁹³ Ibid., Appendix 1–43.

²⁹⁴ Ibid., 40.

E. CONSISTENCY

The criterion of consistency insures a plan complies with regulatory requirements, and other policies, standards, and procedures. The Chicago plan conforms to several of these measures, many of which are outlined in the plan's guiding principles section. These include:

- *Presidential Policy Directive-8, National Preparedness*
- *The National Response Framework*
- *The National Preparedness Goal*
- The National Incident Management System (NIMS) and the Incident Command System
- the DHS planning guidance *Strategy for Improving Response to and Recovery from an IND Attack*
- The Atomic Energy Act of 1954 (AEA) U.S.C., §2163
- The Occupational Safety and Health Act of 1970
- The Post-Katrina Emergency Management Reform Act (PKEMRA) of 2006
- *The Illinois Statewide Communications Interoperability Plan (SCIP)*
- *The National Emergency Communications Plan (NECP)*
- *The FEMA Regional Planning Guide*
- *Comprehensive Preparedness Guide (CPG 101)*²⁹⁵

The above listed resources that the plan draws from are not all inclusive; however, these resources represent both state and federal guidelines. They also include a spectrum of policies and regulations that address emergency management principles, radiological considerations, and interoperability of communications. The range of these regulations and procedures from the different tiers of government firmly establishes that the plan is compliant with the criterion of consistency.

F. FEASIBILITY

In order to meet the requirements of the criterion of feasibility, the plan must recognize that disasters are quantitatively and qualitatively different from everyday

²⁹⁵ Ibid., 3.

emergencies and everyday crises. It also must be based on what is likely to happen. The plan does this by first stating that all echelons of government will initially be overwhelmed and that resources will not only be significantly strained but actually will be critically reduced instantaneously upon the detonation of an IND.²⁹⁶

Just as in the southern California plan, the Chicago plan also has utilized an extensive amount of data to calculate the estimated number of casualties, damage zones, and impact on critical infrastructure and essential resources. This further supports the criterion's measures, creating as realistic of an understanding of the impacts as possible.

As a result of the detailed analysis of the likely outcomes of the scenario, and evaluations of national and local capabilities and capacity, a gap analysis can be conducted. Strategically, the federal government gains an understanding of the gaps in technical capabilities and general capacities that will be needed for this type of scenario. It also can plan where to obtain some of the needed resources from or fund new efforts to build a certain capability shortfall. Tactically, this level of technical detail better informs first responders how to safely work in and around the hazards presented in this type of attack. This literally lends itself to the feasibility of the plan.

The sheer magnitude of an IND detonation and the immediate loss of vital resources and critical infrastructure make it impossible to have enough initial on-hand resources. At best, it will take a considerable amount of time to obtain the resources to just stabilize the effects of a detonated IND. However, the plan incorporates both Department of Defense civil support teams and federal civilian assets, such as the Department of Energy's Radiological Assistance Program (RAP) teams in its response.²⁹⁷

The Chicago plan meets the criterion of feasibility. It predicts possible problems and addresses them through the tasks listed in the executive checklist. In addition, the plan recognizes that the detonation of an IND is significantly different than other crises and as such will need extensive outside resources and assets with special capabilities to

²⁹⁶ Ibid., 1.

²⁹⁷ Ibid., Appendix 1-7, 1-16.

respond. Furthermore, the plan lists compiled data similar to the southern California plan regarding the number of casualties, damaged zones, and cascading effects of critical infrastructure failures. This presents a realistic understanding of the likely circumstances that a region will face in the aftermath of an IND detonation. Together these examples succeed in meeting the measures of this criterion.

G. SUMMARY

The case studies presented are very similar despite concentrating on two different hazards. The southern California plan relies heavily on GIS, while the Chicago plan centers on the execution checklist. However, both appear to be based on the same underlying principle of capabilities-based planning. The next chapter will analyze the plans by further comparing and contrasting the common areas that make them exemplars of the thesis' evaluative criteria. Those sections of reciprocal merit will then be highlighting to further demonstrate examples of excellent catastrophe response planning.

THIS PAGE INTENTIONALLY LEFT BLANK

XII. CONCLUSIONS BASED ON EVALUATION OF THE CASE STUDIES

A. EVALUATION

Each of the case studies follows the evaluative criteria established in Chapter VI of the thesis. The criteria was developed using measures from the federal government, private non-profit associations, and academia. This diverse grouping of sources from which the criteria were derived ensures a well-balanced assessment of the federally coordinated response plans presented in the case studies.

The southern California plan addresses a natural occurring catastrophe while the Chicago plan prepares for a man-caused event. Therefore, the structures of the plans differ significantly, yet they have several commonalities that make them exemplars of vertically synchronized, intergovernmental, catastrophe, response plans. This chapter assesses the positive aspects of the plans and areas for further research and improvement.

The foundation of the southern California plan is based extensively on the analysis of geographic information systems (GIS). The application of GIS works well for this plan because of the fixed nature of the hazard posed. The location of the San Andreas fault combined with historic perspectives and scientific models of regional earthquake activity make GIS a logical medium to center the plan around. This has led to the development of the concept of priority response areas (PRA).

These PRAs are based on shake magnitude, population concentrations and structural density. By pre-designating these areas, first responders know where to concentrate their efforts regardless if they have communications with higher commands or lateral units. This same methodology can be utilized for different applications. The two variables of population concentration and structural density are universal to almost any catastrophe. The third variable of shake magnitude from the California case study can be altered to different hazards, such as river and tributary flooding, the inland distance and height of a tsunami induced wave, or explosive blast proximity.

The major component of the Chicago IND plan is the execution checklist. This functional matrix chronologically lists tasks, pre-determined by stakeholders, that are essential to a successful response to the detonation of an IND. Since the tasks have been agreed upon, this allows for its immediate use at the onset of a crisis. An additional benefit of the pre-established execution checklist is that the sequence of the tasks is synchronized so they complement and build upon each other. Furthermore, they can be implemented without direction from higher command in the event communications are lost, as is expected in this scenario. The structure of the Chicago plan clearly has applications to other catastrophes and important concepts that should be replicated in other response plans.

The difference in the plans is indicative of the criterion of flexibility. Although counter to Quarantelli's recommendation that response plans not be agent specific, the two different formats validate the necessity of adaptability in response plans. Emergency planners should first attempt to identify the likely hazards that could impact their communities. If they are not prone to any natural disasters, then industrial accidents, critical infrastructure failures, and/or acts of terrorism should be examined. Planners must then consider the best planning framework for the threat or hazard they are preparing for in order to implement the most effective response.

B. UNIVERSAL PLANNING APPLICATIONS

The case studies also provide important lessons learned for universal catastrophe response planning. Many of the features of each of the plans are valid, even in regions that do not have predictable catastrophes. The "hub and spoke" concept of pre-designated, established, and stocked staging and supply areas are essential to any catastrophe response. Having them co-located or near planned routes of ingress is also an important factor that is incorporated into both plans. This should not be limited to roadway access but should include multiple modes of transportation to include railways, airports, and seaports.

This leads to the determination of pathways and end points for supply or resupply. In addition, this includes identifying potential shelters and places survivors traditionally

congregate for assistance after a catastrophe, such as stadiums, arenas, and schools. Staging areas and base camps for incoming resources, rescue workers, and volunteers also need to be considered ahead of a catastrophic event as they have in the case studies.

Additional commonalities of both case studies that are fundamental to the development of future plans are their tracking and accounting of baseline regional, pre-event demographics and infrastructure. As mentioned above, the key elements used in determining PRAs include elements such as population concentrations, structural density, and hazard vulnerability. An understanding of a region's critical infrastructure and the most critical links and nodes of the individual system are essential to predetermine and harden from a potential hazard if possible. Interdependencies of each sector's systems and its impact on a response plan's priorities are also a major learning point from both of the plans presented.

Both plans also make extensive use of scientific, evidence, and data-based information in their development. Having quantifiable statistics concerning the numbers of potential injured casualties, fatalities, damaged structures, and amount of debris for the most likely threats provides the basis to start planning. It also establishes an understanding of the magnitude and scope for stakeholders, planners, and emergency responders. This important function is supported by Quarantelli's criterion that plans recognize that disasters are both quantitatively and qualitatively different from other types of crises.

This type of data assists in establishing resource needs for the response and mitigation of the after effects of a catastrophe. Both plans identify the potential consequences of the respective threats on the current, local inventories of emergency response resources, and critical infrastructure. The Chicago IND plan even calculates the anticipated loss of vital commodities, such as fuel and water, to the immediate affected area and the surrounding region. Based on these predicted losses, the Chicago IND plan then tries to gauge the additional amount of commodities needed to make up for the deficiencies; not only to sustain survivors but also to support the influx of first responders and their life saving missions. This level of specificity prepares for worst-case scenarios and shows an exceptional level of detail of the cascading effects catastrophes create.

Therefore, a finding as a result of the research of this thesis is that data, scientific and/or evidence based information are important factors in catastrophe planning and must be integrated into a catastrophe response plan. These quantitatively and qualitatively defensible details should expand upon and be incorporated into Quarantelli's principle that the best social science be used as an integral part of the development of a catastrophe plan. The advent of "big data" and the resulting scientific principles should be a modern addition to the decades-old and proven 10 principles of disaster planning.²⁹⁸

Both plans address the capabilities or skills needed, such as firefighting, USAR, and radiation sickness medical specialists. The Chicago plan, also expounds upon the quantity of needed vital commodities in the aftermath of an IND detonation. Furthermore, each plan also calculates the losses of essential resources and the additional capacity needed to supplant these losses and mitigate the multitude of subsequent hazards and support life sustaining needs.

Historically, this additional capacity will come in the form of federal assets or from voluntary intrastate memorandums of agreement or interstate Emergency Management Assistance Compact (EMAC) requests. Presumably, this is where each plan assumes the additional capacity that is needed to respond to each of the respective scenarios presented will come from; because it is not fully addressed in either plan. The researched literature uses the term capability to describe both the necessary skills and additional quantity of resources. However, there is a marked distinction between capability and capacity. As Figure 4 demonstrates, rapidly mobilizing emergency service and other resources is extremely problematic in the initial stages of a catastrophic incident.

²⁹⁸ Quarantelli, *Research Based Criteria for Evaluating Disaster*, 4.

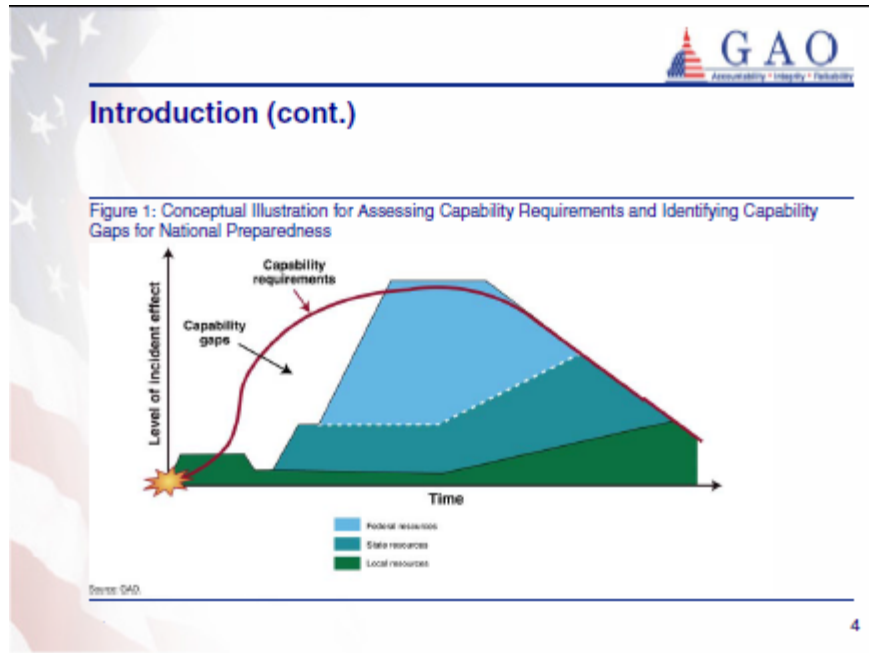


Figure 3. Conceptual Illustration for Assessing Capability Requirements and Identifying Capability Gaps for National Preparedness²⁹⁹

Therefore, defined skills or abilities—capability versus the amount of those resources needed—capacity should be defined and calculated separately. For example, the military may have the most capable, small unit, special operations team, yet it does not have the capacity to assault an enemy division. The next section of this chapter makes recommendations to remedy or enhance the essential issue of ensuring needed capacity.

C. RECOMMENDATIONS

Several recommendations emerged based as a result of the author’s research and experience, several recommendations emerged. These include adapting current federal task force models for catastrophe planning and reforming grant funding to address the gap in emergency service resource *capacity* dedicated to national catastrophe response.

²⁹⁹ Government Accountability Office, *FEMA Has Made Limited Progress in Efforts to Develop and Implement a System to Assess National Preparedness Capabilities*, 2010, <http://www.gao.gov/new.items/d1151r.pdf>, 4.

1. Enhance the Emergency Management Assistance Compact Processes

The catastrophic scenarios presented in both of the case studies calculate an enormous number of casualties, physical destruction, and collapse of critical infrastructure. The unpredictable timing of an IND explosion or of a strong magnitude earthquake in major metropolitan areas demonstrates the need to have resources pre-identified and to deploy on short notice before an incident occurs.

The present national emergency resource request and allocation system is the EMAC. EMAC is a national interstate mutual aid agreement among all 50 states and several of the United States' territories to provide assistance and resources in the event of a disaster declared by a governor. According to the compact:

Once the conditions for providing assistance to a requesting state have been set, the terms constitute a legally binding contractual agreement that makes affected states responsible for reimbursement. The EMAC legislation solves the problems of liability and responsibilities of cost and allows for credentials, licenses, and certifications to be honored across state lines.³⁰⁰

It is administered by the National Emergency Managers' Association (NEMA), a group started among state emergency officials in 1974 to exchange information and coordinate operations. EMAC works in conjunction with FEMA's federal disaster response system to provide state-to-state assistance when it appears a disaster is going to be declared.

States usually request personnel and resources in the wake of disasters through their emergency management agencies. This process can be quite bureaucratic. First, the impacted state makes an EMAC request for specific needed resources, which is then retransmitted to other state emergency management agencies to see if they can fill the order. State emergency management agencies fill the request at the state level or poll local jurisdictions to see if they can meet the request. If a state or one of its county or municipalities can fill an order for resources or personnel, that jurisdiction must calculate the financial costs associated with deploying them. This is forwarded to the requesting

³⁰⁰ "Emergency Management Assistance Compact (EMAC)," <http://www.emacweb.org/index.php/learnaboutemac/what-is-emac>, 1.

state to compare against other incoming proposals so they can accept the ones that best meet their needs. Besides financial costs, states consider variables such as FEMA typing (level of capability), response time and others. Even though the process can be bureaucratic, EMAC has developed a system that expedites this process.

Mission ready packages (MRP) identify resources that are pre-established and entered into the EMAC system, indicating they are ready for deployment. The essential information needed for a state to consider and accept a resource to respond to a catastrophe, including FEMA type, related costs, deployment time, and location, are already calculated and are loaded in the EMAC system. By doing so, these agencies indicate they are ready for immediate consideration by states in need of their services.³⁰¹ EMAC still needs to insure the listed resource is available from the participating jurisdiction and the requesting agency still needs to formally accept. While this does speed up the resource ordering process, additional procedures can be added to further reduce response times and add national capacity.

EMAC should institute a fourth operations level, Level 4, to its existing three levels.³⁰² The current three levels are not activated until the onset of an emergency (see Figure 5). This new fourth level would provide a daily, around-the-clock operational watch desk. During this Level 4 phase, EMAC would electronically check on the status of mission ready packages from across the country to affirm their availability, deployment status, and any changes in their EMAC criteria at least once in a 24-hour period. A steady state operational status report would be made available of all the emergency response assets that states and other municipalities have available and can deploy on short notice. This is similar to what fire departments across the country do each and every day and on a national level what the Department of Defense does through the

³⁰¹ “EMAC—Emergency Management Assistance Compact: Frequently Asked Questions About MRPs,” 2015, <http://www.emacweb.org/.index.php/learnaboutemac/module-positions/mission-ready-package>, 1.

³⁰² Emergency Management Assistance Compact (EMAC),” 23.

Defense Readiness Reporting System (DRRS) to track and account for its available resources.³⁰³

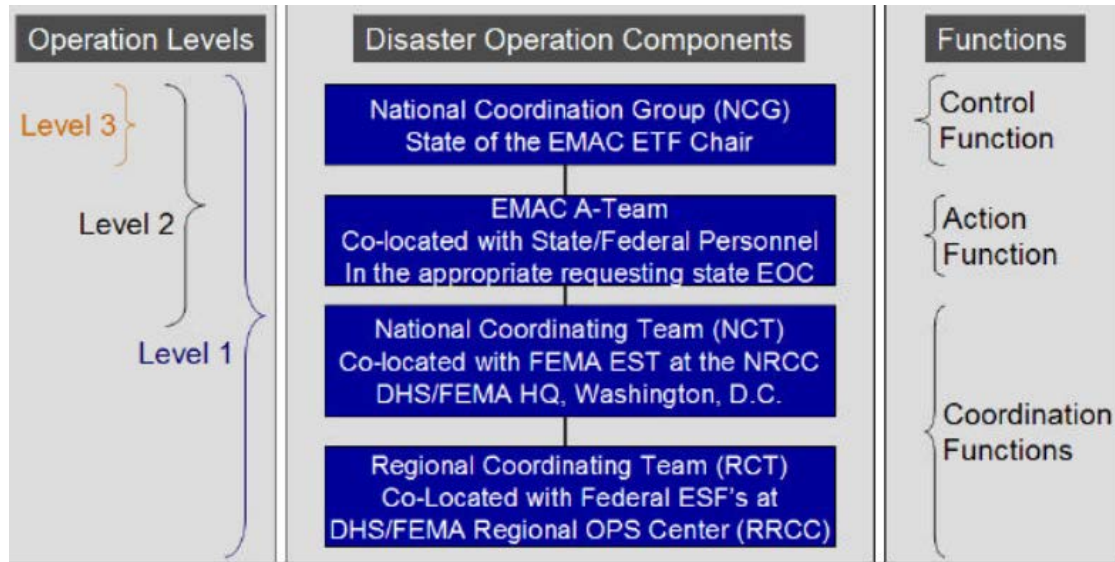


Figure 4. Current EMAC Operation Levels³⁰⁴

Having EMAC account for emergency response assets on a daily basis not only would create a common operating picture of what is immediately available in times of crisis, it also would establish a larger picture as to the overall capability and capacity for national emergency response. Utilizing this system, resource gaps could then be better identified and programs to improve national or regional capability, and capacity could be developed. The resource gaps identified by instituting this system could be addressed by Congress through DHS by modifying its grant structure and the terms in which funding for resources are allocated. This will be expanded upon later in the chapter.

³⁰³ Laura J. Junor, "The Defense Readiness Reporting System: A New Tool for Force Management," *Joint Force Quarterly*, no. 39 (October 2005): 30, www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA479857

³⁰⁴ Federal Emergency Management Agency, *EMAC—Emergency Management Assistance Compact: EMAC Overview*, August 2006, <http://www.fema.gov/media-library-data/20130726-1726-25045-0915/060802emac.pdf>, 23.

2. Build National Capacity through a County Based System

The above recommended changes to the EMAC system are just one way to help determine where the gaps strategically lie in national catastrophe preparedness. Each state, or at a minimum, each FEMA region should have a baseline of assets that are capable of handling the Department of Homeland Security’s “core capabilities” for its largest populations. Additionally, states should also be ready to mitigate likely large-scale natural disasters for their area of operations and be able to contribute to the benchmarks of the meta-scenario.

In order to ensure there is adequate national capacity, a county-based resource system should be implemented. There are 3141 counties or their equivalents throughout the United States, not including the American territories.³⁰⁵ If each of these contributed a mission ready package in just the three primary emergency functions of police, fire, and emergency medical services, this would be a tremendous, cumulative force multiplier in terms of nationwide capacity.

By having each county in the country designate a FEMA typed ambulance strike team (five ambulances), it would result in 15,705 ambulances and crews. A fire task force from each county or equivalent consisting of two engines, one truck, a rescue squad, and a chief officer would exponentially increase fire and rescue services to a catastrophe zone. Likewise, a law enforcement deployment team (LEDT) or strike team consisting of 26 officers (a team leader—lieutenant), five supervisors (sergeants), and 20 officers from each county or equivalent would provide a potential surge of up to 81,666 police officers.

While this constitutes a significant increase in capacity for any catastrophe, it is important to remember that these numbers of resources would be needed for 24 hours per day operations for a sustained period up until and into the recovery phase of a prolonged and complex incident. This would be a “win-win” situation for the counties or their equivalents and the nation. The counties would obtain these resources on a grant from the DHS. They would then be able to use them in their daily, day-to-day operations but

³⁰⁵ U.S. Geological Society, “How Many Counties Are There in the United States?,” April 4, 2008, <http://gallery.usgs.gov/audios/124#.VN4Y0iyxUYs>, 1.

would be legislatively mandated to register them as MRP assets and rapidly respond with them when requested. However, this would require a change to the current grant structure.

The comparison study of New Zealand's Ministry of Civil Defense and Emergency management (MCDEM) emphasizes the need to view homeland security from a bottom-up perspective, while taking into consideration a holistic and strategic national planning framework—the end goal of which is to be able to mitigate the largest anticipated catastrophes that will require a coordinated national response. The next section proposes changes to the homeland security grant conditions that would support the above recommendations.

3. Restructuring Federal Grant Funding

The concept of restructuring DHS grant funding based on national preparedness needs is not new. It was advocated relatively shortly after the September 11, 2001 attacks. The 2003 report *Emergency Responders: Drastically Underfunded, Dangerously Unprepared*, produced by an independent task force sponsored by the Council on Foreign Relations, concludes, “Congress should work to establish a system of distributing funds based less on politics and more on threat.³⁰⁶” It also recommends, “States should develop a prioritized list of requirements in order to ensure that federal funding is allocated properly and quickly to achieve the best possible return on investments.³⁰⁷”

However, this must be balanced with the scope of catastrophe resource response gaps and allocations nationally. Although states and localities frequently identify needs within their own communities, a more comprehensive approach based on meeting a nationwide catastrophic event is necessary. Also, from the national perspective, resources need to be distributed not only by the type and level of threat but to those locales outside of areas expected to be impacted by catastrophes so the necessary resources will be unaffected by the very catastrophes where they will be deployed. Federal grant funding should be incentivized and offered to each county to provide a mission ready package in

³⁰⁶ Metz, Rudman, and Clarke, *Emergency Responders*, vi.

³⁰⁷ *Ibid.*, vii.

each of the primary emergency response disciplines as previously outlined. Currently, most resources funded by federal DHS grant funds are not required to provide assistance outside of their immediate areas.³⁰⁸ Under new guidelines, resources purchased with federal grant funds would be legislatively obligated to report as part of a mission ready package and would mandatorily respond to EMAC requests, similar to the New Zealand CDEM groups.

Counties that could only partially commit due to staffing levels would receive pro-rated funding. Jurisdictions that volunteer to obtain and sustain resources beyond the basic police, fire, and EMS mission ready packages or agree to fill regional gaps in certain specialized capabilities would further be compensated through the grant process. However, the key is distinguishing those resources that would enhance the *national* capacity and capability shortages and not just a resource that supplants local funding or provides a limited advantage outside the immediate area where it is stationed. Otherwise, as the independent task force concluded, “Investments in enhancing emergency responder capabilities, therefore, will be lost if they are not integrated into a larger national strategy for meeting broader homeland security needs.”³⁰⁹ Although similar to the New Zealand MCDEM comparison presented, this policy recommendation balances the need for a legislatively mandated response of local resources while respecting states’ rights and the United States’ federalist system of government.

The recommendations outlined thus far in this chapter will enhance capacity and capability. They are based on the extensive forecasted resource needs for each of the catastrophes outlined in the case studies and the positive after action reviews of the CDEM plan in response to the 2011 Christchurch, New Zealand earthquake. The following recommendation will build intergovernmental collaboration and will especially help in those regions where this is difficult to achieve due to limited staffing or funding. Not all jurisdictions have the ability to collaboratively engage and develop comprehensive response plans as those presented in the case studies.

³⁰⁸ Federal Emergency Management Agency, “FEMA—FY 2013 Homeland Security Grant Program (HSGP),” accessed May 24, 2014, <https://www.fema.gov/fy-2013-homeland-security-grant-program-hsgp-0>

³⁰⁹ Metzl, Rudman, and Clarke, *Emergency Responders*, 12.

4. Joint Catastrophe Planning Teams

In order to encourage collaboration among local, state, and FEMA regions, the federal government can adopt a model based on the New Zealand CDEM groups and adapted from federally funded task forces. Law enforcement examples of these types of task forces include joint terrorism task forces (JTTF), and high intensity drug trafficking area (HIDTA) task forces. These task forces are organized by a primary federal agency that then requests local police departments to participate by providing officers who become federally deputized and work on the task forces. Some of the officers' expenses, such as partial salary reimbursement, overtime, certain equipment, and vehicles, are often provided by the sponsoring federal law enforcement agency.³¹⁰

This allows for the paring of the resources of the federal government in terms of finances, technology, equipment and local law enforcement organizations' intimate knowledge of their jurisdictions. FEMA funded urban search and rescue (USAR) task forces are perfect examples of this model outside the law enforcement realm. The USAR task forces receive federal funding for their extensive equipment caches and are reimbursed for their training hours and time while deployed to actual events.³¹¹ The local departments that host the task forces gain highly technical capabilities and real-life experience. In turn, the USAR task forces are expected to deploy when given a task order to assist anywhere in the country and frequently overseas when requested and arranged through the Department of State.

Another example is an incident management team (IMT). IMTs are already established groups of homeland security and emergency management professionals from local departments representing multiple disciplines who are well versed in the Incident Command System (ICS). They often receive federal funding to regularly train and prepare to respond to significant large scale disasters and national catastrophes.³¹² Once

³¹⁰ Drug Enforcement Agency, "DEA Programs: State & Local Task Forces," 2014, <http://www.dea.gov/ops/taskforces.shtml>

³¹¹ Federal Emergency Management Agency, "Urban Search & Rescue Participants," July 24, 2014, <https://www.fema.gov/urban-search-rescue-participants>

³¹² U.S. Fire Administration, "Incident Management Team Professional Development and Training," 2014, <http://www.usfa.fema.gov/training/imt/>

on site, the IMT structures the incident's response utilizing the ICS framework and manages the resources needed to mitigate the incident.

The IMTs are presently designed to be reactive to situations. However, because of the experience and make-up of their staffing, they would be the ideal group to adapt or recruit from to form proactive catastrophe contingency planning groups. Using the law enforcement task force model, FEMA would assign a permanent staff at the state level from the regional office to coordinate the team and represent federal strategic interests and perspectives.

Similar to the CDEM groups, a core number of IMT members from across a state would then be assigned to these newly formed joint catastrophe planning teams (JCPT) to identify the likely regional hazards they will face and develop contingency plans for them. After the plans are developed, the JCPT will identify any gaps in resources needed to execute the plans. Next, they will develop coordination arrangements such as memorandum of agreements (MOA) or work on obtaining the needed resources in an all-inclusive, coordinated manner, rather than disparate smaller entities vying for the same grant funding.

The IMT members assigned to the JCPT would then introduce the plans back to the rest of the IMT members. This emulates the CDEM groups and their contribution to the national CDEM plan presented in the New Zealand MCDEM comparison study. The IMT would then gear its training and responses toward the state plan created by the JCPT. The JCPT's plan would then be incorporated into the applicable FEMA region's plan and eventually into the *National Response Plan*, thus bridging the hometown security and homeland security divide.

D. CONCLUSION

The evident gap between the federal and state and local governments in terms of catastrophe planning is well recognized. Although this is a complex issue, many of the building blocks needed to successfully create a solution already exist. Streamlining the EMAC system and increasing its readily deployable inventory will enhance readiness. Having Congress reform the current grant structure will develop incentives for state and

local agencies to maintain resources that enhance national capabilities and capacities at the county based level. Moreover, adapting the federal task force models will provide a vehicle for intergovernmental collaboration. Finally, continuing with the initiatives and partnerships the FEMA regional offices have developed to create response plans, like those in the case studies, are essential to bridging the gap between state and local governments and the hierarchy of the DHS.

Collectively, these recommendations will increase collaboration by bolstering relationships across all levels of government. Grant funded resources will be able to rapidly deploy to catastrophes and will mutually benefit the local region on a daily basis and the nation in time of a catastrophe. The fusion of local and federal emergency management professionals that follow the criteria established earlier in this thesis will produce catastrophe response plans that are significant to all stakeholders' perspectives, needs and requirements. As a result, these proposals will merge hometown security with homeland security resulting in a safer and more resilient nation.

LIST OF REFERENCES

- Baca, Anna Marie. "History of Disaster Legislation." *FEMA—On Call: Disaster Reserve Workforce News* (September 2008): 1. <http://www.fema.gov/pdf/dae/200809.pdf>.
- Brandt, Larry D. and Ann S. Yoshimura. *Analysis of Sheltering and Evacuation Strategies for a Chicago Nuclear Detonation Scenario*. Livermore, CA: Sandia National Laboratories, 2011. <https://nige.files.wordpress.com/2011/12/brandt-and-yoshimura.pdf>.
- Brown, Jared T. *Presidential Policy Directive 8 and the National Preparedness System: Background and Issues for Congress*. Washington, DC: Congressional Research Service, 2011. <http://fas.org/sgp/crs/homesecc/R42073.pdf>.
- Caudle, Sharon. "Homeland Security: Advancing the National Strategic Position." *Homeland Security Affairs* VIII (August 2012): 1–17.
- Cheng, Derek. "Christchurch Earthquake: Search Teams Leaving No Stone Unturned." *The New Zealand Herald*, February 28, 2011. Accessed March 31, 2014. http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10709161.
- Coburn, Tom. *Safety at Any Price: Assessing the Impact of Homeland Security Spending in U.S. Cities*. Washington, DC: Homeland Security and Governmental Affairs Committee, 2012. <https://info.publicintelligence.net/SenatorCoburn-UASI.pdf>.
- Davis, Paul K. *Analytical Architecture for Capabilities-based Planning, Mission-System Analysis, and Transformation*. Santa Monica, CA: RAND National Defense Institute, 2002. http://www.rand.org/content/dam/rand/pubs/monograph_reports/2005/MR1513.pdf.
- Emergency Management Accreditation Program. *The Emergency Management Standard*. Lexington, KY: The Emergency Management Accreditation Program, 2013. <http://www.emaponline.org/>
- Federal Emergency Management Agency. *The Comprehensive Preparedness Guide 101*. Version 2.0. Washington, DC: Federal Emergency Management Agency, 2010.
- . *EMAC—Emergency Management Assistance Compact: EMAC Overview*. August 2006. <http://www.fema.gov/media-library-data/20130726-1726-25045-0915/060802emac.pdf>.

- Federal Emergency Response Agency Region V. *Integrated Improvised Nuclear Device Response Plan City of Chicago, County of Cook, State of Illinois and FEMA Region V*. Washington, DC Federal Emergency Response Agency Region V, 2012.
- Federal Emergency Management Agency Region X. *Multi-Year Training and Exercise Plan, Fiscal Years 2013–2015: Federal Emergency Management Agency Region X*. Washington, DC: Federal Emergency Management Agency, Region X, 2012. http://www.ak-prepared.com/Preparedness/Training/Documents/Final_RX_MYTEP_2012.pdf.
- Federal Emergency Management Agency Region IX, and the California Office of Emergency Services. *Southern California Catastrophic Earthquake Plan*. 2010. [http://www.caloes.ca.gov/PlanningPreparednessSite/Documents/SoCalCatastrophicConops\(Public\)2010.pdf](http://www.caloes.ca.gov/PlanningPreparednessSite/Documents/SoCalCatastrophicConops(Public)2010.pdf).
- The Fifth Annual Report to the President and the Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction, V. Forging America's New Normalcy: Securing Our Homeland, Preserving Our Liberty*. Arlington, VA: RAND Corporation, 2003. http://www.rand.org/content/dam/rand/www/external/nsrd/terrpanel/volume_v/volume_v.pdf.
- Franklin, Daniel. "The FEMA Phoenix." *Washington Monthly*, July 2005. <http://www.washingtonmonthly.com/features/2005/0509.franklin.html>.
- Freed, Judson M. "No Failure of Imagination: Examining Foundational Flaws in America's Homeland Security Enterprise." Master's thesis, Naval Postgraduate School, 2011.
- Gniady, Lisa Noel. *Bridging the Gap: Department of Defense's Planning for Domestic Disaster Assistance*. Leavenworth, KS: U.S. Army Command and General Staff College, 2008. <https://www.hsdl.org/?view&did=728985>.
- Government Accountability Office. *FEMA Has Made Limited Progress in Efforts to Develop and Implement a System to Assess National Preparedness Capabilities*. 2010. <http://www.gao.gov/new.items/d1151r.pdf>.
- Hapgood, Mike. *Space Weather: It's Impact on Earth and Implications for Business*. London: Lloyd's, 2010. http://www.lloyds.com/~media/lloyds/reports/360/360%20space%20weather/7311_lloyds_360_space%20weather_03.pdf#search=%27space%20weather%27.

- Ian McLean Consultancy Services, Ltd. *Review of the Civil Defense Emergency Management Response to the 22 February Christchurch Earthquake*. Christchurch, New Zealand: Ian McLean Consultancy Services Ltd, 2012. http://static1.squarespace.com/static/5006875e24ac21f35d8de8d2/t/51624a1fe4b080e511781833/1365395999422/ReviewOfTheCDEMResponseTo22FebChchEarthquake_Final+Report_4+July+2012.pdf.
- Isakov, Alexander. "Clinical and Systems Preparedness." Presented at Joint Counterterrorism Awareness Workshop, Washington, DC, December 2013.
- Ithier, Jan. "Synchronizing Federal Operational Planning for National Catastrophes." Master's thesis, Naval Postgraduate School, 2010.
- Junor, Laura J. "The Defense Readiness Reporting System: A New Tool for Force Management." *Joint Force Quarterly*, no. 39 (October 2005): 30–33. www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA479857.
- Marghella, Pietro, Adam Montella, and William Josko. "Dump the 3-Ring Binders: Changing the Paradigm for Enhanced Preparedness and Response." http://www.academia.edu/3595570/Dump_the_3-Ring_Binders_Changing_the_Planning_Paradigm_for_Enhanced_Preparedness_and_Response.
- Maryland Emergency Management Agency. *State of Maryland 2015–2016 Multi-Year Training and Exercise Plan*. Reisterstown, MD: Maryland Emergency Management Agency, 2015. <https://news.maryland.gov/mema/wp-content/uploads/sites/7/2015/01/2015-2016-Multi-Year-Training-and-Exercise-Plan-Approved.pdf>.
- McEntire, ed., David A. *Comparative Emergency Management: Understanding Disaster Policies, Organizations, and Initiatives from Around the World*. Washington, DC: Federal Emergency Management Agency. <https://training.fema.gov/hiedu/comparative%20em%20book%20-%20introduction%20chapter.doc>.
- . *Disciplines, Disasters and Emergency Management*. Charles C. Thompson Publishers Ltd. Springfield, IL, 2007.
- McEntire, David A. and Chris Webb, *Emergency Management in New Zealand: Potential Disasters and Opportunities for Resilience*. Washington, DC: Federal Emergency Management Agency, 2008. <https://training.fema.gov/hiedu/downloads/compemgmtbookproject/comparative%20em%20book%20-%20chapter%20-%20em%20in%20new%20zealand.doc>.

- Metzl, Frederic, Jamie, Warren B. Rudman, and Richard A. Clarke. *Emergency Responders: Drastically Underfunded, Dangerously Unprepared: Report of an Independent Task Force Sponsored by the Council on Foreign Relations*. New York: Council on Foreign Relations, 2003.
- Morag, Nadav. *Comparative Homeland Security: Global Lessons*. 1st ed. Hoboken, NJ: Wiley, 2011.
- National Intelligence Council. *Global Trends 2025 a Transformed World*. Washington, DC: National Intelligence Council, 2008. http://www.dni.gov/nic/PDF_2025/2025_Global_Trends_Final_Report.pdf.
- . *Global Trends 2030: Alternative Worlds*. Washington, DC: National Intelligence Council, 2012. <https://publicintelligence.net/global-trends-2030/>.
- National Fire Protection Association. *NFPA 1600, Standard on Disaster/emergency Management and Business Continuity Programs*. Quincy, MA: National Fire Protection Association, 2013.
- Nebraska Emergency Management Agency, and Federal Emergency Management Agency Region VII. “Nebraska Multi-Year Training and Exercise Plan 2012–2015 (MYTEP).” Washington, DC: Nebraska Emergency Management Agency, and Federal Emergency Management Agency Region VII, 2011. http://www.nema.ne.gov/pdf/training/mytep_19dec11.pdf.
- New Zealand Ministry of Civil Defence and Emergency Management. *National Civil Defence Emergency Management Strategy*. Wellington, New Zealand: New Zealand Department of Internal Affairs, 2008. <http://civildefence.govt.nz/assets/Uploads/publications/national-CDEM-strategy-2008.pdf>.
- Oregon Military Department. Office of Emergency Management, *State of Oregon Cascadia Subduction Zone Catastrophic Earthquake and Tsunami Operations Plan*. Salem, OR: Oregon Military Department, Office of Emergency Management, 2010. http://www.oregon.gov/OMD/OEM/plans_train/docs/CSZ/1_csz_plan_final.pdf.
- Preusse, Paul. “Mega City/Mega Disaster Reduction.” Presented at National Center for Research on Earthquake Engineering Conference, Taipei, Taiwan, May 2014. <http://conf.ncee.org.tw/Proceedings/0-I0990506/06%20Concurrent%20Working%20Group%20Discussions/Bio%20&%20Position%20Papers/Preusse%20Paul.pdf>.
- Quarantelli, Enricho L. *Research Based Criteria for Evaluating Disaster Planning and Managing*. Newark, DE: University of Delaware, 1997. http://www.nifv.nl/upload/179144_668_1168610952796-quarantelli-1998.pdf.

- State of Florida, Division of Emergency Management. *State of Florida, Division of Emergency Management (FDEM) 2013–2015 Multi-Year Training and Exercise Plan (MYTEP)*. Tallahassee, FL: State of Florida, Division of Emergency Management, 2013.
- State of Missouri, and Federal Emergency Management Agency Region VII. *New Madrid Seismic Zone Joint Missouri Response Operations Plan*. State of Missouri, and Federal Emergency Management Agency Region VII, 2011. <https://www.llis.dhs.gov/sites/default/files/NewMadridSeismicZonePlan.pdf>.
- Stripling, Mitch. *Managing Chaos: The Disaster Planner's Handbook in Eight Parts*. New York: New York City Department of Health and Mental Hygiene, 2013. <http://www.nyc.gov/html/doh/downloads/pdf/em/mc-disaster-handbook.pdf>
- Tussing, Bert B. *Implementing a New Vision: Unity of Effort in Preparing for and Responding to Catastrophic Events*. Issue paper 2–11. Fort Leavenworth, KS: Center for Strategic Leadership, U.S. Army War College, 2011.
- U.S. Department of Defense. *Quadrennial Defense Review*. Washington, DC: Department of Defense, 2010. http://www.defense.gov/QDR/images/QDR_as_of_12Feb10_1000.pdf.
- U.S. Department of Homeland Security. *Homeland Security Exercise and Evaluation Program (HSEEP)*. Washington, DC: U.S. Department of Homeland Security, 2013. http://www.fema.gov/media-library-data/20130726-1914-25045-8890/hseep_apr13_.pdf.
- . *The National Preparedness Goal*. Washington, DC: U.S. Department of Homeland Security, 2011.
- . *National Preparedness Guidelines*. Washington, DC: U.S. Department of Homeland Security, 2007. http://www.fema.gov/pdf/emergency/nrf/National_Preparedness_Guidelines.pdf.
- . *National Response Framework*. Washington, DC: U.S. Department of Homeland Security, 2008.
- . *Quadrennial Homeland Security Review Report*. Washington, DC: U.S. Department of Homeland Security, 2010. <http://www.dhs.gov/sites/default/files/publications/2010-qhsr-report.pdf>.
- . *Target Capabilities List: A Companion to the National Preparedness Guidelines*. Washington, DC: U.S. Department of Homeland Security, 2007. <http://www.fema.gov/pdf/government/training/tcl.pdf>.

- U.S. Department of Homeland Security, Federal Emergency Management Agency Region IX, and California Governor's Office of Emergency Services. *California Cascadia Subduction Zone Earthquake and Tsunami Response Plan*. U.S. Department of Homeland Security, Federal Emergency Management Agency Region IX, and California Governor's Office of Emergency Services, 2013. <http://www.calema.ca.gov/PlanningandPreparedness/Pages/Catastrophic-Planning.aspx>.
- Utah Division of Homeland Security. *Multi-Year Training and Exercise Plan: Utah Department of Public Safety, Division of Homeland Security*. Salt Lake City, UT: Utah Division of Homeland Security, 2010. http://dem.utah.gov/wp-content/uploads/sites/18/2015/02/Utah_MYTEP_Final2011-2013rev1.pdf.
- Washington Military Department, Emergency Management Division. *State of Washington, 2013–2015 Training and Exercise Plan*. Camp Murray, WA: Washington Military Department, Emergency Management Division, 2012.
- White House, *Presidential Policy Directive 8-National Preparedness*. Washington, DC: White House, 2011. <http://www.dhs.gov/xlibrary/assets/presidential-policy-directive-8-national-preparedness.pdf>.
- Woolley, John, and Gerhard Peters. "Franklin D. Roosevelt, XXXII President of the United States: 1933–1945. 52—Executive Order 8757 Establishing the Office of Civilian Defense. May 20, 1941." American Presidency Project. Accessed May 17, 2014. <http://www.presidency.ucsb.edu/ws/index.php?pid=16117>.
- Wombwell, James A. *Army Support during the Hurricane Katrina Disaster*. Occasional paper 29. Fort Leavenworth, KS: Combat Studies Institute, 2009. <http://usacac.army.mil/cac2/cgsc/carl/download/csipubs/wombwell.pdf>.
- Wormuth, Christine E. *Managing the Next Domestic Catastrophe: Ready (or Not)?: A Beyond Goldwater-Nichols Phase 4 Report*. Washington, DC: CSIS Press, 2008.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California